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Libraries and Information Centers
Conference Series

**MANAGING RESOURCES IN A SEA OF CHANGE:
Proceedings of the 27th Annual Conference of the
International Association of Aquatic and Marine Science
Libraries and Information Centers (IAMSLIC)
and the
9th Conference of the
European Association of Aquatic Sciences
Libraries and Information Centres (EURASLIC)**

Editors:

James W. Markham, David J. Hyett & Andrea L. Duda



Joint IAMSLIC/EURASLIC Conference held 14-19 October, 2001
at Brest, France

Conference Organizers:

Susan S. Berteaux (IAMSLIC), Joan Baron Varley (EURASLIC) & Marthe Melguen (IFREMER)

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INTRODUCTION

Susan S. Berteaux

Conference Convener IAMSLIC/EURASLIC 2001

IAMSLIC President 2001-2002

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Welcome to the Proceedings of the Joint 27th Annual IAMSLIC Conference and the 9th EURASLIC Conference held in Brest, France, October 14-18, 2001. The focus of the Conference, "Managing Resources in a Sea of Change" is reflected in the diverse and dynamic work of our colleagues you will read about in these Proceedings. The first keynote speaker, John Akeroyd, spoke on the management of change in electronic libraries, touching on many of the issues addressed throughout the conference. Harald von Hielmcrone, our second keynote speaker, provided insight into the development of copyright within the European Union.

We manage our collections, staffing, fiscal, computing, and all library resources in a constant state of change. The papers, posters, reports, workshop and discussions in these proceedings describe how our colleagues deal with some of the changes they have encountered in managing collections, services, digital library projects, electronic journals, copyright, scholarly publishing, document delivery, resource sharing, access to information, and over-arching technology-related issues. The country reports, institution reports and lively discussion groups sharpen our awareness of how some of our colleagues manage libraries within various degrees of geographic, political and technological constraints.

I hope you will find the Proceedings informative and motivating.



INTRODUCTION BY THE EURASLIC PRESIDENT

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On behalf of Euraslic I would like to extend a very warm welcome to our colleagues from Iamslic, and to other participants who have travelled from further afield, to attend this second Joint Conference of Iamslic and Euraslic in Europe.

On behalf of Euraslic my thanks go to all those who have been involved in the preparations for this Joint Conference, and I extend special thanks to Susan Berteaux of Iamslic and Marthe Melguen of Ifremer whose considerable efforts are now finally coming to fruition.

I would also like to take this opportunity to thank Peter Pissierssens and the IOC for their continued support of Euraslic and for once again providing sponsorship for Euraslic nominated participants.

All of our lives are dominated by technology. We cannot escape from email, the internet, the world wide web; but whilst the papers and sessions at this conference almost all focus on some type or aspect of technology, let us also try and put technology aside for a few days and TALK to each other. Conferences are a marvellous opportunity for human networking, for establishing new contacts and making new friends. Whilst there will be ample opportunities to talk over coffee and lunches, we have included a number of interesting discussions sessions to be held in Room 1. They focus on information needs in Africa, Eastern Europe, and the Mediterranean. There is a special session for participants from Environment Libraries, and also a Panel Discussion on Institutional Leadership Roles and Opportunities. I encourage you to take the opportunity to share your thoughts and views in these sessions.

Once again, on behalf of Euraslic, welcome to Europe, Welcome to this Joint Conference, I hope that at the end of the week you will all go away enthused and refreshed with new ideas, useful contacts and new friends.



EDITOR'S CONFERENCE REPORT*

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The International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) and its affiliate, the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC) met for the 27th Annual IAMSLIC Conference and the 9th EURASLIC Conference in Brest, France, October 14-19, 2001. In attendance were 129 people from 43 countries, including 43 from France, 25 from U.S.A., mostly from California or Massachusetts, and 9 from England. Because this conference was in Europe, a number of Europeans were able to attend their first IAMSLIC Conference. Among countries represented were Australia, Belgium, Bulgaria, Croatia, Estonia, Germany, Iceland, Indonesia, Italy, Mexico, Mongolia, Philippines, Russia, South Africa, and Tanzania. Conference participants represented a great range of libraries, including one-person, marine-station libraries in isolated locations, academic and institutional libraries in developing countries, libraries in large research institutions, and large academic libraries.

Under the general theme "Managing Resources in a Sea of Change", following the opening reception on Sunday evening, there were 3 days of contributed and invited papers and panel discussions, as well as a session of brief oral summaries of posters displayed. Topics presented and discussed included current awareness, digital library projects, document imaging, and internet and intranet systems. A panel discussion on institutional leadership by librarians showed that many aquatic science librarians are very much involved in planning and leadership beyond the library and hold positions of influence, including chair of the university academic assembly; president of the state library association; and marine science vocabulary source for the OED.

A keynote speaker on managing resources spoke of the hybrid library, which manages both e-resources and books, emphasizing the value of metadata, and discussing the move from authentication to authorization, and the problems that license agreements have with remote users, noting that we now need systems that tell us as much about users as collections. Other invited speakers discussed copyright in the E.U.; e-journals in France; an experimental platform integrating network distribution of document searching functions, online full-text, and control of access and printing; and virtual libraries and business models in scholarly publishing. Other papers described library participation in a long-term monitoring project, in which the librarian provided metadata enrichment of the primary documents; a project mapping ASFA thesaurus terms to DDC; a large in-house document-imaging project; scholarly publishing and the fact that authors do not tend to distinguish between societal and commercial publishers when deciding where to publish; the digital divide, which includes physical, financial, cognitive, content and political aspects; academic information in southern Africa, and its relation to water, the key strategic resource of the whole area; and Avanti, the web-based "articles-on-demand" service at UCSD. Posters covered a range of topics, including various locally-developed databases; metadata resources; and an e-book survey, which concluded that at this time e-books offer very little of relevance for marine and freshwater science.

In sessions parallel to the main sessions, country and institution reports from Europe, Asia and Africa were also presented. A dominant theme for whole conference, as usual in this international group of librarians, many from isolated places, was resource sharing and networking. The week after my return home, I received a request from a UCSB researcher for an obscure German publication, so I sent a message to the

IAMSLIC Listserver. Within hours, I received four offers to send it to me, three of them from German librarians who had been in Brest at the conference.

On the fourth day the conference moved to IFREMER (Institut française de Recherche pour l'Exploitation de la Mer) (<http://www.ifremer.fr/francais/>) and CEDM (Centre de Documentation sur la Mer), where IFREMER scientists described their current research in biotechnology, geosciences, and resources exploitation of the deep sea. IFREMER is the largest oceanographic research center in France, and possibly Europe, with facilities at Brest, and in 23 other places in France and overseas. Experiments were described on the biotechnology of extremophiles, organisms living under high pressure and high temperature in the deep sea near hydrothermal vents. Scientists are investigating the possibilities of using extremophiles for bioremediation. Because of the difficulties in investigating these organisms in the deep sea (*in situ*) or in culture in test tubes (*in vitro*) many experiments are performed in computer simulation (*in silico*). Scientific information management and IFREMER computer facilities were also discussed and the director of CEDM gave a tour of the center's new building, due to open soon.

After 4 days of intense meetings, we had a day-long tour, first visiting Océanopolis (<http://www.oceanopolis.com/>), a very impressive aquarium that has become one of the prime tourist attractions in Brittany (Bretagne). The aquarium has separate sections for temperate, tropical and polar exhibits. Afterwards we visited various parts of Brittany, including the western edge of France at Pointe de Pen-Hir, and the medieval town of Quimper (*Kemper* in Breton), with interesting museums, architecture, and pottery. Brittany is obviously proud of being more Breton than French, with bilingual signs, Celtic music and art, and distinctive architecture. The people were friendly and helpful, even to those of us speaking fractured French.

Throughout the week we had great food and wine, at receptions, a splendid and sumptuous banquet, and many restaurants. The meetings were very successful and we came home with more information, and more friends added to personal networks.

The next IAMSLIC Conference will be held in October 2002 in Mazatlan, Mexico.

* Adapted from: Markham, J.W. (2001). "IAMSLIC/EURASLIC 2001: Brest, France." *Library Waves, UCSB Library: the Newsletter of the Employees of the Libraries at UC Santa Barbara* November/December 2001 [<http://www.library.ucsb.edu/libwaves/nov01/iamslc2001.html>].

WORKSHOP: PRESENTATIONS LIVE AND THROUGH THE WWW

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ABSTRACT: How to create a better presentation, supported with slides? This skill is applicable in situations like presenting a conference paper, teaching in general and library instruction in particular, proposing a research topic or a budget, and public speaking in general.

How to create slides by using only word processing software and a printer? Using the more dedicated program to create and maintain series of slides for presentations, Microsoft PowerPoint, in its most recent version (2000), you can

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- print these for distribution as a printed book or as more simple take-away handouts,
- make these also accessible through a web (an intranet or the WWW).
- In the web version of the presentations, active hyperlinks can be included easily and these can be checked by Microsoft Frontpage, together with the other parts of the web site.

The complexity of this type of software is growing. Hints and advice can be offered based on experience with these tools in the creation of educational materials in the areas of information technology and information retrieval, all included in a web site of more than 100 MB, with thousands of files and hundreds of hyperlinks, in teaching a course on this subject for postgraduate students in ecological marine management

(see <http://www.vub.ac.be/BIBLIO/nieuwenhuysen/courses/>)

You can find the most recent version of slides used in my presentation ABOUT presentations, in the format of a Microsoft PowerPoint 97 / 2000 show (.PPS file) online at
<http://www.vub.ac.be/BIBLIO/nieuwenhuysen/courses/chapters/present.pps>

THE MANAGEMENT OF CHANGE IN ELECTRONIC LIBRARIES

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Libraries are in a process of fundamental change brought about by radical developments in technology. This paper makes some assumptions as to how the future will look, addresses the barriers to increased use of technology and finally looks at what managers need to do to bring about these changes and reviews the relevant key issues.

“I have seen the future and brother it is murder”

“Things are gonna slide in all directions...”

Leonard Cohen: The Future

Introduction

My starting point in this discussion is the notion of the digital library which, despite much research and many scholarly articles remains ill-defined and illusive. I want to try and model the digital library and to that end will attempt to describe a generic model for any library. Peter Brophy, an eminent UK authority constructed a theoretical model which might apply to any library in a paper in 2000. He built upon what he refers to as - the common mission - to enable users to gain access to the information that they need (Brophy 2000). Brophy proposed - on the one hand a universe of information which is adequately organised and using metadata as a document surrogate and on the other, a universe of users sub-divided to specific user populations. The function of the library as he sees it is - through its core processes - is to bring these together. This is a highly mechanistic view and to some extent overlooks the subsidiary and associated roles of libraries, such as training and user support, which are likely to predominate as the core processes are effectively automated out of the system. But it is helpful in informing some of the functions a library needs to perform in the future. As Brophy says “libraries will be based on new paradigms of service and whilst traditional functions will not be discarded wholesale, libraries will be much more active participants in the exploitation and the organisation of information and knowledge”. So the point is not that the fundamental purpose of libraries is changing but that the relative importance of different functions, given a different context, is shifting.

Critical to the current generation of digital libraries has been the steady progress in computerisation of all or most aspects of library functions, beginning in the early 70s

with computerised library catalogues, and moving through the development of circulation systems, to the development of the integrated library systems which appeared in many advanced libraries towards the end of the late 70's and early 80's. These integrated systems use a single, software architecture to manage the core processes of libraries including cataloguing, circulation, acquisitions, and financial control and, with varying degrees, other associated but perhaps less critical functions such as inter-library loans and management information. One of the biggest milestones over this period was the development of the OPAC which revolutionised catalogue searching and first brought about the notion that libraries could, somehow, be distributed and that catalogues did not necessarily represent just the stock held within that particular building.

ILMS have continued to develop this mixture of highly sophisticated functions but alongside these has been the parallel emergence of other systems concerned with the delivery of information to the users. Critical has been the development of online information delivered through stand-alone and then networked CD-ROMs and now through remote servers. Many of these have, in turn, been re-emerging as web compliant databases providing even an average library with the opportunity to search enormous collections of data.

Libraries have had to encompass these emerging services and generally embrace them within a traditional library framework. This need - to be able to deal with conventional books and journals on one hand and electronic resources on the other - has given rise to what has become known as the hybrid library (Rusbridge 1998) - the notion being that it must at one and the same time deal with both a plurality of licensed electronic resources, often with different interfaces and search engines, including web resources through search engines or portals, and yet, in parallel, manage traditional library books and their circulation. The scale of this challenge is extraordinary and as a consequence there are a number of technical barriers, which stand in the way of the development of the digital library, and it is to these that I shall now turn.

The first is this issue of integration. Highly developed libraries can quote a whole series of discreet services built up over the recent past, which in many ways serve to confuse and baffle our users. In my own library I could quote probably as many as 18 interfaces including: the catalogue, several CD-ROM systems (each of which have a different proprietary interface), web based services, Internet search engines, gateway services, portals, intranet information retrieval systems, etc. There is a distinct lack of uniformity in the approach so that users are faced with learning a multiplicity of search systems to undertake even a small-scale literature search, particularly if they are working in cross disciplinary areas. Thus digital libraries are dealing with a distributed environment where users require seamless access to resources which might be distributed and heterogeneous. What is usually advocated, is a single point of access to a totality of digital library collections. Such systems would retrieve a relevant set of references together with suitable annotations, be adequately de-duplicated and effectively ranked. Some levels of integration have been achieved, particularly through the web itself, although that only offers integration at a rather shallow level.

There are a number of critical developments which are going towards resolving the multiple resource/single point of access challenge. Many are the subject of considerable research effort worldwide at the moment. They include, for example: the development of metadata systems capable of acting as effective resource surrogates at various levels (for example, from collection description right down to individual web page), and those in the context of different disciplines and the resources. The European Commission has put effort into looking at ways of inter-operating with different metadata schema and resolving these to provide a seamless approach as far as the user is concerned. In the same way, has been the development of common search protocols such as Z39.50; which is best known in the library community but suffers somewhat from only being accepted within that community. There is a view that there will be a gradual migration of Z39.50 towards an XML implementation, which in turn implies it will be much easier to adopt in the context of XML systems generally.

Many of these developments have been wrapped into what has become known as resource brokers, intermediate systems which can perform a whole number of functions between the user and the resource they are attempting to search. So that as far as the user is concerned they are presented with a single set of unified resources in the response to a query instead of consecutively having to search a number of data base systems. There are now a number of commercial products which perform this function, some integrated within integrated library management systems; others such as Metalib can act as stand-alone systems.

Meanwhile, outside the library sector we have seen the emergence of a multiplicity of technologies that are radically altering the way in which general users both regard and use information. These include exceptionally powerful Internet search engines, capable on the one hand of identifying astonishing amounts of garbage, but also capable of the most intricate levels of retrieval of quality resources with both speed and efficiency. Such search engines are challenging traditional library mechanisms as rapid gateways to information resources. Other developments have included harvesting agents, which can trawl distributed sites and collate the results into high-quality and highly personalised subsets. And finally has been the re-emergence of SDI or alerting systems as they now tend to be known, which are customisable and can deliver to the user's desktop selective resources based on user or community developed profiles. Such systems save the user effort by alerting them to requirements as and when they need them and can be used to create and sustain virtual and real research groups, to monitor the output of specific annual conferences, training and similar opportunities and to identify citations, particularly to your own research.

New Information Search Scenarios

So an effective system ought to integrate all these new technologies into a unified organisational information system but before I stress the efficiencies to be gained to too great an extent, it is worth pausing for a moment to consider the alternative. Because,

much of the above assumes the classic model of information searching whereby words are entered into the system and through some process of comparison information resources are retrieved. There is an alternative view which says that users simply do not work like that - that they are happier addressing a specific subject collection, which they know will go some way towards answering the kind of problems they have, rather than addressing the whole of 'cyber space'. They may want a common interface but users may not be easily diverted from historical patterns of usage towards more generalised searching just like that.

The notion of searching out a specific title is also disappearing and my guess is that the bundled journal collections are illustrating new ways of information searching whereby value stems less from the quality markers such as peer review, reputation, layout etc and more from ease of access, ease of display and the quality of the descriptors which ensure adequate retrieval in the first place. The bundles will be different to what they once were and will be defined not by publishers or links from secondary services but by ways in which librarians *et al.* choose to parcel them up. Many current aggregations are either historically based, that is based around pre-existing print collections or the consequence of consortial arrangements. What are needed are aggregations based around institutional user needs and refined by actual usage.

And I also believe there is another sea change in searching as a result of the web: that is that the simplicity of moving from item to item. This again suggests a shift from the classic search and retrieve paradigm to structured browsing based on citations and links. The development of standards such as Open URL and SFX are testament to that. And as an extension of that is the opportunity to use user feedback (in the sense of user comments or recommendations) to guide the search process. How many users have looked at this article? What did they think of it? (Lynch 2001).

So we are left with new paradigms of usage with new balances between:

- Generalised searching vs. subject/searching v personalised
- Collection vs. titles
- Search and retrieve vs. citations and links and recommendations

Authorisation and Authentication

A third technical issue, which might incorrectly be considered trivial, is that we tend to know very little about who the user is. In the electronic domain this is not a simple question - we need assurances as to the fact that users are who they say they are, particularly if we are dealing with licensed resources where we need to give guarantees about access. Users must be suitably validated by some organisation and we must have systems in place, which permit them to do only what we would wish. The first level of that is authentication which is the process of identifying users on the network and is usually brought about by a combination of username/password challenge or IP domain

search and restriction. There are more sophisticated accreditation systems that are coming, but are relatively little used in the library sector, and are more common in e-commerce applications; there will be a need to be more robust if we want to be involved in such systems. Once we have identified who someone is, there is a secondary process of authorisation, which essentially says what patrons can do once they have access. This is important for the managers of licensed resources and is critical in the context of the provision of e journals and the like. We might for example want to say that a user can access resource a but not b or c, whereas all users in group x can access everything. Even more complex arrangements could be envisaged across organisational boundaries where users may have different roles in different contexts; a researcher in one, a student in another and an employee in third and so on. There are emerging standards here such as Shibboleth in the US and PAPI in Europe. All of this leads to the notion that in the future we will need to know as much about the user as we do know about the object they are trying to find.

Management of Change

Managerial and change issues encompassing the move to digital libraries are substantial and involve both human and resource factors. Moreover, the changes are often difficult to predict, dependant as they are on the ever-changing nature of technology.

At the economic level, libraries in developed services are already aware of the problems, which derive from the need to maintain dual subscriptions to both electronic and traditional materials during this transitional period, which could last for some years. Users are often disinclined to make radical changes in their use of materials and resent electronic formats being imposed upon them; they also frequently require connectivity, machinery and IT/web skills to make best use of what is available. Moreover, spiralling journal prices add to the extra cost burden so that any potential savings the library might feel would be brought about by electronic delivery, are often difficult to realise.

One positive development has been the growth of consortial purchasing of bundled services which, as a consequence, should show some economy in budgets and also serve to democratise resource provision, especially for smaller institutions which can 'piggy back' on larger organisations resource requirements. However, we should be wary of purchasing policies which create redundancy in provision and that such bundled purchasing potentially enables access to large amounts of material which might be little needed (Friend 2000). An alternative is that of selling individual items for example, though at this point there seems to be little enthusiasm at library levels for end user charging or even for libraries to mediate in some similar arrangement. My suspicion is that this will come about in time, at least as a way of providing backup to core materials which the library cannot possibly buy.

Collective purchasing has had a dramatic impact and, providing consortia members are prepared to give and take, the benefits have been significant to all concerned. But this model may in itself not be transferable – it relates mainly to the licensing of scholarly

data and works only in that context. There are limitations: licenses are still confused as to how they treat remote users; there are still a variety of authentication procedures demanded and even servicing different buildings is not always simple or accepted. The emergence of licensing has brought new business models but at the same time raised new questions for librarians and publishers alike. As Fred Friend has said “consortial purchasing is not the only feature of the new way of working, but is a critical feature that we have to get right. We will only get it right if the new business models provide enough income for publications to remain viable and enough of a saving to allow librarians to increase the range of information available to users (Friend 2000).”

Another major factor in the decline of the cost base has been the emergence of free journals (free to users) derived from a mixture of a drift to self-publishing on the one hand and Institutions asserting rights over their own IPR on the other. We are all familiar with the arguments and although it is my view that scholarly publishing will continue in its existing form for some time to come, the mounting body of opinion which suggests that there will be a substantial increase in self-publishing or at least self-archiving can't all be wrong. For example universities are asserting rights over their own intellectual property, and the growth of e-print and other open archive initiatives are all potential ways of creating alternatives to the traditional scholarly publishing route.

I know you will counter with questions of quality but who is to argue that the current peer review mechanisms are not over elaborate or overstated? There are alternative ways of establishing authority and the current somewhat secretive process of peer review seems almost anachronistic in an age which is demanding more transparency. Lodging a paper in a MIT based repository to be accessed by many could be considered as prestigious an act as publishing in a journal that is read by very few. And there are the emerging alternatives to peer review such as web site critiques, web citation, or myriad of site metrics as indicators of value. Moreover such knowledge repositories do not need to be merely passive - they are a potential focus for the dissemination of new ideas and could provide the same function of reinforcing academic status as that performed by scholarly journals.

Thus for the library manager, the economics of digital library delivery are complex and changing but I would argue, the longer term signals are largely healthy in that we may have at least seen the end of the spiralling costs of scholarly publishing from a mixture of those resources to which access has been negotiated, those electronic papers which have been defined as having a requisite level of quality to those which have been self archived by the author including adding in suitable descriptions so as to be retrieved through agent or similar technologies.

What then does the library manager need to do to ensure this shift to electronic delivery is as smooth as possible? What are the factors that need to be addressed? I've categorised my own views under four distinct headings which derive from the analysis above. These are strategic management, procurement, staffing and staff development.

Strategic management

To bring about a transition to new forms of library suggest that the library manager should provide clear and articulate vision as to what the service might look like, how it might perform and how it will be evaluated at some future time. It should not be too far fetched or so far beyond the imagination of staff as to preclude its acceptance, but it will be a matter of driving the service forward and ensuring that those charged with delivering the change feel some ownership of it. As importantly it will need to encompass the views of the users, many of whom may wish to retain a traditional perspective on library delivery. Strategic plans will need to be sold on to the client base and achieve at least a respectable level of acceptance particularly from the executive, though in the end it may not gain total acceptance of everybody within the organisation.

Thus the library manager involved in strategic management must be very focused and the vision should be reinforced to the staff at all levels

Procurement

I've already talked about the economics of e-services and this could well imply a difficult period of increased expenditure so as to achieve medium term economies. As we have seen, collaborative purchasing with like minded libraries is one way forward, and works best between libraries with similar purchasing power or similar clientele so the charges levied on constituent members begins to be equitable. Consortial approaches can also be used to develop digital content, underwrite the cost of digitisation of material requiring conversion and so on and are likely to become more a feature of library services as they become more distributed.

Staffing

Perhaps more critical than any of these is to ensure that staff structures are in place which will meet the new challenges of electronic delivery. This will imply analysing every function within the service and asking the question, is it appropriate to continue to work in this way or are there alternatives that will help us achieve the strategic goal of delivery mechanisms? The nature of the core business of a library will change and functions such as cataloguing, which it could be argued has been the absolute foundation of libraries for the past hundred years or so, might well be achieved by subsidiary agencies such as National Cataloguing centres or global utilities. Technical services departments may have to find alternative roles which could imply cataloguing Internet resources, though even this begs the question would it be better done co-operatively. It would be foolish to achieve economy in traditional cataloguing methods merely to replace it with another format and the development of the portals render this unnecessary. Many library staff will need to be re-skilled, both to ensure their knowledge and increase awareness of the accent in user support. Librarians will also need to promote themselves as knowledge managers, as web information managers.

In summary we are going through a period of rapid change in the delivery of library services and need to re-think and constantly re-invent what we are. The library of the future will be as concerned with adding value to information resources and providing support and guidance as it will with acting as custodians of print material.

Library Futures

Will libraries in the future disappear entirely? Perhaps that depends how we define library: it could be a physical space, it could be a concept, it could be through its functions (Rusbridge 1998). As we have seen, the concept of a library as a collection of information sources defined by certain boundaries will remain, the boundary definitions will be more complex, deriving as much from consortial deals, usage issues and historical commitments as to collections within a building. The digital library will be a more fluent concept capable of continuous change and modification and even defined by the end user as much as by the librarian as intermediary

Much of this suggests that though there are tasks here in selection and procurement, they are becoming less pronounced, so that old style collection management is conceivably becoming redundant.

Libraries as Space

Libraries as a physical environment seem on the surface the least likely to exist in a digital future. Access to web services can be got from most places with adequate connectivity, which, with the increasing impact of mobile communications, means literally anywhere. Digital libraries will be free of the constraints of delivering audio and graphics and universally portable as individuals become able to access and maintain their own institutional view of the library. The counter argument goes that we still need spaces where users can come together, even if they are working independently, and which are conducive to long periods of screen use, are ergonomically designed, and have in place support systems and navigational help together with an associated output devices such as colour printers or high definition screens. These centres are already emerging as Internet cafes, resources centres, learning hubs and so on. Moreover, such centres are likely to coexist with more traditional provision permitting ease of use.

Library as function

If the core process of libraries is organising the information universe to enable easy access by users then we can argue that libraries have an unchallenged role to provide the relevant tools for that to continue in the Web domain. Building Web portals, creating and adding value to Web resources are all central to future systems. It implies customisation of resources, rights management, re packaging and re formatting and so on. We will need to be active in identifying content, disseminating and re presenting resources to suit different audiences and markets. It is all about becoming more user centred and less collection focused or function dominated.

Libraries will need to bring higher levels of support to a user body which is becoming more distributed. Indeed if you imagine that all libraries will have the capability of delivering most anything then the level and quality of support, the level of customer support and service may well be the central determinant as to whether a service is successful or not.

Part of that agenda is Information Literacy; a need to train our users to not only search for themselves but also to discriminate and evaluate amongst resources which are increasingly plentiful but, as I have described, of dubious quality. This can be group based, one on one, through technology or traditional – it doesn't really matter. What is important is that as a task it becomes central to our role as knowledge broker.

Summary

To try and summarise, it seems to me that the shift that is taking place is away from the management of physical resources towards exploitation, support and the creation of pathways and links to support our mission of supporting research and innovation. Such services will be even more focussed on the user and his or her needs than before to the extent that they become highly personalised. Libraries will need to add real value to these processes in a way which is both measurable and unique.

And though I don't want to dwell on the role of librarians - in some ways we spend too much time contemplating our future whilst forgetting that the pressures of change we are currently experiencing are as much a feature of business and other professions as ourselves. But it does suggest to me that we need to reassess roles and the work force. We will need to realign staff effort into growth areas such as portal development and web support and at the same time re-address the centrality of other functions and look for a new skills set to meet these new challenges. We will need to form new alliances and partnerships - with pedagogic experts, with document managers, with publishers and other information businesses. It suggests librarians will need to be even more skilled than ever and keep on being reskilled as the technology changes ...the web won't last forever. It suggests a leaner, meaner workforce which is well paid and occupying the high ground of knowledge transfer, leaving the mundane and routine jobs to contractors or to be automated out of the system.

So finally, I advocate the following as being indicative of where we are heading:

- Libraries will become functions rather than places;
- And user focussed rather than collection centred;
- Information will become cheap but of questionable quality;
- Users will be more distributed yet we will need to know more about them;

- Libraries will add value to information to provide more appropriate resources;
- The core processes of organising information will diversify into creating user focussed, personalised systems addressing all kinds of information;
- Libraries will comprise a mixture of professionals with changing boundaries and alliances;

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WHICH TOOLS FOR SCIENTIFIC CURRENT AWARENESS IN CEMAGREF?

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Abstract: Cemagref is a French public scientific research institute in agricultural and environmental engineering. Its scientific and technical community is multidisciplinary and consists of ten regional centres in France.

Each centre is equipped with an information service. Information professionals must offer Cemagref researchers homogeneous and efficient information services throughout the organisation.

Tools offered by publishers for accessing to scientific and technical information increase each year, and become more effective and more diversified. Resources are scattered. Researchers need to be directed to tools best adapted to their needs.

Cemagref information professionals' concern is to identify tools, and to choose the most cost effective solution in collaboration with researchers.

Working closely with researchers and having a good knowledge of their needs is a major advantage.

This paper deals with the study methods and the results obtained in response to researchers information needs .

Introduction

Cemagref, a research institute for agricultural and environmental engineering, is a public establishment with a scientific and technological vocation under the responsibility of the ministries for agriculture and research. Its 1000-strong personnel conducts applied research in the following areas : understanding and preventing natural risks, management of soils and aquatic environments, engineering of water and waste treatment facilities, engineering of agricultural and agri-foodstuffs facilities.

Its 500 engineers and researchers have varied and complementary scientific and technological skills: from life sciences to engineering sciences, from biology to landscaping, from fluid mechanics to hydrology, ever mindful of the social and economic aspects.

Set up in 1981, from 2 technical institutes, it had to become a research institute. Research activities are conducted in around thirty research units, set up at 10 sites in France.

Cemagref's documentary organisation is based on the body's geographical distribution, each site having a documentation centre. 22 persons are employed in document handling, with the primary aim of meeting the information needs of the establishment's researchers. The documentary network is co-ordinated by the IST department (Scientific and Technical Information), at General Management level. Setting up computerised documentation, a thesaurus and a document utilisation system has given this network considerable experience in collective work, which is made all the richer by the arrival of Internet. As Cemagref and its research policy develop, the traditional research laboratory libraries are becoming fully-fledged information services at the hub of the various networks. However, the researchers' work remains the main inspiration of all the work conducted.

1. Information professionals' role

The advent of electronic information brought a new challenge to information professionals. Indeed, since one can access the information directly, a researcher could avoid consulting a documentation centre. In this context, information professionals have to assist researchers in accessing to a virtual documentation centre and in giving them means to directly access to judicious information resources.

Thus, the information professional has to bring added-value services to face this plethora of information. This necessity implies that the information professional is well integrated in research teams, knows the degree of acceptance of ICT (Information and Communication Technologies) by researchers and heightens researchers' awareness of it.

Principal services offered are:

- analysing information resources and classifying them to ensure access to primary information;
- monitoring and synthesising information because it is always too voluminous and abundant;
- evaluating tools.

When one reads this list, one could think that the information professionals' function hasn't changed. However, information professionals have to transfer a part of their know-how and competence to assist researchers in their research work.

For instance, we can cite:

- organising training periods for using tools. These periods need to be short, as researchers have little spare time,
- writing directions for use and FAQ (Frequently-Asked-Questions), which would allow an easy use of information resources,
- identifying and training some people to communicate information.

Thus, information professionals of Cemagref will increase the standing of their functions by transferring a part of their experience to users, establishing a permanent dialogue to anticipate and supply their needs at best. Though their know-how is not put into question, information professionals need to adapt these new conditions by widening their competence field, working upstream as well as listening to their research teams. In short, information professionals still provide access to information.

Thus, information professionals have to face a real paradox. They must share their working know-how with their client to justify the interest of their functions. It is the cost of their building a new place within their own organisation.

2. Analysis of researchers' needs

In Cemagref, laboratories often are multi-institutional units (e.g. UMR – Mixed Unit of Research; IFR – Federative Institute of Research). From this fact is drawn the necessity to share resources. Researchers work more and more on cross-disciplinary themes and they have to use several information search tools because of scattered resources. Researchers can hardly hand their bibliographic work over. They need to know emerging subjects, to follow trends, their current subjects of research and subjects from former research.

In this context, making users as autonomous as possible thanks to tools that are adapted to their needs is the challenge of Cemagref information professionals.

A survey shows that researchers appreciate portals, because several resources are available from a single tool. Which portals have to be favoured for Cemagref's researchers?

According to the survey, the most appreciated functionalities seem to be the following ones:

- subject coverage is as large as possible and time coverage spans at least ten years;
- selected tools give a “browse” and a “search” access to allow the complementary approach of either “search” function or profiles used when researchers leaf through periodicals' abstracts;
- a direct link between bibliography and complete article and the possibility of passing directly from an article to another;
- access to full text of periodicals is very appreciated. This formula is still recent in Cemagref as first agreements with publishers were concluded at the beginning of 2001 but it was quickly adopted. For researchers, immediate acquisition of the document is a plus because they no longer have procedures to obtain primary document. Moreover, the article (PDF format) can be printed out in colour, which is very convenient for schemes;
- alerts systems are interesting when they allow immediate access to primary documents. Indeed, if the delay between request of the article and its receipt is too long, the researcher may no longer be dealing with the topic which made him ask for the document;
- presence of the author's e-mail address allows fast and direct contact between scientists who work in the same field;

- export of data in a universal format is an important criterion because Endnote software is a bibliographic software chosen by our researchers.

These elements proved to be precious when the study led in Cemagref got synthesised.

Methodology of the study

Though information is abundant today, one must be aware when choosing products for users. Cemagref multidisciplinary and need to rationalise costs were factors that needed to be considered at this step. Cemagref information professionals led this study by communicating with each other through their network to rationalise the tasks.

As these tools evolve quickly, we recommend the reader to pay attention to the study's methodology rather than to its results.

1. Review of existing scientific awareness tools

Tested tools belong to totally different types but they can complement each other to obtain complete access to information. Different providers were asked for some test periods to fulfil this study's needs.

Four types of products were studied:

- Free multidisciplinary databases on internet web
- Article@inist: database from INIST (CNRS), first French provider of scientific articles;
- Ingenta-Uncover
- Fee-based multidisciplinary databases
- Information Quest (IQ): database marketed by Rowecom company
- Inside: database marketed by British Library
- Publishers' portals
- ScienceDirect (SD) from Elsevier
- Ideal from Academic Press
- Institute for Scientific Information (ISI) products
- Web of Science (WoS)
- Current Contents version CCSearch-WebSPIRS from SilverPlatter (CCS)

2. Elaboration and validation of a grid for analysing products

Cemagref information professionals have defined an analysing grid to compare these tools in an optimal way. A certain number of practicalities were pointed out. For instance, we can cite:

- search engine power
- updating periodicity, available coverage

- possibility to save profiles or search histories.

The complete analysing grid can be seen in annex 1.

3. Test of different tools on search strategies in collaboration with research teams

During a defined period, tools were tested using different search requests on different sites of Cemagref.

For instance, the following three subjects were analysed at Lyon Cemagref for the years 1999-2001 :

Subject 1: Influence of climate changes on fish

Equation 1: Climat* Chang* AND Fish*

Subject 2: Semi-permeable membrane device

Equation 2: SPMD OR (Semi permeable membran*device*) AND NOT (Parallel* Process*OR Comput* OR program*)

Subject 3: Effects of copper on bacteria or alga of biofilms (or periphytons)

Equation 3: Copper AND (Bacteri* OR Alga* OR Seaweed*) AND (Biofilm* OR Periphyton*)

Two ratios were established for every search request and tool:

Number of relevant references/total number of references

Number of references, which are exclusively present in the considered database/total number of relevant references in the tested database.

For these two ratios:

- Information Quest was compared with Article@Inist and Ingenta
- Information Quest and Inside were compared with ScienceDirect
- ScienceDirect was compared with ISI products

Synthesis of obtained results

First, tools were compared from their principal functionalities side.

Results were assembled in a grid (annex 2).

This first analysis points out that products set can be divided into two categories:

Ingenta / Article@Inist / Information Quest

Inside / ScienceDirect / Ideal / WoS / CC Search / CC Connect

1. Comparison between Ingenta-Uncover, Article@inist, Information Quest

Due to their functionalities, these tools belong to the same range of products. They don't allow a complex search. It means that it is not possible to combine several search steps. These products either do not allow or allow little access to full text.

Ingenta-Uncover retrieves fewer relevant references than Article@inist. Therefore, amidst free databases, Article@Inist is the product which provides most results and has the most powerful search engine.

Article@Inist and Information Quest (IQ) give about the same number of relevant references.

Due to their functionalities, these tools can only complement each other. They cannot be compared to the following products.

2. Comparison between Information Quest and Inside

Since Information Quest uses British Library database, it gives good results. However, the search form, which is a search string limited to 80 characters, is very deceptive and answering delays are very long. Moreover, updating appears not to be frequent. Information Quest sometimes allows access to full text but Rowecom has few agreements with publishers that supply Cemagref.

Therefore, in its current state, Information Quest can hardly allow Cemagref's staff to access to full text.

As for Inside, on the one hand, all users approve it for its search engine which is performing and allows access to proceedings references.

On the other hand, the low number of abstracts in the database is deplorable for both those two tools.

Inside and Information Quest results are as good as ScienceDirect's but they are different from them and hence complementary to them.

3. Comparison of ISI's products with ScienceDirect and Ideal

All these products give access to full text.

a) *Ideal*

This product will be soon excluded from comparisons since the subjects it deals with are too narrow and mostly medical.

Moreover, one has to negotiate every year to have access to collections backfiles. It is a budget strain and a constraint for users.

ScienceDirect

Due to its functionalities, ScienceDirect was compared with ISI products (Current Contents Search and WoS). For information professionals of Cemagref, the underlying question was to know whether ScienceDirect could replace Current Contents. ScienceDirect product is well done but one cannot find in it the same quality of indexing as in ISI databases. Indeed, a search by author's name is hard to perform and references are redundant.

ScienceDirect is a publisher product whose main goal is to access to full text. Bibliographic products of ISI (WoS, CCS, CCC) are mostly oriented toward research and scientific current awareness. It is why they have a tested search technology and a larger field of investigation.

Thus, at first sight, although these products are hardly comparable, they complement each other. However, ScienceDirect occupies a different position from the other publishers since it is organised in portals (accommodation of other editors, agreement with other database producers), its thematic coverage keeps on increasing and its search form may regularly get improved. Moreover, its functionality called "Cited by" openly places it on the 'bibliometric territory' of WoS, even though its coverage still is more limited than that of WoS.

Results retrieved from ScienceDirect alone represent about one third of those from Web of Science (WoS). Most of ScienceDirect references actually are in WoS.

Mixing of the two approaches consolidated by their technology of complementary links would allow a coherent and complete tool to Cemagref researchers.

Annex 3 shows a comparative analysis of ISI products

b) WoS

WoS is the product whence most results are obtained.

WoS is a powerful tool of bibliographic search. It allows rapid identification of articles about a subject. Moreover, bibliographical links permit surfing rapidly from reference to reference and reaching full text is possible thanks to ISI Links technology.

This product has been very appreciated by researchers: it provides current awareness and allows rapid construction of an efficient bibliography. Getting to a new research subject can also be achieved by following an intuitive approach (navigation links). Nevertheless,

one can regret that the electronic address of the author does not appear. Indeed, it is a hindrance for direct contacts between researchers.

c) CC Search

CC Search is an awareness tool but also provides retrospective searching if one can afford its backfiles.

This product gets advantages from SilverPlatter's technology

- single search form for chosen databases
- a well-made search unit .

It allows crossfile searching (CC + other databases) and it can use SilverLinker links technology. Hence, it brings a plus in comparison with CC Connect.

The alerts system is interesting although it doesn't allow a direct link to full text.

d) CC Connect

This product will be excluded because it doesn't allow access to full text in its current state and retrospective searches cover a limited backfile.

Conclusion

In order to supply Cemagref researchers' needs, product(s) acquired must offer: an extensive backfile, a multidisciplinary coverage, a double possibility of search (retrospective search and awareness), access to full text. In the range of free products, information professionals of Cemagref recommend to use Article@inist (INIST-CNRS). According to budget constraints and negotiation possibilities, several scenarios can be conceivable for fee-based products:

1. ScienceDirect and Web of Science in Science file*
2. ScienceDirect and CC Search*
3. ScienceDirect and thematic bibliographic databases (CAB, Econlit, INSPEC)
4. Science Direct and Inside*

However, it must be reported that though its cost is high, access to an important multidisciplinary bibliographic database, such as Web of Science won't allow Cemagref to avoid negotiations with publishers for access to full text. It is why Cemagref belongs to Couperin university consortium and concludes step by step some agreements with high-profiled scientific publishers.

*This device could be completed by the acquisition of focused databases.

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Internet Sites

- Article@inist (INIST-CNRS) : <http://services.inist.fr/public/fre/conslt.htm>
- Ingenta : <http://www.ingenta.com/>
- Information Quest : <http://www.eiq.com/>
- Inside (British Library) : <http://www.bl.uk/online/inside/>
- Ideal : (Academic Press) : <http://www.idealibrary.com/>
- ScienceDirect (Elsevier) : <http://www.sciencedirect.com/>
- SilverPlatter : <http://www.silverplatter.com/>
- Current Contents et Web of Science (ISI) : <http://www.isinet.com/isi/>

Annex 1

Products analysing grid

Name of the product:

URL	
Brief description (product for information professionals or researchers, retrospective, awareness...)	
Details	
Contact	
Subject coverage	
Time coverage	
Frequency of updating	
Contents	
Agreement: lodging of other databases	
Links technologies: DOI Crossref...	
Support : Internet, Intranet	
Localisation of software and mirror sites	
Technical reliability	
Functionalities	
Search form : simple, advanced	
Combination of search steps	
Data saving	
Alerts system	
Saving profiles and / or search steps (on software)	
Alerts on queries	
Statistics of product use	
On line help (language...)	
Access to primary documents - by a provider - full text - e-mail address of authors - links in the bibliography	
Experience of the product -within Cemagref -outside Cemagref	
Degree of interest of the product (research teams, geographic group, establishment)	
Fixing of a price scale (number of potential users,	

number of simultaneous access...)	
Technical means	
Human means	
Users' opinion (synthesis)	
Comments	

Annex 2

Comparison grid of tools (June 2001)

	Over cast period	Agreements	Speed	Combination of search steps	Abstracts	Export towards Endnote	Access to full text on the publisher's site	Saving of queries Alerts on queries	Author's e-mail	Links in the bibliography	Sorting out according number of citations	Contents Alerts
Ingenta	1988->	Medline, Uncover, ScienceDirect, Catchword	-	No	Yes (according to publishers)	No	Yes	No No	No	No	No	Yes
Article@Inist	1990->	Pascal Francis	+	No	Yes	No	No	No No	No	No	No	No
Inside	1993->	None	+	Yes	Few	No	No	Yes Yes	No	No	No	Yes
IQ	1990->	BL	-	Very easy search (< 80 char.)	Few	No	For some publishers only	Yes No	No	No	No	Yes
Science direct	1995->	INSPEC, EconLit, Biosis and databases produced by Elsevier : Compendex, Fluidex, Embase, Geobase, Oceanbase, Biobase, Biotechnobase, Beilstein Abstracts	++	Yes	Yes	Yes	Yes	Yes Yes	Yes	Yes	No	Yes
WoS	1945 ->	Biosis, CAB (in progress), GenBank, Derwent	+++	No	Yes	Yes	Yes	Yes (search steps) No	No	Yes	Yes	No
CC Search	1994->	Multibase search via Webspirs	+++	Yes	Yes	Yes	Yes	Yes Yes	Yes	No	No	Yes
CC Connect	1990 ->	None	+++	Yes	Yes	Yes	No	Yes Yes	Yes	No	No	No

Annex 3

Comparison grid of ISI products : Current Contents Connect (CCC), Current Contents Search (CCS) and Web of Science (WoS)

	Web of Science	CC Search (SilverPlatter WebSpirs version)	CC Connect (web version of ISI)
Description	<p>WoS is multidisciplinary. It corresponds to ISI Citation Databases. Thus, it can be used as a base of bibliographic references and summaries as well as a source of information about cited authors, teams and research themes (cited reference searching).</p> <p>Coverage : Multidisciplinary in Sciences, Health Sciences, Arts and Humanities. 8000 periodicals, organised in 3 series of available backfiles: Science (since 1945) Social sciences (since 1956) Arts and humanities (since 1975)</p>	<p>Awareness oriented bibliographic base, which can use an search form (WebSPIRS-SP) allowing retrospective and multibase search.</p> <p>Coverage: since 1994</p> <p>Coverage: multidisciplinary, 7000 titles of periodicals + 2000 documents in series organised in 7 series: Agriculture, Biology & Environmental Sciences Engineering, Computing & Technology Social & Behavioral Sciences Arts & Humanities Clinical Medicine Life Sciences</p>	<p>Awareness oriented bibliographic base</p> <p>Coverage: since 1990?</p> <p>Coverage: multidisciplinary, 7000 titles of periodicals + 2000 documents in series organised in 7 series: Agriculture, Biology & Environmental Sciences Engineering, Computing & Technology Social & Behavioral Sciences Arts & Humanities Clinical Medicine Life Sciences Physical, Chemical & Earth Sciences</p>
Advantages	<ul style="list-style-type: none"> - Double possibility Awareness + Retrospective search, adapted to double need of Cemagref - Double possibility of search: classical and on cited references. This second option allows to apprehend teams, which work on a theme identical to one's own topic . - Intuitive search. - Links technology ISI Links: links from article reference toward: full text, other bibliographic bases, aggregators, OPAC. - Possibility of bouncing with in fine bibliographic links (<i>cited references</i>) and articles that cite the reference (<i>Citing Articles</i>), as well as related articles (<i>Related References</i>) and those from 	<ul style="list-style-type: none"> - Double possibility of awareness or retrospective search Simple and comfy search form ; powerful enough, 'trainer'. Interrogation on the whole period or a part of it; flexibility of choice offered to user (last release, term, part or complete base) - Simultaneous or chosen interrogation of series - Building of the search by steps - Access to index - Saving of search steps - Alerts service on queries (DSI) - SilverLinker technology of links: link toward full text (possible insertion of parameters); toward providers of primary 	<ul style="list-style-type: none"> - Simple search form , adapted to regular search on queries - Possibility to question the whole period - Queries on forms that are saved by the user (HTML pages) - E-mail address of the author can be clicked on -Current Web contents: web sites selection by ISI - Possible surfing between CCC and WoS

	<p>eventual interconnected bases (e.g. links toward WoS Proceedings).</p> <ul style="list-style-type: none"> - Automatic downloading toward EndNote v.4 - Sending of selected references by e-mail. 	<p>documents; toward one's own OPAC, aggregators</p> <ul style="list-style-type: none"> - author's e-mail address - Possible insertion of display parameters by user - Surfing throughout references such as author, source, complete summary of the magazine links - Downloading toward EndNote - Z 39.50 connection - Sending of references through e-mail - Selection of web sites and search engines (September 2001 version) <p>In the framework of multiple subscriptions: homogeneous approach, whatever the interrogated database is (single search form); possibility of multibase search</p>	
Withdrawals	<ul style="list-style-type: none"> - Absence of the author's e-mail address - In fine bibliography: absence of references titles that don't belong to ISI database, limits interest of their citation - Difficulty to build a step-by-step search (and therefore to save a true search history): the single data capture box does not allow this approach. The form isn't assisted enough and it requires the building of a complex search request - No alerts system on queries or contents - No access to index (considered as useful under their CC Windows version) 	<ul style="list-style-type: none"> - Access to profiles: necessity to settle a more customised access (lack of confidentiality) - Not abundant backfiles (begins in 1994) <p>More flexibility would be appreciated for search form (announced for Sept 2001 release)</p>	<ul style="list-style-type: none"> - Not abundant backfiles - User doesn't master the knowledge from the last on line release (choice Last Week; Last Four Weeks) - Insertion of customised parameters is not possible for user - No links toward full text - Number of steps by profile is limited to 10 (no possible insertion of parameters) - No standardised alert service (does exist as an option) - No histories saving
Assessment	<p>+++</p> <p>Despite some would-be appreciated development, especially in order to narrow the questioning field and contact the authors through electronic bulletin board.</p> <p>Its strong points are the overcast periods, double interrogation ,Article search-cited articles search and</p>	<p>+++</p> <p>Coverage back to 1994.</p> <p>Flexible and efficient; numerous offered functionalities by search form ; strong point is the possible association to other databases.</p> <p>Difficulty to decide between CCS and WoS because their</p>	<p>+</p> <p>Easy to use search form that is adapted to a search on queries . In comparison with CC Windows, there isn't a real progress despite the desktop multi-platform interrogation , which is characteristic of all Web versions .</p>

	<p>bounds that link references. Its interrogation mode is less good in matter of regular search on profile or when one has to build a 'classic' request, although it is perfect for an intuitive search to approach a subject.</p> <p>Difficulty to decide between CCS and WoS because their approach is very different.</p>	<p>approach is very different.</p>	
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IMIS: Integrated Marine Information System

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Abstract: The Flanders Marine Institute has taken the initiative to build an integrated information tool, called IMIS. The objective of this database is to provide information on all topics relevant to marine sciences - be it people with their expertise, institutions and their mandate, publications, etc. Different types of 'knowledge items' correspond to different modules in the system, each with their own entry into the database. These modules are (currently): Persons, Institutes, Literature, Journals, Conferences, Projects and Datasets. IMIS version 1.0 (accessible at: <http://www.vliz.be/vmcddata/Imis/index.htm>) is in operation and the VMDC (Flanders Marine Data and Information Centre) schedules a new enhanced version in 2002.

Introduction

The Flanders Marine Institute, VLIZ was established in 1999. One of its primary goals is to provide the necessary tools for coordinated marine research in Flanders. The VMDC (Flanders Marine Data and Information Centre) has some more specific objectives, within this framework :

- To provide data and information to researchers, public authorities and other interested parties, in a suitable and prompt way
- To stimulate networking and to maximally centralise the nationally and internationally available data of research groups and governmental authorities
- To develop and maintain databases for interdisciplinary research, according to the established international standards
- To integrate various kinds of data, and perform consistency and quality controls

VMDC took the initiative to build a system, called **IMIS (Integrated Marine Information System)**, with multiple functionalities. Its main goal is to map the marine-scientific landscape in Flanders in its totality.

But how did this idea come up?

Historical development

In May 2000, VLIZ decided to build an online information system, mainly based on the large literature collection the institute inherited from two former marine-scientific institutes.

In a first phase we looked at several commercially available cataloguing programmes. Soon we realised that cataloguing software is an excellent tool to store and retrieve information on titles available on library shelves. But records in a library catalogue do not tell us where the authors work, we cannot find out in what subject fields they are active, we do not know anything about their colleagues, and we cannot ask them for this information, as any contact data (address, e-mail, telephone) are missing.

In a second phase we started looking for software that could present all these variables in an integrated, concise format. Surprisingly, not much came up. What we found were still more library catalogues and many many software tools that could present us splendid directories of all kinds. Still, not one developer apparently had looked into the possibility of linking these two concepts into a brand new one: presenting all the different data sets in one interface!

This diagnosis, and the fact VLIZ had the inhouse expertise, led us to a drastical solution: building the whole product ourselves!

First, we agreed on some very important basics.

- The developed product should be as compatible as possible with other currently used platforms, and database programmes.
- The record structure should be compliant with the ASFIS-structure (Aquatic Sciences & Fisheries Information System). This was necessary as one of the VLIZ objectives is to become the ASFA Input Center for Belgium.
- The finished product will be distributed freely to all interested parties, especially in developing countries, with the objective to enable an international information network based on the same system everywhere.
- All data and information in the information system should be accessible to all users without thresholds; this meant implementing a web-based interface.
- Finally, the developed database should be an open system, without any thresholds to source codes, to make changes and improvements possible where and when needed.

The road we have chosen did mean hard work. As with any new product, problems come up at the least expected time and place, and a lot still needs to be done. However, after one year of hard thinking, programming, testing, refusing, restarting, hoping and with a

lot of cooperation and good humour, we were able to implement a first version of our 'integration idea'. IMIS 1.0 was born.

Technical description

IMIS Integrated Marine Information System

As explained already, IMIS is intended to be an integrated management system for a variety of information and data sources. The current system enables the management of:

- Library catalogue
- Directory of scientists and institutions
- Catalogue of research projects
- Metadata of ocean data sets
- Database of conferences and events

The integrated approach allows for cross-referencing between the information sources e.g. the Author field in the bibliographic database crosslinks to a record in the directory of scientists.

TECHNICAL SOLUTION DESCRIPTION

IMIS is developed as an SQL-server relational database system running on a MS NT server. For web serving the Apache 1.3.9 web server software is used. Accordingly cgi-bin applications were developed in VBasic 6.0 and the library CGI VB 1.4 (Kevin O'Brien, 1996).

For data entry, forms were developed in MS-Access, linked to the SQL-server database using ODBC.

TECHNICAL REQUIREMENTS

CONFIG 1: Less than 10 simultaneous users

- Database engine: In this case SQL-server is not required and can be replaced with MSDE that is included in MS-Office Professional 2000 (but is not installed by default).
- Data entry: MS-Access 2000
- OPAC: web server. Currently tested only with Apache web server (v. 1.3.9)

CONFIG 2: more than 10 simultaneous users

- Database engine: SQL-server 2000 Standard version (Academic Price: US\$1500)
- Data entry: MS-Access 2000
- OPAC: web server. Currently tested only with Apache web server (v. 1.3.9)

Note: it is possible to develop an IMIS system with another RDBMS (eg ORACLE, mySQL, Filemaker) if the RDBMS is ODBC compliant. However, this has not been tested and additional engineering work may be required.

LIBRARY MANAGEMENT MODULE

The current IMIS library module allows for catalogue management only. In order to allow for possible collaboration with ASFA as an ASFA input centre, IMIS uses the ASFIS (ASFISIS-3) record structure and scroll-lists (controlled vocabulary) such as ASFA Thesaurus, ASFA Geographic Descriptors, ASFA Journal Title Monitoring List. VLIZ decided not to use the ASFA Taxonomic Authority list because it is too limited. VLIZ is considering the use of the ITIS Taxonomic Reference list (as is the case also for ASFA).

An IMIS bibliographic record allows for 3 levels: analytic, monographic and serial. An interesting advantage of the relation structure is that e.g. for 20 chapters of a book, the monographic information needs to be entered only once in IMIS, whereas ASFISIS will require 20 duplicates.

IMIS allows for the generation of a user notification when new records have been created in the catalogue.

IMIS plans to add several library functions in the near future:

PATRONS

- add/edit patron info
- patron groups and rights
- address labels

CIRCULATION

- charge/discharge/renew item to patron
- reserve/unreserved item for patron
- notifications

ORDERS

- create/update/receive order

SUPPLIERS

- create/edit supplier

Also SERIALS CONTROL will be added (verify arrival of serials and generate warnings of non-arrival)

IMIS LIBRARY MODULE: TECHNICAL INFO

Vlizlit.mdb is started up in Access on the workstation:

Authors: reference list of authors (surname, first name, initials)

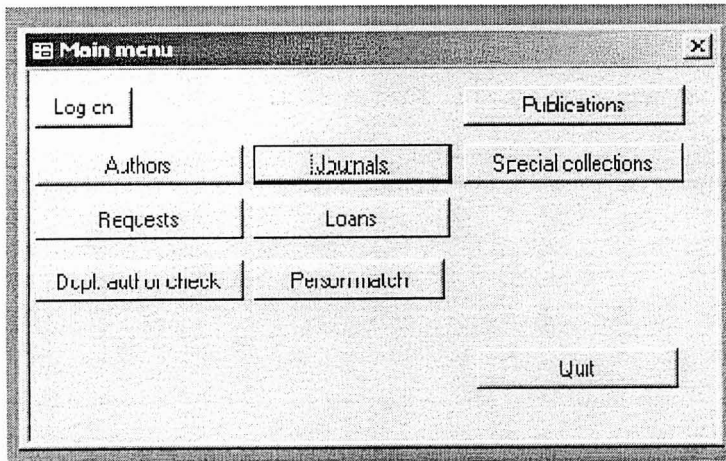
Journals: list of all journals and of the library holdings of these journals

Requests & Loans: library management tools

Duplicate Authors: checking tool to eliminate duplicate input

Person match: linking author names to person name in Persons-module

Special collections: enables identification of eg donated collections or specific bibliographies



Journals: main entry form to enter bibliographic descriptions

JournalForm: Form

ID: 4 In Antelope Public
 Approved for distribution

JourTitle: Acta Adriatica

JourAbbrev: Acta Adriat.

Publisher: Institute of Oceanography and Fisheries

City: Split, Croatia

ISSN: 0001-5113 ASFACode: 000005

ASFA Inp. C.: CS Shelf Location: 1a

URL:

Holdings Management Remarks Memo

Order	From	Year	Volume	Number	Till	Year	Volume	Number
10	1932	1	1	1966	13	1		
20	1970	14	1	1978	17	15		
30	1978	19	1	1988	29	2		
40	1990	31	1	1999	41	suppl.		
50	2000	41	1					

Record: 11 of 3506

Publications: main entry form to enter bibliographic descriptions

Basic mandatory fields are situated in the main section. Several tab-sheets allow data input related to the specific bibliographic form of the record:

- **Analytic:** relation to the source publication
- **Abstracts:** English abstract and original language abstracts when available
- **Keywords:** Thesaurus, geographical terms, taxonomic terms and free keywords are added here as needed
- **Description:** standard description of physical features and general content description
- **Address:** corresponding author's address
- **Special collection:** enables identification of e.g. donated collections or specific bibliographies

Main form and Analytic tab-sheet

Publications: Form

BIBID: 21018 In library Public

Bb Lcvc: AS Approved for distribution

Englsh Title: New evidences on the marine Holocene in the western Belgian coastal plain

OrigTitle:

Language title: English Translated by input centre

Author	Ed	Cor	Order	Details
▶ Baeteman, C	1	1	1	Details

Analytic **Abstracts** | Keywords | Description | Address | Spec. Coll.

▶ AnaID: 17167

Publication Date: 1970

Volume: 07

Issue: 1

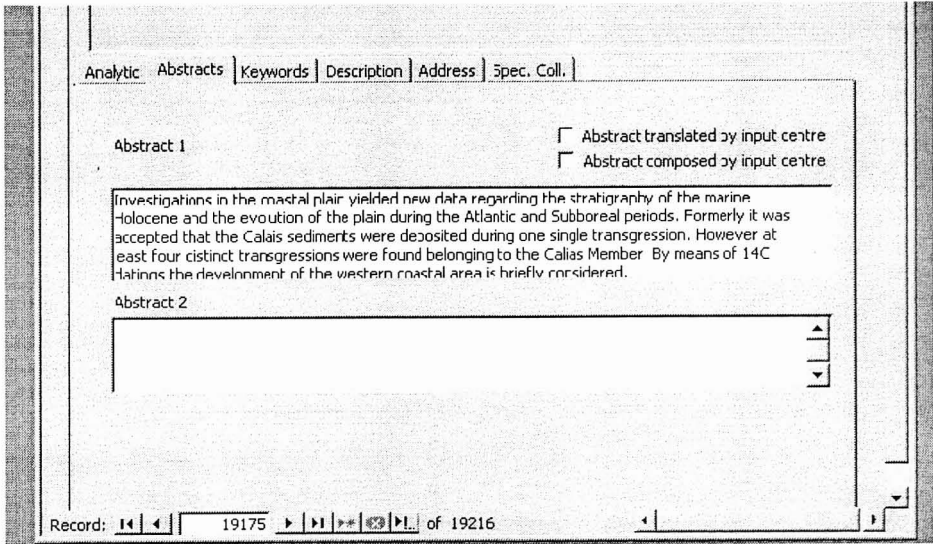
Pagination: 49-54

Journal: Bull. Belg. Ver. Geologie

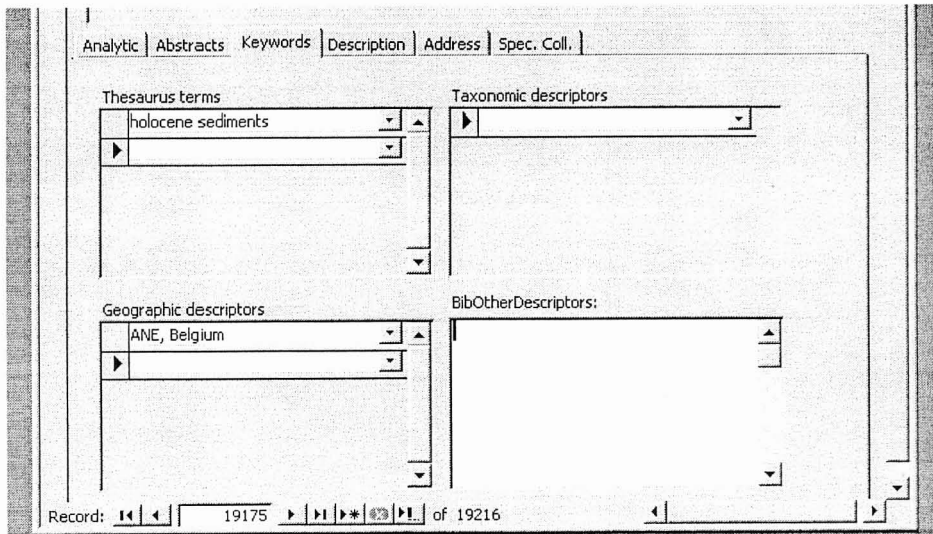
Book/Monograph:

Record: 14 | 19175 | 19216 of 19216

Abstracts tab-sheet



Keywords tab-sheet



Description tab-sheet

Analytic	Abstracts	Keywords	Description	Address	Spec. Coll.
Environment:	<input checked="" type="checkbox"/> Marine	<input type="checkbox"/> Brackish	<input type="checkbox"/> Freshwater		
Document type:	Journal article	Phys. medium:	Paper		
BibNotes:	<input type="text"/>				
Literary styles:	<input type="text"/>				
Languages:	English	<input checked="" type="checkbox"/> Summary			
	*		<input type="checkbox"/> Summary		

Record: 19175 of 19216

Address tab-sheet

Analytic	Abstracts	Keywords	Description	Address	Spec. Coll.
AdrLine1:	Belgische Geologische Dienst				
AdrLine2:	Jennerstraat 13				
AdrLine3:	B-1000 brussel				
Country:	Belgium				
Phone:					
Fax:					
Email:	cecile.basteman@mineco.fgov.be				

Record: 19175 of 19216

Special collections tab-sheet

Analytic | Abstracts | Keywords | Description | Address | Spec. Coll. |

▶	▼	▲
▶	▼	▲
▶	▼	▲

Record: 19175 of 19216

WEB-BASED OPAC

The screenshot shows a web browser window titled "Integrated Marine Information System - Microsoft Internet Explorer". The address bar shows the URL "http://www.vliz.be/vmckdata/lms/bbsrch.htm". The page header features the Flanders Marine Institute logo and name. A vertical navigation menu on the left lists various sections: info, Background, Activities, Our coast..., Databases, IMIS, Ecosystem, Institute, Literature, Journal, Publications, Project, Dataset, About, NS Research, MASHFA, Experts, National Vignette, Reuten, Calendar, Links, and Contact. The main content area is titled "IMIS - Search for publications". It includes a search form with the following fields: Title, Author (containing "mees"), Initials, Abstract/Title word, Word in any field, Publication year, and Acquisition date (dd/mm/yyyy)(note) with a dropdown menu set to "Later than". A "Search!" button is located at the bottom right of the form. Below the form, a "Note" section states: "This search option can be used to check recent acquisitions in the library. The date used is the date that the record was created in the database. For retrospective input (which is a main activity in the library, and will continue to be so for quite a while), this is obviously a later date than the one when the publication came to the library." The Windows taskbar at the bottom shows the Start button, several icons, and open applications including "Kleur ni...", "IMIS - M...", "Main menu", "Untitled...", "Publicat...", "Integra...", and "Docume...". The system clock shows "16:55".

The current web-based OPAC is quite basic allowing for searching in Title, Author, Initials (of author name), Abstract or Title word, Word in any field, Publication year and Acquisition date.

VLIZ Integrated Marine Information System: Literature - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.vliz.be/cg-bin/vmdc2web.exe

Flanders Marine Institute

IMIS: Literature

first | prev. | Records 1 to 10 of 57 | next | last

De Troch, M.; Mees, J.; Wakwabi, E.O. (1998) Diets of abundant fishes from beach seine catches in seagrass beds of a tropical bay (Gazi Bay, Kenya). *Belg. J. Zool.* 128(2): 135-154. ([Details](#))

Mees, J.; Jones, M.B. (1997) The hyperbenthos. *Oceanogr. Mar. Biol. Ann. Rev.* 35: 221-255. ([Details](#))

Lock, K.; Beyst, B.; Mees, J. (1999) Circadiel patterns in the tidal plankton of a sandy beach in Zeebrugge (Belgium). *Belg. J. Zool.* 129(2): 339-352. ([Details](#))

De Troch, M.; Mees, J.; Papadopoulos, I.; Wakwabi, E.O. (1996) Fish communities in a tropical bay (Gazi Bay, Kenya): seagrass beds vs. unvegetated areas. *Neth. J. Zool.* 46(3-4): 236-252. ([Details](#))

Mees, J.; Reijnders, P.J.H. (1994) The harbour seal, *Phoca vitulina*, in the Oosterschelde: decline and possibilities for recovery. Pp 547-555 in Niennuis, P.H.; Smaal, A.C. (Ed.) *Hydrobiologia* 282/283. *The Oosterschelde Estuary (The Netherlands): a case-study of a changing ecosystem. Developments in Hydrobiology, 97*. Kluwer Academic Publishers: Dordrecht, The Netherlands. ([Details](#))

Cattrijsse, A.; Mees, J.; Hamerlynck, O. (1993). The hyperbenthic Amphipoda and Isopoda of the Voordelta and the Westerschelde estuary. *Cah. Biol. Mar.* 34: 187-200. ([Details](#))


Verslycke, T.; Janssen, C.; Lock, K.; Mees, J. (2000) First occurrence of the Pontocaspian invader *Hemimysis anomala* (Sars, 1907) in Belgium (Crustacea: Mysidacea). *Belg. J. Zool.* 130(2): 157-158. ([Details](#))

Start | Re: Kieu... | IMIS - M... | Main menu | Untitled ... | Publicati... | VLIZ In... | Docume... | 16:58

VLIZ Integrated Marine Information System: Literature - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.vliz.be/cgi-bin/vmdc2web.exe?action=Lit&LitID=300

 Flanders Marine Institute

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IMIS: Details of publication

Diets of abundant fishes from beach seine catches in seagrass beds of a tropical bay (Gazi Bay, Kenya)

Full citation: De Troch, M.; Mees, J.; Wakwabi, E.O. (1998). Diets of abundant fishes from beach seine catches in seagrass beds of a tropical bay (Gazi Bay, Kenya). *Belg. J. Zool.* 128(2): 135-154.

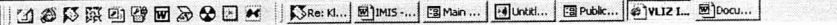
Availability: Present in the library

Abstract

The composition of the diet of 14 fish species that were common in beach seine catches over the seagrass beds of Gazi Bay (Kenya) was investigated. Three trophic guilds could be distinguished based on dietary diversity and on the numerical and gravimetical composition of the diet. *Herklotsichthys quadrimaculatus*, *Stolephorus indicus* and *Athennomorus duodecimalis* were planktivores. Their stomach fullness index was low and the diet was not diverse. The main food items were harpacticoid and calanoid copepods and brachyuran zoea and megalopae. *Apogon thermalis*, *Fowiera aurita*, *Paramonacanthus barnardi*, *Mulluoides flavolineatus*, *Lutjanus fulvillamma*, *L. argentimaculatus* and *Gerres acinaces* were benthivores, mainly feeding on small epi- and hyperbenthic prey. Their diet was very diverse and it was dominated by Amphipoda (Gammaridea), Tanaidacea and Mysidacea. Their fullness indices were low, but a little bit higher than those observed for the planktivores. A third group were the 'piscivores'. *Bothus myriaster*, *Fistularia commersonii*, *Sphyaena barracuda* and *Plotosus lineatus*. The dominant items in the food spectrum of these species were postlarval fishes and large nektonic invertebrates (gammaridean amphipods, mysids, shrimp and crabs). Their diet was not diverse and the fullness index was much higher than that of the other species examined. All other species caught were further classified according to the following feeding guilds: herbivores, planktivores, benthivores (epi- and hyperbenthivores) and piscivores. The ichthyofauna of Gazi Bay was clearly dominated by benthivores.

Author(s)

- De Troch, M.
- Mees, J.

Start |  | Re: Kl... | IMIS... | Man... | Link... | Public... | VLIZ L... | Docu... | 17:01

In cases where a 'directory of scientists' record exists the user can click on to see the full description of the selected author:

VLIZ Integrated Marine Information System: Literature - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History Print Mail News RSS

Address http://www.vliz.be/cgi-bin/vmdc2web.exe?action=Liter&Skijs=0&aName=De+Troch&aInk=M%2E Links

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[Nederlandse](#)

IMIS: Literature

De Troch, M.; Mees, J.; Wakwabi, E.O. (1998). Diets of abundant fishes from beach seine catches in seagrass beds of a tropical bay (Gazi Bay, Kenya). *Belg. J. Zool.* 128(2): 135-154. ([Details](#))

De Troch, M.; Mees, J.; Papadopoulos, I.; Wakwabi, E.O. (1996). Fish communities in a tropical bay (Gazi Bay, Kenya): seagrass beds vs. unvegetated areas. *Neth. J. Zool.* 46(3-4): 236-252. ([Details](#))

Chatterjee, T.; De Troch, M. (2000). Halacaridae (Acan) from Gazi Bay (Kenya): description and biogeography of three new and two known species. *Hydrobiologia* 427: 177-194. ([Details](#))

De Troch, M.; Fiers, F.; Vincx, M. (2000). Range extension and microhabitat of *Lightiella incisa* (Cephalocarida). *J. Zool. Lond.* 251: 199-204. ([Details](#))

Fiers, F.; De Troch, M. (2000). New Tetragnonicipitidae (Copepoda, Harpacticoida) from the Indo-Pacific. *Hydrobiologia* 434: 97-144. ([Details](#))

De Troch, M. (1995). Gemeenschapsanalyse en trofische organisatie van de ichthyofauna in een tropische baai (Gazi Bay, Kenya). [Community analysis and trophic organisation of the ichthyofauna in a tropical bay (Gazi Bay, Kenya)] BSc thesis, Universiteit Gent (RUG). 136 pp. ([Details](#))

De Troch, M.; Gurdebeke, S.; Fiers, F.; Vincx, M. (2001). Zonation and structuring factors of meiofauna communities in a tropical seagrass bed (Gazi Bay, Kenya). *J. Sea Res.* 45: 45-61. ([Details](#))

De Troch, M. (2001). Ecologie van harpacticoide copepoden: structurele biodiversiteit in tropische zeegrasvelden. [Ecology of harpacticoid copepods: structural biodiversity in tropical seagrass beds.] PhD thesis, Universiteit Gent (RUG). 254 pp. ([Details](#))

De Troch, M.; Fiers, F.; Vincx, M. (2001). Alpha and beta diversity of harpacticoid copepods in a tropical seagrass bed: the relation between diversity and species' range size distribution. *Mar. Ecol. Progr. Ser.* 215: 225-236. ([Details](#))

Start | Re: kl... | IMIS-... | Main... | Untid... | Publc... | VLIZ I... | Docu... | 17:09

For a monograph series, the separate monographs in the series are listed

VLIZ Integrated Marine Information System: Literature - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.vliz.be/cgi-bin/vmdc2web?action=LiteID&LitID=5963

Go |

Parts of monograph

Ridgway, J.; Andrews, J.E.; Ellis, S.; Horton, B.P.; Innes, J.B.; Knox, R.W.O.B.; McArthur, J.J.; Maher, B.A.; Metcalfe, S.E.; Mitlehner, A.; Parkes, A.; Rees, J.G.; Samways, G.M.; Shennan, I. (2000). Analysis and interpretation of Holocene sedimentary sequences in the Humber estuary. Pp 9-39 in Shennan, I., Andrews, J. (Ed.). *Holocene land-ocean interaction and environmental change around the North Sea. Geological Society Special Publication, 166*. The Geological Society, London, UK. ([details](#))

Horton, B.P., Edwards, R.J., Lloyd, J.M. (2000). Implications of a microfossil-based transfer function in Holocene sea-level studies. Pp 41-54 in Shennan, I., Andrews, J. (Ed.). *Holocene land-ocean interaction and environmental change around the North Sea. Geological Society Special Publication, 166*. The Geological Society, London, UK. ([details](#))

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Macklin, M.G., Taylor, M.P., Hudson-Edwards, K.A., Howard, A.J. (2000). Holocene environmental change in the Yorkshire Ouse basin and its influence on river dynamics and sediment fluxes to the coastal zone. Pp 87-96 in Shennan, I., Andrews, J. (Ed.). *Holocene land-ocean interaction and environmental change around the North Sea. Geological Society Special Publication, 166*. The Geological Society, London, UK. ([details](#))

Metcalfe, S.E.; Ellis, S.; Horton, B.P.; Innes, J.B.; McArthur, J.; Mitlehner, A.; Parkes, A.; Pethick, J.S.; Rees, J.; Ridgway, J.; Rutherford, M.M.; Shennan, I.; Tooley, M.J. (2000). The Holocene evolution of the Humber Estuary: reconstructing change in a dynamic environment. Pp 97-118 in Shennan, I.; Andrews, J. (Ed.). *Holocene land-ocean interaction and environmental change around the North Sea. Geological Society Special Publication, 166*. The Geological Society, London, UK. ([details](#))

Rees, J.G.; Ridgway, J.; Ellis, S.; Knox, R.W.O.B.; Newsham, R.; Parkes, A. (2000). Holocene sediment storage in the Humber Estuary. Pp 119-143 in Shennan, I., Andrews, J. (Ed.). *Holocene land-ocean interaction and environmental change around the North Sea. Geological Society Special Publication, 166*. The Geological Society, London, UK. ([details](#))

Start | Re: KL... | IMIS -... | Main... | Unknl... | Public... | VLIZ L... | Docu... | 17:11

In the Conference module information on conferences and symposia is listed:

Vlaams Instituut voor de Zee (VLIZ)
Flanders Marine Institute

IMIS: Conference details

Studiedag: 'Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen'

Organisers: Vlaams Instituut voor de Zee (VLIZ)
City/Place: Thermane Palace, Oostende
Country: Belgium
Beginndate: 11/9/2001
Enddate: 11/9/2001
EMail address: info@vliz.be
web site: <http://www.vliz.be>

Proceedings: Mees, J.; Seys, J. (2001) Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen: Studiedag, Oostende, 9 november 2001. [Coastal and marine management: policy supporting research in Flanders: Symposium, Oostende, 9 November, 2001] VLIZ Special Publication, 4. Vlaams Instituut voor de Zee (VLIZ): Oostende, Belgium. IV, 82 pp. (details)

Navigation menu: Home, Background, Activities, Our coast, Databases, IMIS, Position, Agency, Education, Research, Publications, Reports, News, Publications, MACP/EA, Events, Marine/Vicarious Banker, Calendar, Links, Contact, Site map, Nederlands.

Browser status bar: Start, Res: kl..., TIMIS..., Man..., Untel..., Public..., VLIZ I..., DocU..., 17:14

Again, if Proceedings have been published, the references are listed in IMIS:

VLIZ Integrated Marine Information System: Literature - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address <http://www.vliz.be/cgi-bin/vms2web?action=LiteID&LiteID=17824> Links

IMIS: Details of publication

Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen: Studiedag, Oostende, 9 november 2001. [Coastal and marine management: policy supporting research in Flanders: Symposium, Oostende, 9 November, 2001.]

Full citation: Mees, J.; Sveys, J. (2001). Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen: Studiedag, Oostende, 9 november 2001. [Coastal and marine management: policy supporting research in Flanders: Symposium, Oostende, 9 November, 2001.] VLIZ Special Publication, 4. Vlaams Instituut voor de Zee (VLIZ). Oostende, Belgium. IV, 82 pp.

Availability: Present in the library

Language original title: Dutch , title translated at input centre

Language publication: Dutch

Author(s)

- [Mees, J.](#) (Editor)
- [Sveys, J.](#) (Editor)

Monograph information

Publisher: Vlaams Instituut voor de Zee (VLIZ)
City: Oostende, Belgium
Volume in series: 4

Conference:

Title: Studiedag: 'Beheer van kust en zee: beleidsondersteunend onderzoek in Vlaanderen'
Organisers: Vlaams Instituut voor de Zee (VLIZ)

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The Projects module contains data regarding current and finished projects:

IMIS - Project details

Biotic interactions in turbid estuarine systems

Short name: Biotic interactions in turbid estuarine systems

Reference number: G010499N

Period: 1/1999 - 12/2002

Sponsor: Fonds voor Wetenschappelijk Onderzoek - Vlaanderen

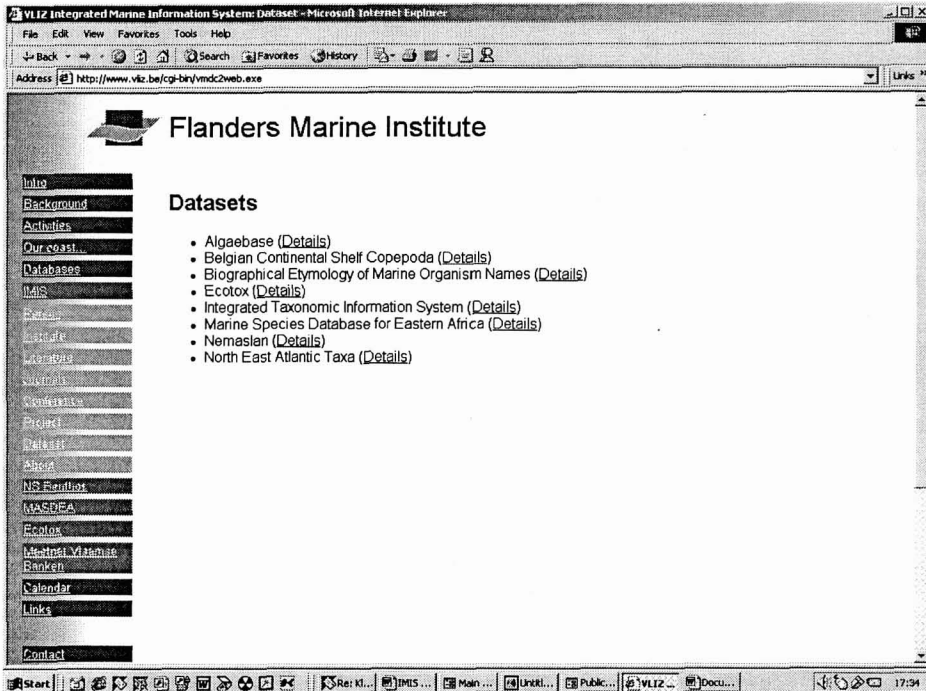
Description: Study of the relative importance of primary production , bacterial production and detritus aversion for the planktonic foodweb. Biotic interactions in the micro- and macrobenthic foodweb. Feeding behaviour of macrocrustacea, fish and birds.

This project aims to contribute to a better understanding of the structure and function of estuarine food webs by studying selected biotic interactions in the plankton and benthos of the schelde estuary (The Netherlands, Belgium). Objectives: (1) The study of the relative importance of primary production, bacterial production and detritus in the planktonic food web. (2) The study of important biotic interactions in the micro- and meiobenthic food web. (3) The study of the feeding ecology of higher trophic levels (fish, macrocrustacea and avifauna) and their impact on lower trophic levels.

Institutions and Scientists

- [Universiteit Gent \(RUG\): Vakgroep Biologie: Afdeling Protistologie en Aquatische Ecologie](#)
 - [Vynerman](#)
- [Universiteit Gent \(RUG\): Vakgroep Biologie: Afdeling Mariene Biologie](#)
 - [Vincx](#)
- [Instituut voor Natuurbehoud](#)
 - [Meire](#)
- [Katholieke Universiteit Leuven: Departement Biologie: Laboratorium voor Aquatische Ecologie](#)
 - [Ollewer](#)
- [Vrije Universiteit Brussel \(VUB\): Vakgroep Biologie: Laboratorium voor Ecologie en Systematiek](#)
 - [Dara](#)
- [Vrije Universiteit Brussel \(VUB\): Vakgroep Scheikunde: Laboratorium Analytische en Milieuchemie](#)

Finally, a list of available datasets is also presented, (experimental to date)



The good, the bad and the future

Very quickly, the marine community in Flanders started using the new information system. From the beginning people highly appreciated the integrated presentation of marine information. One single access point (the web-interface of IMIS) provided all answers to the FAQ of our marine researcher: who, where, what, when, with whom, why? Coming from a situation where one had to spend days and weeks to gather this kind of data (by phone, fax, letters, personal communication, etc.), this new tool was a long-awaited asset.

Soon enough, however, some weak points in the system became visible:

- An integrated information system gives the user an impression of completeness, but the input of data remains an intensive, relatively slow process. So, many names, addresses, core publications and other important data are still missing.
- At the level of integration of the different modules, some obvious links were missing (e.g. the merging of publication lists of an author, publishing as Prudhoe, J. and Prudhoe, J.R.M.).

- Solutions were needed to link on line full text documents to records in the databases on a permanent basis.
- A solution was needed to link references to a printed article, as well as to the same article published on a CD-ROM (or on another physical form).
- Users notified us of the need for a two-way information management: identified remote users must be able to manage and add information to the system, and have the ability of extracting data and references in a personalised format.

All these problems and other flaws of the system needed to be resolved, as well on the level of data gathering, input management as database structure and functionality. So the decision to write version 2 of IMIS was an obvious one.

However, as IMIS 1.0 proves to be a widely used and appreciated tool within the Flemish marine community, we can give the necessary time and attention to the writing and implementing of this new version. Due to the fact IMIS already exists and works, the Flemish marine community is rapidly moving towards a similar model of coordination and structural contacts, as well with VLIZ as with each other. The massive feedback we receive from all users proves that the tool was needed, but also that it is far from perfect, and needs a lot of attention to grow into a strong valuable information tool. We believe this is possible, and that integrated information management will be the best choice for the future.



CROATIAN SCIENTIFIC BIBLIOGRAPHY (CROSBI)
- FOUR YEARS EXPERIENCE
<http://bib.irb.hr>

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ABSTRACT: The differences between traditional vs. electronic bibliography are described. There are four elements in the Croatian Scientific Bibliography (CROSBI) creation process: the bibliography itself; the Croatian Ministry of Science and Technology (MST), scientists and their institutional libraries. The main features of the web interface and functions are presented. Advantages and disadvantages of such a specific approach are discussed. Some results of four years experience, as a distribution of the bibliographic records according to document type, institution and scientific project, are presented.

“What the bibliographer is concerned with is pieces of paper or parchment with certain written or printed signs. With these signs he [she] is concerned merely as arbitrary marks; their meaning is no business of his [hers].”

Sir Walter Wilson Greg (1911)

BACKGROUND

Although Croatia is a very young country (since 1991) the first Croatian bibliography is very old and comprehensive: *Bibliographia Croatica (cro. Bibliografija hrvatska)* published 1860 and 1863 (all publications from 15th century to 1863), the situation in the early nineties was not promising. As in many countries also in Croatia National and University Library is being publishing the Croatian National Bibliography in traditional paper format, but this bibliography is covering only the papers published in Croatia. Scientific communication is not limited inside country borders and Croatian scientists are publishing a lot in international journals, especially in the field of sciences and biomedicine. Paper-based bibliography covering only a small percentage of scientific publications is not a reliable and accessible source of information. For that reason many academic and research institutions started to build their local or thematic bibliographies. Data about Croatian research papers has been scattered across different commercial databases also.

A comprehensive, current, accurate and accessible bibliography is even more important in small countries like Croatia, with only eight thousand scientists. Scientific research in Croatia is financed by the Ministry of Science and Technology (MST) through research projects. The most important criteria for project evaluation and subsequent funding is the

number of papers published by researchers working on various projects. That was the main reason for the Ministry of Science and Technology to initiate a concept of electronic bibliography in the network environment. The first few more or less successful initiatives were the good test bed for the CROSBİ (Croatian Scientific Bibliography) project, which started in the early 1997, and is created and maintained in the Ruđer Bošković Institute Library. Being designed to hold information about projects, researchers and bibliographic references, this electronic bibliography is expected to improve scientific communication and enable research projects to be acknowledged and properly evaluated. In addition to helping both MST and researchers, CROSBİ is a potential source of numerous scientometric analyses.

ELEMENTS OF THE CONCEPT

There are four main elements in the concept of the CROSBİ electronic bibliography:

1. Bibliography

From the very beginning CROSBİ was intended to solve some of the major problems and limitations of the existing traditional bibliographies:

- a) delay – the bibliographic data are entered into the CROSBİ database soon after publishing, or even immediately after being accepted for publishing;
- b) low flexibility – all types of publication can be present in the CROSBİ database, not only journal papers or books;
- c) coverage – CROSBİ bibliography is covering all publications if one of the authors is Croatian, and all publications published in Croatia;
- d) access – the database can be accessed 24 hours 7 days a week
- e) low usability – built by scientists themselves, CROSBİ database usage inside the scientific community is very high.

2. Librarians

In the CROSBİ concept librarians are not creators of the database, namely professionals responsible for the input. The librarians expertise is built into the web interface, database maintenance, and statistical and scientometric analysis.

3. Scholars

Having in mind motivating reasons for academics to publish, as peer recognition, leading to promotion, tenure and increase in salaries, the wish to add to the sum of human knowledge in their own academic disciplines and communication with their colleagues,

scholars in the CROSBI concept are information providers. The scientific community also has also strong demands for data about current research.

4. Ministry of Science and Technology

Scientific research in Croatia has been financed through Ministry of Science and Technology by direct financing of agreed programs implemented by public institutes and projects performed by faculties and other legal entities with a mechanism of annual monitoring of results. The most important criteria for the project evaluation and subsequent funding are the number and quality of papers published by a scientist engaged in different projects. A complete, accurate, and reliable bibliography of scientific papers is crucial for this purpose.

FUNCTIONS

What are “pieces of parchment” in a current research information system like CROSBI? CROSBI is collecting data about published and unpublished papers on all media, current projects, research fields, institution and scientist. Essential functions of the CROSBI e-bibliography are:

- Continuous creation of the knowledge base;
- Significant improvement of scientific communication and proper acknowledgment and evaluation of research;
- source for the numerous scientometric analyses of interest to the scientific community.
- CROSBI is designed to provide:
- accurate and current information about research papers (published, accepted for publishing, unpublished);
- information about current research project papers (to be browsed and retrieved by project name, institution or subject field);
- provision of a full-text document retrieval from the bibliography archive (respecting copyright agreement);
- service, which is easy to use and available 7 days a week as a source of reference;
- source of reference for different research and academic institution to ease the maintenance of their personal or local databases;
- facility to merge all existing digital records in the archive of the MST bibliographic records into one unified database at some point in future;
- an exchange of information on the international level.

WEB INTERFACE

There are several modules on the CROSBI main page providing data input and data retrieval.

FAQ offers answers on frequently asked questions, which are mostly connected to the additional categorisation of publications, network problems and Croatian fonts. The difference between types of publications is explained by the meaning of a particular bibliographic field.

Browsing module includes browsing by programs, projects, subject field and scientific institution. MST provides all of the authority files used. Limits to a publication type or time period are provided.

Simple Search offers a search by Author, Title or Key-word fields, which can be limited to one type of publication. *Advanced Search* is not really advanced, but includes the possibility to search by several fields at the same time (Figure 1).

Data Input and *Data Correction* modules include complex web forms for different types of publications. One paper has to be entered into the database once and could be associated to several programs/projects at the same time. The data about different publication types have been collected (Figure 1):

1. Journal paper (journal article, review article, conference proceedings paper, letter, bibliography, news, editorial, comment, note, discussion, survey, etc.)
2. Journal paper in press
3. Book
4. Book chapter
5. Textbook
6. Doctoral thesis, master's thesis, graduate thesis
7. Conference proceedings paper
8. Patent
9. Other.

After the paper has been accepted or just prepared for publishing, the scientist has to fill in the bibliographic data into the CROSBİ database by using a user-friendly web interface, and the full-text document can be uploaded easily into the CROSBİ electronic archive.

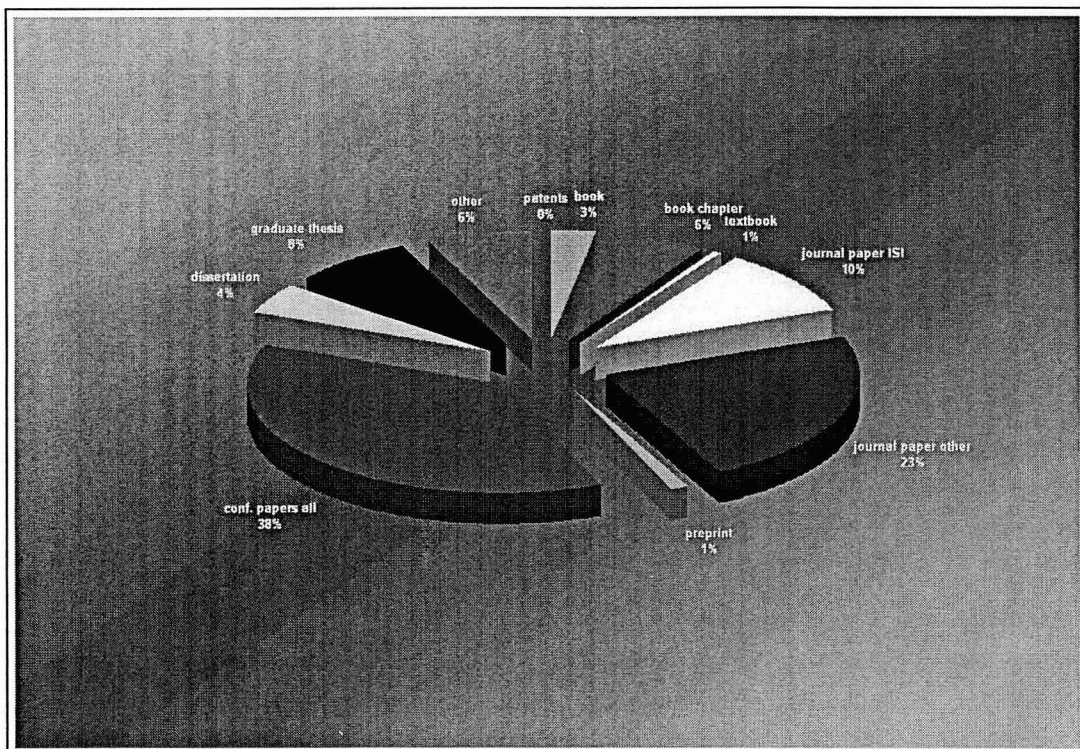


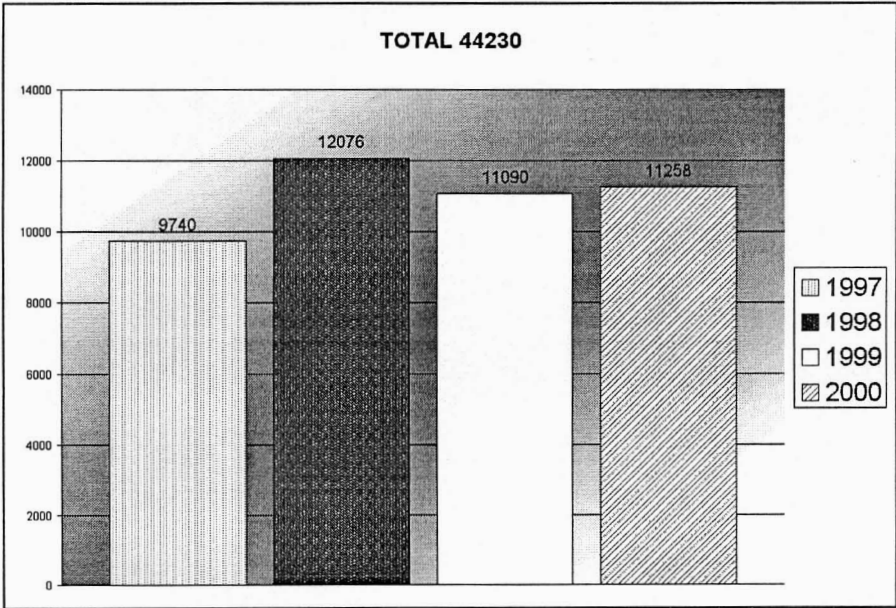
Figure 1. Different type of documents and their presence in the database

Some crucial bibliographic data are collected in English language as well (title, key words, abstract). Now, we are in the process of completing the English version interface. For each publication type, an additional categorisation is provided, e.g. a journal paper has different categories such as scientific, professional and other. The data containing information whether a journal is indexed in the *Current Contents* or other *Institute for Scientific Information* (ISI) secondary publications is included in the bibliographic description. The data about other international secondary publications is included also. For MST as a financing body, it is very important that Croatian scientists publish their papers in international journals with high impact in the scientific community.

RESULTS, STATISTICS

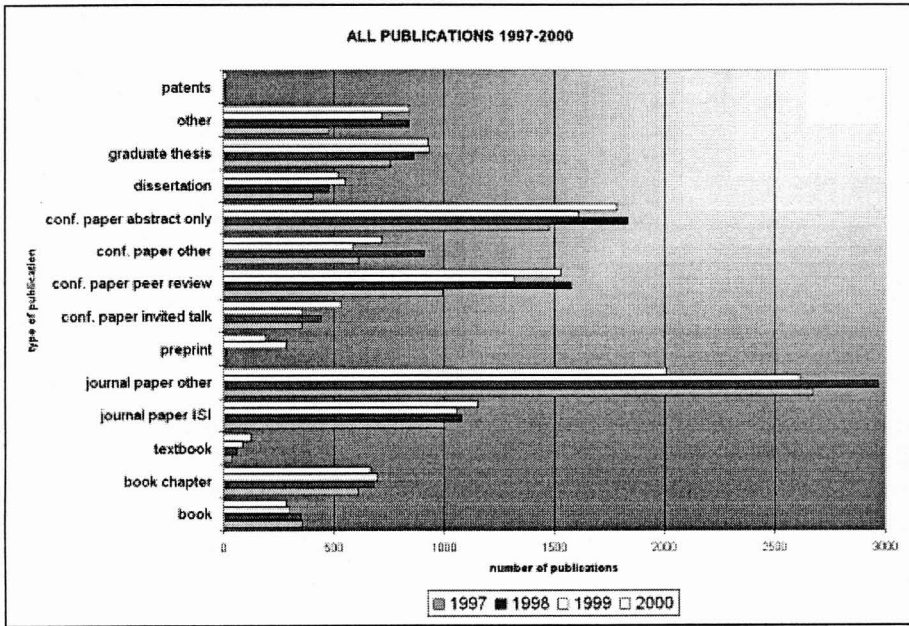
There are approx. 1,200 outgoing scientific programs and projects financed by the Ministry of Science and Technology. Figure 2 presents the scientific output from all programs and projects in the period 1997-2001.

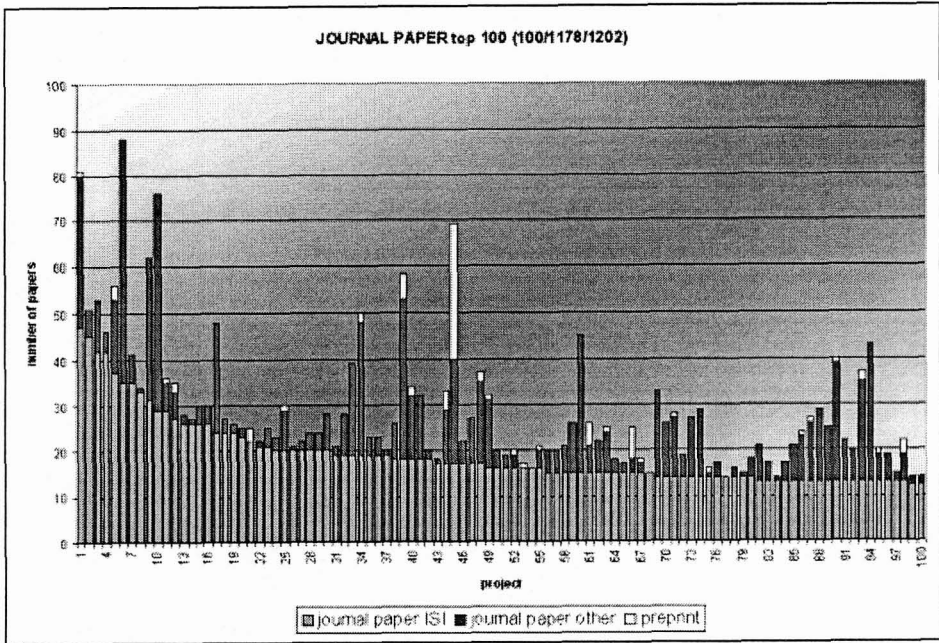
Figure 2. Number of bibliographic records (1997-2000)



If we look at the total four-year scientific production by different type of the document, it is obvious that scientists mostly publish in journals (Figure 3). A review of journal papers has shown that 6,016 papers were published in journals indexed in ISI databases (*Current Contents*, *Science Citation Index*, *Social Science Citation Index*, *Arts and Humanities Citation Index*), 6,526 papers were published in other journals (domestic and

international, not indexed in the ISI publications) and 1,514 papers were accepted for publishing but have not been published yet. A significant part of journal papers (almost half) were published in the internationally recognizable journals covered by secondary publications of the Institute for Scientific Information. Their selection process, although not perfect, includes all journals with high impact in the scientific community (Garfield, 1979). The fundamental issue for scientists in small countries such as Croatia is to publish their best-quality papers in the best international journals (Figure 4).





Traditional conferences are another well-established way of disseminating information, and therefore papers in conference proceedings are so high in number. Although development of Internet improved the information flow significantly and established communication channels that did not exist before, participating in traditional conferences is still very popular. Thankfully, technology has still some way to go, before it can seriously compete with the advantages of physically attending a real conference and meeting real people. We have divided conference proceedings papers into four main categories:

1. Invited talks – plenary sessions, assuming the most prestigious kind of conference participation;
2. Conference proceedings papers with peer review;
3. Conference proceedings papers without peer review;
4. Conference papers published only in the book of abstracts (posters usually).

The top 100 projects with the biggest number of conference papers are presented in Figure 5. Information about presentation tools is also collected in the database, and it is indicated which kind of presentation is behind any published paper: lecture, invited lecture, poster, demonstration or some other.

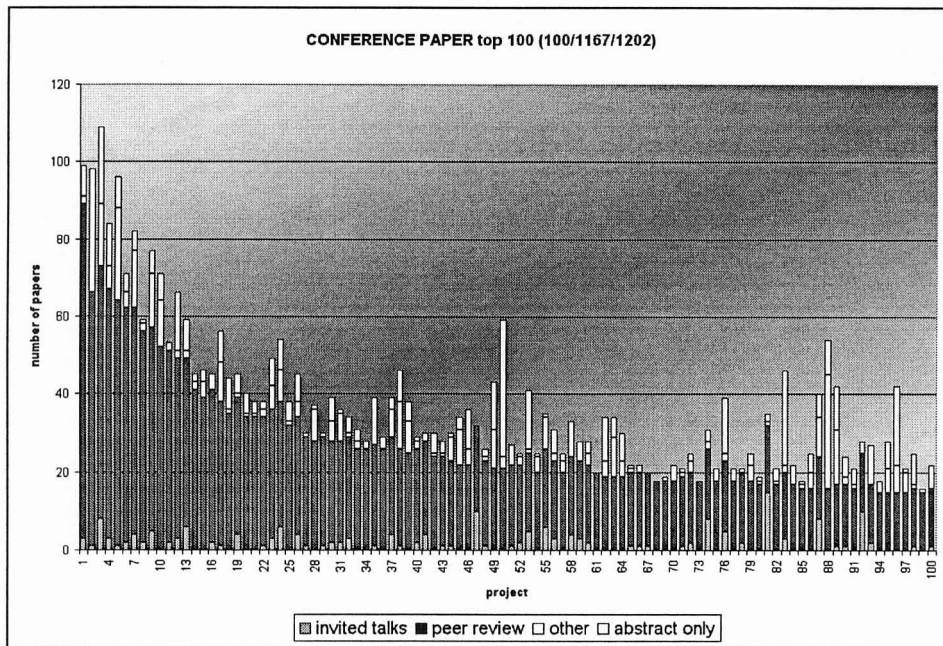


Figure 5. Top 100 projects according to conference papers

FUTURE

There are still a lot of problems connected with the CROSBI database. We are facing human errors, duplicate entries, incomplete records, paper categorization failure, typing mistakes, lack of authority control and lack of proper indexing. The present hardware and software platform doesn't allow the appropriate level of authority control, and could be changed only with the bigger investment in the project (the CROSBI project is financed by \$10,000.00 per year).

For the future development we are planning to improve:

- retrieval facilities with sorting, printing and saving functions,
- field control (to avoid common mistakes) and authority control (authors, project names and numbers, institutions, journal titles, etc.),
- electronic full text archive with standard network formats and open public access (copyright issues),
- document exchange and network retrieval standards implementation,
- database maintenance by library professionals
- hypertext possibilities

CONCLUSION

The electronic bibliography as described here, has not much in common with traditional bibliographic tools. Its priorities are currency, accuracy, coverage and access. Being a rapidly changing structure, it tries to implement all requests coming either from users or librarians. Bearing in mind all imperfections of the system, we find our continuous contact with scientists motivating and progressive. After all, one of the CROSBİ premises is that all works published by Croatian authors are of the greatest importance, regardless in which country they are published, in which publication or media.

The greatest importance of the whole system is not in the system itself, but in its content. Scientific output as a result of research performed on 1,200 scientific programs and projects in a four years period is certainly impressive. All scientometric studies and papers take into account just the most significant part of Croatian scientific output - journal articles from the journals indexed by the Institute for Scientific Information secondary publications. In this sense the four years of scientific output is unique and valuable. The insight into publications, their types and number shows publishing habits of Croatian scientists. A more detailed analysis could provide information on differences between scientists from different subject fields and much more.

A lot of questions are still open and it is difficult to predict how the world of scholarly publishing will change, what kind of publishing pattern scholarly authors will have in the future, and how this will be reflected in bibliography development.

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EURYDICE: A PLATFORM FOR UNIFIED ACCESS TO DOCUMENTS

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ABSTRACT: In this paper we present Eurydice, a platform dedicated to provide a unified gateway to documents. Its basic functionalities about collecting documents have been designed based on a long experience about the management of scientific documentation among large and demanding academic communities such as IMAG and INRIA. Besides the basic problem of accessing documents – which was of course the original and main motivation of the project - a great effort has been dedicated to the development of management functionalities which could help institutions to control, analyse the current situation about the use of the documentation, and finally to set a better ground for a documentation policy. Finally a great emphasis – and corresponding technical investment – has been put on the protection of property and reproduction rights both from the users’ institution side and from the editors’ side.

KEYWORDS: Digital library, electronic document, electronic access, digitization, libraries consortium, shared mode access, documentary resources, documentation policy

Developers staff :

Serge Rouveyrol, Cyril Araud (IMAG)
Bruno Marmol, Florian Dufour (INRIA Rhône-Alpes)

Introduction

Electronic access to information has been a main concern since the nineties. It has led to a considerable improvement in document exchanges between libraries and to an equally important evolution considering users' autonomy. Electronic access is by now a common feature of all research and university libraries and has triggered a fast evolution of these institutions.

This authentic mutation has occurred in the context of fast development and dissemination of new technologies but also often in the context of a relative stagnation - when not a decrease - of financial resources. The access to scientific information has by now a considerable impact on library budgets.

Considering either simple operations such as information retrieval (access to databases) or access to documents themselves (either in paper or in electronic formats), subscription costs have more than doubled (particularly in the domain of exact sciences). It is by now a well-known concern that editors may become more important as electronic documents become more common compared to paper documents.

Warned by information professionals, universities and research institutes of the Rhône-Alpes region have decided to promote a long-term policy for a better exploitation of the regional documentary resources. This policy is clearly inspired from examples in the US and Canada.

BRAIN and CAMPRA

The BRAIN¹ initiative was launched in 1998. To undertake this project, CURA² - a consortium of regional universities and French Grandes Ecoles, along with national research institutions such as CNRS³, Cemagref⁴, INSERM⁵, INRIA⁶, INRETS⁷ has decided to found its action on a coordination among all these involved institutions. Five working groups have been designated for (i) access to electronic journals and catalogs (ii) acquisition of digitised corpuses (iii) digitalisation of paper documents (iv) digitalisation of manual catalogs and (v) the design of a regional gateway on the web for accessing electronic documentation. All the proposed actions were aimed to benefit the entire community of the researchers of the region.

¹ BRAIN :Bibliothèque Rhônealpine de l'Information Numérique

² CURA : Conférence Universitaire Rhône-Alpes

³ CNRS : Centre National de la Recherche Scientifique. URL : <http://www.cnrs.fr>

⁴ Cemagref : La Recherche pour l'Ingénierie de l'Agriculture et de l'Environnement. URL : <http://www.cemagref.fr>

⁵ INSERM : Institut National de la Santé et de la Recherche Médicale. URL : <http://www.inserm.fr>

⁶ INRIA : Institut National de la Recherche en Informatique et en Automatique. URL : <http://www.inria.fr>

⁷ INRETS : Institut National de Recherche sur les Transports et leur Sécurité. URL : <http://www.inrets.fr>

The participant institutions have – among other specifications – aimed for the optimization of subscription funds use the amount of which cumulates to several tens of million francs at the regional level. This optimization is undertaken via a common organisation regarding negotiations with editors to obtain better prices, and with the Centre Français de la Photocopie regarding duplication rights. The creation of a regional consortium quickly appeared as an obvious solution as the infrastructure of an effective, multi-site, coordination.

According to this policy, CAMPRA⁸, a regional consortium of documentation centers supported by BRAIN has been designed and assigned three major goals :

- distributed access to large electronic catalogs such as Current Contents, Inspec etc.
- access to electronic versions of journals subscribed by the consortium.
- design of a platform aimed to support a common policy about the sharing of electronic documents and a better acquisition strategy.

The design, implementation and experimentation of the Eurydice⁹ platform is the main outcome of the third axis of this regional policy.

Outlines of the Eurydice Project

Eurydice is a platform aimed to provide all the partners of CAMPRA a unique environment for accessing documents (either in paper or electronic format) and electronic catalogs.

This ongoing project is financially supported by the Rhône-Alpes region and the participants involved in the project on a 50% basis. A first phase of the project has led to the development of a first version of the platform and involved three partners : IMAG¹⁰, INRIA Rhône-Alpes and XRCE¹¹. This original version was derived from a former platform dedicated to the digitization « on demand » and the electronic distribution of paper documents named CALLIOPE¹². Two new partners – ISH¹³ and ENSL¹⁴ - have recently joined this development group for an experimentation program which constitutes the second phase of the project. This second phase has recently started with the installation of the Eurydice platform in these two institutions, and its outcomes – through

⁸ CAMPRA : Consortium pour l'Accès Mutualisé aux Publications scientifiques numérisées en Rhône-Alpes

⁹ Eurydice : wife of Orpheus, daughter-in-law of Calliope

¹⁰ IMAG : Institut d'Informatique et Mathématiques Appliquées de Grenoble. URL : <http://www.imag.fr>

¹¹ XRCE : Xerox Research Center Europe. URL : <http://www.xerox.fr/>

¹² Cf. : Alauzun, C. et Laurent, P. - « CALLIOPE : un exemple de mise à disposition d'un fonds documentaire scientifique », *Micro-bulletin*, 1999, 3.

¹³ ISH : Institut des Sciences de l'Homme de Lyon. URL : <http://www.ish-lyon.cnrs.fr/>

¹⁴ ENSL : Ecole Normale Supérieure de Lyon. URL : <http://www.ens-lyon.fr/>

extensive final-users tests – will hopefully ease the dissemination of the platform among the regional members of the CAMPRA consortium.

The Eurydice Platform

Main functionalities

Eurydice is a platform managing controlled access to scientific publications. The intended users are researchers and academics from the member institutions participating in the experiments and – ultimately – any institution within CAMPRA. The general goal is to provide a distributed access to papers within journal collections. An important feature lies in the possibility for any registered user to access papers from journals which have been subscribed by his institution, or by any other associated institution.

Eurydice has been designed to provide access to articles themselves and to a series of services integrated in a unique interface, based on pre-defined institution profiles. Access rights and associated services are related to these profiles.

From users' point of view

The starting point when using Eurydice is the Summary Server which contains lists of journals subscribed by each institution. Journal titles are clustered based on domains. By now – during the experiment phase – two domains have been selected : human sciences and exact sciences (including computer science and applied mathematics), any given title being possibly related to one or two domains. The selection of relevant titles to be offered in this context results from a cooperation between the various documentation centers associated within the consortium, depending on their actual subscriptions and the services they plan to provide (see below the corresponding constraints).

Access to Eurydice is controlled, based on user identification and/or user's machine IP number. This allows for adapting formats of displayed pages and services to the actual rights subscribed by each user's institution, regarding accessed information sources. As will be seen later, this distinction is shown to the users based on specific access icons displayed jointly with document titles.

Beyond the simple browsing through title lists sorted by domains or by journal titles, Eurydice provides – and this is a main feature of the platform – a direct access to any individually selected paper.

Downloading selected papers is not systematic ; this is done only at the explicit request of the authorized user (i.e., if the user estimates that the article is relevant to his/her information need). The downloading process itself is optimized by a caching strategy which avoids further network accesses to the paper home-site if another authorized user wants to download it (once a paper has been downloaded, a specific icon signals that it is now fast-accessible on the site for further authorized access). When selecting this second case by depressing the corresponding button, the user will trigger – in a totally

transparent way – a procedure adapted to his own access rights (i.e., the access rights subscribed by his parent institution) and to the availability of the requested article.

The available procedures are described in the following table :

Processing	Paper Destination	Paper Delivery	Reception format	
Transfer of the original PDF format	Member of a subscribing institution	Delivery on the user's workstation	<i>Electronic</i>	Local Mode Access
Printing by the subscribing institution	Member of an affiliated, but not subscribing institution	Delivery on an authorized printer of the affiliated institution	<i>paper</i>	Shared Mode Access
Printing the document server of the subscribing institution	All authorized users	Delivery on an authorized printer	<i>paper</i>	
Classical photocopy	All authorized users	Delivery by postal mail	<i>paper</i>	

Processing	Paper Destination	Paper Delivery	Reception format	
Transfer of the original PDF format	Member of a subscribing institution	Delivery on the user's workstation	<i>Electronic</i>	Local Mode Access
Printing by the subscribing institution	Member of an affiliated, but not subscribing institution	Delivery on an authorized printer of the affiliated institution	<i>paper</i>	Shared Mode Access
Printing the document server of the subscribing institution	All authorized users	Delivery on an authorized printer	<i>paper</i>	
Classical photocopy	All authorized users	Delivery by postal mail	<i>paper</i>	

Beyond this basic functionality about accessing documents, whatever their original format through a single, unified procedure and a unique environment, Eurydice offers :

- a search engine to investigate the Summary Database
- an Alert Service about one or several titles selected by each individual user

It should be clear, however, that Eurydice is not a bibliographic database. Information available on the Summary Server is extracted from journal summaries : title and journal ISSN, title and authors of articles, abstracts (when available), volume number, date and page numbers. These are the information items indexed by the system and hence usable as query items for the search engine (based on a simple query interface).

Summaries are stored on a common server for all the affiliated partners. This centralised organisation allows Eurydice to provide the Alert Service mentioned above. This Alert Service allows any individual user to « subscribe » to any title, or list of titles, whatever the involved editors, and to receive (at his e-mail address) the latest available summary(ies) as soon as they have been received from the editors (the summary database is updated on a daily basis). The user may then, from his own workstation, seek and access relevant papers immediately after their electronic publication. At this time the Alert Service is based only on title selection ; in the next version it is planned to base this filtering process on *thematic profiles* defined by individual users.

Eurydice and authors' copyrights

Eurydice's underlying strategy about legal rights is based on French regulation in the domain of author copyrights and photocopy regulation. It should be clear now (from the table above) that whatever the situation, any requested article is delivered to the user using only two possible formats :

- if the user's parent institution has subscribed for the electronic version of the corresponding journal, the article is delivered in its electronic version on the user's workstation. The user may then store it or print it ; all legal aspects regarding this situation have been fixed when the parent institution has negotiated the subscription with the editor, and hence are applicable to any member of this institution.
- If the parent institution has not subscribed either to the paper or electronic version of the journal, the article may be delivered (if available) from another affiliated institution, provided that it has subscribed to this journal.

It is important to notice that in this case the *article is always delivered in paper format*. As shown in table 1 above, this may be done by printing the paper on a printer located in the user's institution, or by classical photocopy from a paper version of the journal and postal mailing to the user. The new situation here is that all these underlying procedures of requesting a printed version from an other affiliated site having the needed paper in electronic version, or asking an affiliated site having a paper version (when no electronic version is available among the affiliated institutions) are completely automatic and transparent for the user. The shape of the request icon warns him that his request can or

cannot be satisfied immediately and, in the later case, that he will receive a message advising him when the article is available and through which procedure (i.e., printed by an authorized document server on an authorised printer within his environment, or photocopied and mailed). When printed by a document server, the server counts the copy and a record of the procedure is stored for further internal billing procedure between the involved institutions .

Most important regarding copyright is the fact that a payment record is automatically generated to fulfill legal copyright obligation to be paid to the CFC¹⁵. Finally, it is important also to notice that the user does not have to worry about which institution to contact to obtain the article : Eurydice entirely manages this aspect of the « localisation » process.

Libraries' Point of View

As explained before, Eurydice provides direct access to document articles requested by individual users from their office. One might then see Eurydice as a powerful shortcut of library classical services and information circuits. It has to be pointed out that using Eurydice, each library - or documentation center - keeps full control of its documentation policy, and particularly of the modalities (among those listed before) which will be offered to the users. Except for specific agreements between institutions willing to share information and services (and possibly costs), every journal subscription paid by a given documentation center of course remains its own property and in its complete access privacy.

On the other side, the documentation center may decide to *share information* (either in paper or in electronic format) and services with some other partner institution(s). It should be clear from the previous explanations that such a process will be (i) entirely based on paper versions of any requested article and (ii) that most of the administrative burden related to this kind of exchange will be undertaken by Eurydice itself. What remains for manual processing is photocopying or digitizing the article (and mailing it, in the later case).

Of course choosing the digitization (upon mailed request) of documents as an offered service has potentially a strong impact on the organization and the work load of any voluntary library or documentation center. This service can be appropriately billed and managed using Eurydice, and collected fees may help to support the corresponding additional investment and salary costs. One main goal of the ongoing experiment is precisely to analyse - in real situations - the organisational and cost impacts of such approaches.

¹⁵ CFC : Centre Français d'exploitation du droit de Copie. A legal, nationwide institution, which collects copy taxes and returns due fees related to photocopies of private material to the editors. See the CFC web site at : <http://www.cfcopies.com/accueil.htm>

Besides friendly interfaces for collecting users' requests also available of course to librarians and their technical staff, Eurydice offers powerful management tools for maintaining document corpuses and for analysing users' behaviour and needs about documentation.

Each library or documentation center has to undertake a basic processing of available document summaries.

Though new summaries are automatically included in the summary database from various private – or possibly public – sources (e.g. Swetscan, editor servers etc.), and despite the professionalism of these providers, errors or missing information within delivered summaries are not rare events. As a result, and in order to maintain information consistency, each partner has to control and maintain in a correct and up-to-date status the information provided on the Summary Server.

To fulfill all these important aspects of documentation management Eurydice provides an "Administration Interface" which allows documentation administrators to correct summaries, to manually add some missing ones, to modify access rights, to interrupt or suppress inactive or useless Alert Services etc.

We have already suggested the possibility of analysing users' behaviour through the unified interface of Eurydice. It is clear that Summary Servers and Document Servers keep records about accesses to their own categories of information (summaries, actual papers and journals). This information – of course kept anonymous in terms of individual identity – establishes an extremely valuable statistical link between institutions (i.e. universities, schools, research labs, research groups, etc. all identified through lists of IP addresses) on one hand, and titles and journals (and hence editors) on the other hand. Eurydice allows maintenance of such statistics, and offers a fairly simple interface for exporting these raw data to an Excel™ application for example. Then it is up to the documentation manager to analyse, interpret and exploit this information for a better control of his/her documentation policy.

Finally it has to be noted that Eurydice allows the storage of all the information managed by the Summary Server, independently of any commercial provider. This is an important feature : Eurydice then ensures the persistence of acquired summaries based on archives, and hence ensures their availability to the users throughout time.

Institutions' Point of View

Using Eurydice, libraries and documentation centers may collect accurate statistical information about information needs and users' behaviour, and provide them to their parent institutions. This information will in turn help institutions to be accurately informed about this important side of academic life and hence it will help making appropriate decisions in this domain. Moreover, these statistics will help institutions considerably to find and design documentation partnerships with other institutions

owning complementary information sources, based on such accurate view of their users' needs compared to their available documentation and financial resources. This aspect has still to be experimentally evaluated, but there is some clear evidence that Eurydice could help reducing costs based on a better sharing of documentation costs.

The System Structure

For historical reasons related to Calliope (see the introduction) the programming language is still Perl. The platform then is mainly based on free software (FreeWais, Apache, module CPAN¹⁶) and on Webdoc™, a software developed by Xerox and dedicated to the management of document databases. Underlying systems are Solaris and Linux and the adaptation of Eurydice under other systems should be simple as long as the underlying software remain available.

There is a kind of dual relationship between the software and its supporting hardware. A server is needed for hosting the Summary Server, and there may be only one Summary Server at a time. On the opposite there may be as many Document Servers as needed, all running under Webdoc. The standard configuration turns out to reduce to one Document Server by affiliated institution and only one Summary Server for a whole consortium.

Eurydice is made up of several components :

- The first – and most visible to the user – is the Summary Server. This server manages several of the most important functionalities provided by Eurydice, namely the summary database, the search engine for retrieving relevant titles, all the access controls, the Alert System for example.
- The second component is made of all the Webdoc Document Servers developed by Xerox Company. These servers manage the storage of documents that have been digitized within affiliated document centers or collected from an editor's site. Every documentation center subscribing to electronic journals or willing to digitize paper journals needs a Document Server. In this way, every electronic document physically remains in its own institutional – and legal considering property – environment.
- The third component is named “the Binder.” Given a user-selected reference from the Summary Database, this component receives via HTTP protocol a request containing all the meta-information describing this document (title, editor etc.) and – from this information – dynamically searches the URL of the corresponding electronic paper on its editor site. Hence the name “Binder” because it binds a meta-definition of an article (i.e., its bibliographical reference) to the actual full-text electronic version of the referred article. Once the URL is found, the Binder communicates this information to the involved Summary Server. Direct access to the paper and its transfer to a Document Server is now feasible. One has to notice that this strategy implies the design of a Binder for each editor because they each have their own policy about document meta-data and electronic access.

16 CPAN : Comprehensive Perl Archive Network

In the remainder of this paper we shall now focus on the Summary Server and on the main Access Control Engine which warrants proper protection of author and editor rights.

The Summary Server

The Summary Server is made of several components :

Modules dedicated to downloading and processing new summaries

Summaries may be collected from various sources : databases such as Swets/Blackwell, Ebsco or INIST¹⁷, or directly from the Alert Service of the editors. The summary formats being different for each editor, a specific module has to be designed for each editor. These modules transform the original summaries into a pivot format (in XML) which is then the only format known by the Summary Server. The XML format was a natural choice for two main reasons : (i) immediate integration of international constraints and standards (use of Unicode for language-specific characters) and (ii) the availability of numerous programming tools for this language. One of course could add that XML being an emerging standard, this choice could help in exchanging references between institutions or reusing owned references on new implementations of the Summary Server.

Service Modules

These components process incoming summaries. A service module needs to be “registered” by the Service Manager to be activated. Once a Service Module is registered, the Service Manager may activate it through a specific API¹⁸. In this way new Service Modules may be added and executed without any modification of the code.

Control Modules

A Control Module executes consistency controls such as checking either a given title is coherent with the given editor and the given ISSN. It cannot of course control titles and corresponding authors. This is an example of what was said above about the role of documentalists for maintaining consistency within summaries. Remember also that Eurydice provides an interface (part of the Administration Interface) to make these corrections.

Database Storage Module

This module loads the Summary Database by storing the summary and its associated meta-data in a file hierarchy. Not all transferred summaries are stored within the Summary Database ; a selection is done based on a configuration (a kind of filter)

¹⁷ INIST : Institut National d'Information Scientifique et Techn ique. A nation-wide documentation institution managed by CNRS.

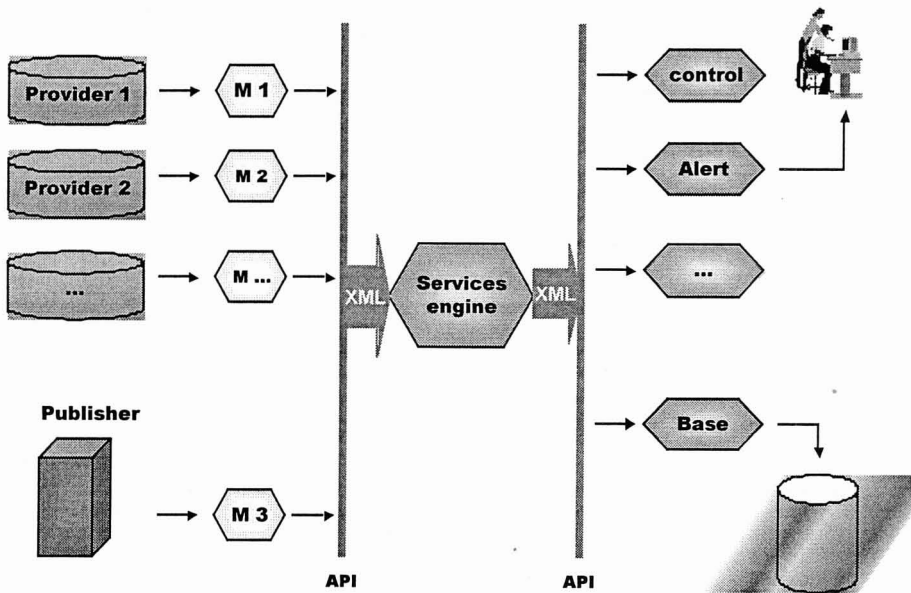
¹⁸ API : Application Program Interface

associated to each summary provider, or based on specific choices done by documentalists or users. From the system's point of view however, there is no theoretical limit to the number of summaries in the database ; the actual limits are set by the users in their domains of interest. Such domains being subject to evolution, the system allows adding new titles at any moment to editor configurations because the systems always keeps track of every information provided, or which have been provided in the past, by all editors. This information, stored in the original format of each editor, may be reused and processed at any moment, using the Control an Database Storage modules.

Alert Modules

The Alert Module uses the electronic mail to send to each user the latest summaries corresponding to their "subscription" (see above). It is important to notice that the list involved in any user's "subscription" may contain titles being (at the moment) out of the actual subscription lists of the Document Server (i.e. the full-text document is not accessible on this Document Server). This is possible because, as said before, the Summary Server stores everything coming from the summary editors (hence also summaries of journals not subscribed at the moment by the institution) ; This is certainly also useful in that access statistics on the Summary Server may in this way fill new potential information needs – or evolutions of domains of interest – which are not currently covered by the institution.

The following figure illustrates the relationship among all these components :



Interface design is an important feature of such interactive environments and a great effort has been dedicated to this aspect.

User Interfaces

The user interface conforms with the recommendations of the W3C¹⁹, and to the notion of accessibility as defined by the WAI²⁰.

Administrators

As said before, administration capabilities have been designed and implemented as a needed complement to the access interface. It includes the correction of summaries, data management, access to statistics and the modifications of configurations. Access to these operations is protected by the protection mechanism of the Web server itself. By now there are only two protection levels : (i) the users who are not allowed to modify configurations and (ii) the administrators (usually from the library staff) who are allowed to modify any configuration.

¹⁹ W3C : World Wide Web Consortium. URL : <http://www.w3.org/>

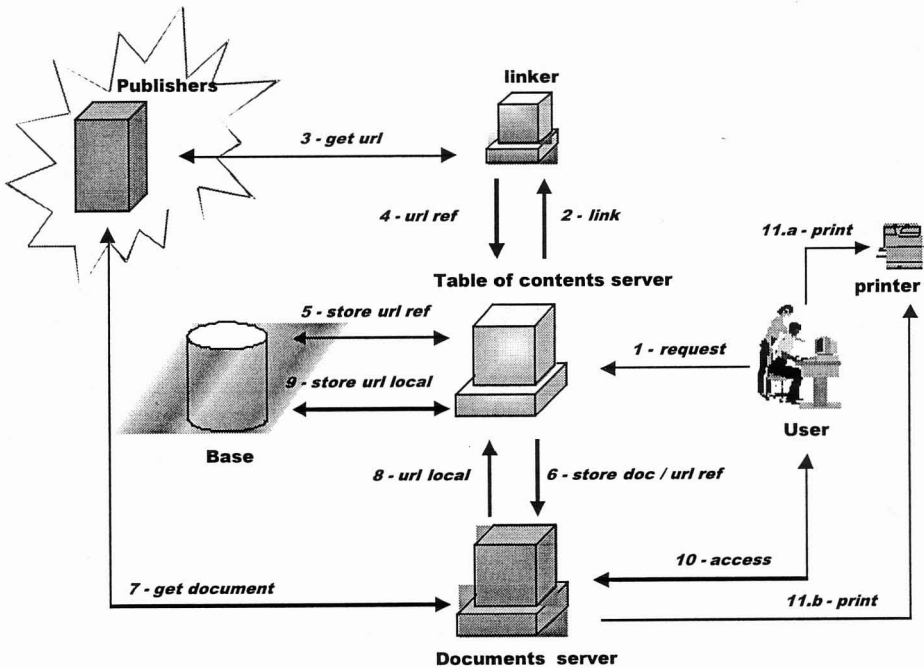
²⁰ WAI : World Accessibility Initiative. URL : <http://www.w3.org/WAI/>

Search Modules

Searching with Eurydice is performed based on FreeWais-sf, a free software for indexing and on Sfgate for managing the Web interface. Searching is performed only on titles and/or author names known in the summary database and not on the whole set of loaded summaries (remember that some of them may have not been loaded in the database).

Communications with other servers

Communications with external software components (i.e. Binder, Document Server) are based on the HTTP protocol and the XML document format. The information flow between the various elements is illustrated by the figure given below.



Control of Access Rights

Effective control of access rights is a complex and fundamental task of the Eurydice platform. The task is fundamental – one might say “critical” - due to the close relationship between access and reproduction control and legal aspects implied by subscription contracts issued with the editors. Eurydice clearly aims at monitoring these two basic functions related to the use of documents by a community of users. Then its reliability in terms of property rights protection may be viewed as critical by any institution, and we may say that Eurydice has been precisely designed and implemented

with this aspect as a primary concern. Security is by now based on tight management of IP address lists and their relation with contractual subscriptions with editors regarding access and reproduction rights (again this is defined in the context of the French legislation in the domain). As explained before, accurate records are maintained about accesses, transfer and reproduction operations which in turn allow (in our opinion) *a priori* and *a posteriori* control about protection of property rights. In the fast evolving context which characterises the present situation of electronic publishing we think that this approach constitutes an acceptable compromise for most institutions and editors. Technically speaking, access control is a difficult notion due to the number of parameters involved : IP numbers, configurations, or adaptation of access rights to specific user classes). At the moment, individual control based on login authentication seems unrealistic due to the complexity and dynamics of the covered populations of users (clear and relatively stable for academic staff, much difficult to monitor in real time for student populations).

In the present configuration of Eurydice, each documentation center defines its own policy about the services offered through Eurydice and manages its own list of IP addresses. This includes the definition of user categories and corresponding services considering the whole collection (i.e. the set of all the subscribed journals).

The list of available services covered by these control procedures is now :

- navigation and browsing
- alert service
- photocopy service
- digitization
- electronic access
-

Conclusion

Eurydice is a platform dedicated to provide a unified gateway to documents. Its basic functionalities for collecting documents have been designed based on a long experience with the management of scientific documentation among large and demanding academic communities such as IMAG and INRIA. Besides the basic problem of accessing documents – which was of course the original and main motivation of the project a great effort has been dedicated to the development of management functionalities which could help institutions to control, analyse the current situation about the use of the documentation, and finally to set a better ground for a documentation policy. Finally a great emphasis – and corresponding technical investment – has been put on the protection of property and reproduction rights both from the users' institution side and from the editors' side.

BUILDING AN IMAGE DATABASE USING CONTENTDM

Louise M. Richards
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University of Washington
Seattle, Washington

ABSTRACT: Staff at the Fisheries-Oceanography Library, University of Washington, created a freshwater and marine digital database of more than 1,600 images using the Content software developed at the UW and material in the library's print collection. This paper will describe the process and decision-making that goes into building an image database, including selection, metadata, staffing/time issues, software, equipment, usage tracking and support issues.

PowerPoint slides for this presentation are available at
<http://faculty.washington.edu/machung/iamslicbrest.html>

LINKING FLORIDA'S NATURAL HERITAGE: SCIENCE & CITIZENRY

Stephanie Haas
University of Florida

Stephanie Haas was unable to attend the conference; however, she provided the following summary of her IMLS project and suggested that if you would like further information you consult the full text article http://www.firstmonday.dk/issues/issue5_6/haas/ published in the electronic journal *FirstMonday*.

Linking Florida's Natural Heritage: Science & Citizenry is an IMLS-funded project that improves access to diverse information on Florida species and ecology. The project includes the development of a web-based interface to both library bibliographic files and museum specimen databases; the creation of bibliographic databases with enhanced taxonomic information; the digitization of a core collection of seminal texts; and, the use of a thesaurus and other tools to improve search and access.

OPTIMIZING JOURNALS ACCESS FOR UNIVERSITY AQUATIC AND MARINE SCIENCES PERSONNEL

James H. Anderson

BioSciences Library and Institute of Arctic Biology
University of Alaska

ABSTRACT: A sea change in access to scientific journals, with a growing hodgepodge of web-based sources for them, all in the broader context of a sea change in scholarly communication, compelled a major effort to make order out of chaos for users of library-provided online journals. This effort to optimize journals access began with a traditional but aggressive user survey and proceeded through six further specific activities, culminating in getting the word out. As the optimization process will necessarily continue indefinitely, conclusive results for only the first three activities are available. These include a description of a mechanism for prioritizing what are defined as essential journals and accessory journals, and for dealing with a third category inherent in online package deals, peripheral journals. It is argued that a certain amount of chaos will remain inherent in the system, but that optimization of journals access can be achieved through science librarians' vigilance. In particular, they need to create one-stop-shopping lists of primary research journals in major subject areas, with links directly into the journals' pages, bypassing the various database user interfaces which can be confusing for journal readers.

Introduction

Within the past few years there has been a sea change in the way journals in the sciences, as well as all other subject areas, are accessed by students and researchers in the academic environment, as well as by most other people in most other intellectual environments. This sea change has been powered by the unprecedented opportunities for access offered by the Internet, particularly its now primary component, the World Wide Web. The web offers the highly attractive potential of desktop access to journals as well as a multitude of other information sources, mostly indexes to those and other publications. While academic librarians have always had to choose from numerous journal titles in the sciences for their subscriptions, often under strong budget pressure, they now have (1) to choose from even more titles, (2) to deal with the daunting complexities of arranging and paying for selected titles individually or in package Big Deals (Frazier 2001), and (3) to facilitate users' web-based desktop access to those titles.

The issues surrounding and problems involved in providing desktop access to online journals are now widely recognized by science librarians, and this writer is confident that order and focus are evolving. Several books and numerous articles have been generated by librarians and other information managers addressing the issues and problems. This

report describes the development and partial implementation of a systematic procedure for optimizing access to journals for university aquatic and marine sciences and fisheries (AMSF) personnel, and other science personnel. The procedure is based on a project in the BioSciences Library (BSL) in the University of Alaska Fairbanks (UAF), which has a primary responsibility to the University's well known, multi-location School of Fisheries and Ocean Sciences with its Institute of Marine Science and various other organizational entities (Anderson 2000). The project was designed to bring BSL up to date in its responsibilities to its constituency and to make some order out of a chaos of web-based possibilities.

Optimizing journals access simply means providing the titles requested and otherwise needed by students and researchers in the forms most of them prefer in a straightforward, one-stop-shopping manner. The procedure described here and the principles it illustrates should be useful for science librarians elsewhere in their efforts to optimize journals access for their own constituencies.

Background

Although the much expanded array of possibilities for access accompanying the advent of web-based online journals is a rather recent phenomenon, much has already been said and written about it: Indeed, in a presentation like this, one is at risk for repeating some of what has already been discussed and implemented, but of which one is not yet aware. Three important book-length treatments are those of Butterworth (1998), Curtis et al. (2000) and Tenopir and King (2000). Among the more important articles are those of Branin et al. (2001), Frazier (2001), Meyer (2001), Nature Web Debates (2001), Rogers (2001), Schaffner (2001), Stackpole and King (1999), Tenopir (2000), Tenopir and King (2001), and Worlock (2001). Of the several major issues treated by these authors, those most relevant to the immediate effort to optimize journals access include:

determining what journals a science library actually must provide to meet the needs of its user community, whether individual titles should be in paper form, online and desktop accessible, or both, and whether back runs should be held and, if so, whether these are available online to free up shelf space from materials long held in paper form,

the enormous number of science journal titles available to choose from and their widely ranging qualities, particularly as indicated by Journal Citation Reports impact factors, and their widely ranging costs, which for some titles, like Elsevier titles, are extreme,

the much increased number of journals now available online in addition to their availability in paper form *or* online only, while some remain available only in traditional paper form,

the diversity of online sources, including publisher package deals (the “Big Deals” criticized by Frazier (2001)), aggregator vendor or subscription agent packages, and single-title-only subscriptions, all with different web addresses, license requirements, and user interfaces that are confusing and even discouraging to those who want only to access particular journals, and

evaluation of online as well as paper-form journals, as through use statistics, to facilitate decisions for further collection development.

More and more, science librarians are coming to grips with these issues and making noteworthy progress toward optimizing journals access. An exemplary web presentation of online science journals is that of the University of Oregon Library System at libweb.uoregon.edu/network/uoeljrls-sciences.html. However, even here, and at several other libraries’ Web sites which were explored, it is necessary to stumble through sometimes confusing local menu hierarchies, then the various publisher or vendor interfaces in order to actually open the pages of a particular journal.

The *primary product* of the journals access optimization effort should be a condensed list of selected primary research journals at a library’s Web site, to facilitate *one-stop shopping*, where even naïve users can choose their titles and go directly to them, bypassing various vendor or publisher database entry interfaces. Of course, if a very large number of primary research journals is subscribed, then more than one list might be necessary. BSL is generating three, for the life sciences, for the physical and earth sciences and for medicine and health care.

The Problem

The problem in the University of Alaska, as elsewhere, has two major components. First, BSL is mandated to provide access to those journals needed by the teaching, research and public service activities in the broad realm of the life sciences in the University. As these activities change over time, and particularly as new programs are started, periodic review of the needs is necessary, and title lists must be readjusted accordingly. Second, the University’s main library, Rasmuson Library, of which BSL is a part, has subscribed to many online index and full-text databases over the past few years, often in response to package deals that have been fairly attractive cost-wise. The total of such resources is currently 127. This is an impressive offering for a small-university library, but it is a confusing hodgepodge of online resources for University personnel. While many of the needed scientific journals are included in these resources, many others are not. Moreover, there are numerous peripheral and superfluous journals and other periodicals included in the package deals that complicate the ideal one-stop-shopping presentation of the primary titles.

The University makes a well organized presentation of its databases at www.uaf.edu/library/onlinedatabases. (See Table 6, below, for specific full-text databases in the sciences.) It has also engaged the company JournalWebCite to produce a

JournalList of all its journal and other periodical titles. Unfortunately, that list contains thousands of titles, many quite irrelevant, it takes a long time to download, it is clumsy to navigate, and some of the titles are not actually accessible under terms of the Library's license agreements with the various publishers and vendors involved. On the other hand, this resource is of great value as a master list.

Thus the BioSciences Librarian felt obliged to conduct as thorough as possible a survey of users' journal needs, to compare the results with what was already available, to determine whether and how to acquire titles not already available, then to present an updated package of life sciences journals in as straightforward, or seamless, a manner as possible. That presentation would include paper-form journals in the library, if justified by user responses, in addition to desktop access beyond the physical library.

Approach

Seven activities were conceived at the outset as essential to optimizing journals access.

1. Determine what titles are needed. A user survey, as thorough as possible, would be the foundation of the whole optimization process. Obviously this is a standard and traditional step.

A survey was conducted by sending three requests in one e-mail message to a majority of the BSL constituency, as represented on the e-mail distribution lists of the administrative secretaries of four primary organizational entities in the University. These were the School of Fisheries and Ocean Sciences with some 150 names, the School of Agriculture and Land Resources Management with around 90 names, the Department of Biology and Wildlife and associated Institute of Arctic Biology with approximately 85 names, and the Department of Chemistry with 12 names. These numbers give an estimated total of 337 names.

The requests to the user community were three: (a) A list of the journals most important to you, to your students and/or in your specific subject area(s). You may list as many as you want, but if they are more than around five, please arrange them in order of decreasing priority. We need YOUR titles - in effect YOUR VOTES - even if the titles are already available on campus and even if you reckon others will list the same ones. (b) An indication of whether you prefer (i) online access at your desktop, where you can, of course, print articles out for reading and filing, (ii) traditional access in paper form in the library, or (iii) both of these. (c) An indication as to whether it is important to maintain on-campus accessibility, in electronic or paper form, to issues older than five years.

The original distribution of the survey on 11 April 2001 was followed by a reminder three weeks later to encourage further responses. Results from the survey were compiled into a single list, or table, in MicroSoft Access. A similar approach by Christie and Kristik (2001) was discovered only late in the work reported here.

2. Determine the appropriate formats for the needed journals. This was addressed by part (b) of the survey questionnaire. The BioSciences Librarian was well aware of the sea change toward desktop access to journals but wanted confirmation from his own constituency, particularly the AMSF component, that the change was indeed welcome.

3. Compare the titles requested with those already provided by BSL or elsewhere on campus, to determine which ones to add and which ones to cancel if necessary. Determination of the latter would be based not only on lack of mention in the user survey, but also on the judgment of the BioSciences Librarian. Three categories of journals were conceived at the outset: (a) *Essential journals* are those specifically requested by users in the survey or otherwise. (b) *Accessory journals* are those not mentioned in the survey but *otherwise needed* by the Library's constituency more adequately to cover, in the Librarian's judgment, the subject areas involved. (c) *Peripheral journals* are all those included in package deals that are *not specifically selected*. For example, in the database Academic Search Premier in the EBSCOhost service, there are a few essential and accessory journals which make the database worthy of subscription, but there are many others ranging from somewhat to highly irrelevant.

4. Identify appropriate sources of essential and accessory journals not already available on campus. Are they available as components of publisher packages, in subscription vendor or aggregator databases, or only individually from their publishers? Or are they available by individual subscription within a vendor database as in Electronic Collections Online in the OCLC FirstSearch service?

5. Determine the optimum combination of sources, to minimize overlap in coverage between databases and thereby to minimize the overall cost.

6. Facilitate one-stop shopping. While most of the essential and accessory journals are, at least ideally, represented in the University's online catalog, and while one can go from titles found there via links directly to the databases containing them in full text, there must also be a separate list of primary research-based titles to facilitate browsing and quick selections. Moreover, these titles must be linked directly to the journals, bypassing menu sequences and database user interfaces. For users, this is equivalent to, and, presumably, equally as intuitive as, popping into the library and grabbing an issue out of the current display rack. For an older issue, use of the alphabetic Web list would be analogous to *running to the shelves for an issue*. In BSL, journals are, in fact, shelved alphabetically by title, not in call number order.

7. Get the word out. The BioSciences Librarian is obliged, by job description and temperament, to interact with his constituency, to minimize ignorance of and confusion concerning numerous and diverse library-provided resources. Thus he will do everything feasible to promote awareness of his efforts to optimize journals access. In the wash of the metaphorical sea change, it is suggested that other science librarians will also need substantial energy and enthusiasm to serve their individual and organizational constituents optimally.

It must be emphasized that optimization of journals access for AMSF and other personnel is a process that will continue at least as long as the broader sea change in journals access and scholarly communication continues. As such, this is only a status report in which no final results or conclusions are possible, particularly with respect to activities 4 through 7 listed above.

Results

1. User survey. Of the estimated 337 individual faculty and research staff members and graduate students in the life sciences to whom the three survey requests were sent, 53, or 15.4 percent, responded. This appears as a disappointingly low return, but it provided a substantial body of data nonetheless. Moreover, the 53 responses were distributed fairly evenly across the several organizational entities surveyed.

Table 1 is the first 25 titles on the first page of the seven-page list of 328 respondents' titles assembled in Microsoft Access. A title indicated by a respondent as of high priority was given a vote of three for that respondent. A title of intermediate priority was assigned a vote of two, and of low priority, a vote of one per respondent. Cumulative vote totals appear in the second column of Table 1. These data alone form an excellent basis for prioritizing titles in what was defined under activity 3, above, as the essential journals category.

Table 1. The first 25 journals, in alphabetic order, requested in the BioSciences Library user survey.

Journal Title	Votes	Old	Presence	Use	JCR
Accounts of Chemical Research	2		Pr	na	11.8
Acta Agriculturae Scandinavica. B	3		ASP	na	0.29
Acta Crystallographica. Section C	2		na	na	0.58
Acta Horticulturae	3	1	na	na	na
Acta Oceanologica Sinica	3		Pb	na	na
Acta Physiologica Scandinavica	3	1	ECO, BSJ	na	0.56
Acta Theriologica	3	1	Pb	7	0.54
Agricultural and Forest Meteorology	2	1	na	na	1.47
Agronomy Journal	3	1	Pr,WSP	na	0.80
Alaska Fishery Research Bulletin	5	1	Pb,On-I	10	na
Ambio	4	2	Pb	16	0.93
American Biology Teacher	3		Pr	na	0.20
American Journal of Botany	5	2	Pb,WSP,JSTOR	13	2.38
American Journal of Human Genetics	3	1	Pb	6	10.43
American Journal of Physiology	11	4	Pb	44	0.88
American Midland Naturalist	6	2	Pb,ASP,WSP,JS	7	0.50
American Naturalist	30	8	Pb,JSTOR	36	3.93
American Scientist	9	3	Pr,Pm,WSP	na	1.69
American Zoologist	3		Pb,WSP	12	2.71
Angewandte Chemie : Intrnl. Engl. Ed.	3	1	na	na	7.80
Animal Behaviour	10	2	Pb	71	2.15
Annals of Botany	9	3	Pb	8	1.33
Annals of Neurology	1		Pb	na	8.32
Antarctic Science	3	1	Pr,Pm	na	1.17
Applied and Environmental Microbiol.	11	5	Pb	31	3.54

Thus by resorting the Access list by the votes in the second column, the highest-priority titles, according to the respondents, are quickly seen, as in Table 2. The first five of these titles are, not surprisingly, *Science*, *Ecology*, *Nature*, *Oecologia*, and *Proceedings of the National Academy of Sciences (PNAS)*. The highest-priority title in the AMSF realm, the 14th on the list of 328 titles, is *Canadian Journal of Fisheries and Aquatic Sciences*, and the second in this category, number 22 on the list, is *Limnology and Oceanography*. This sorting device alone would go a long way toward selecting titles to retain if budget constraints forced a severe treatment.

Table 2. The first 25 titles in decreasing order of total votes cast in the user survey.

Journal Title	Votes	Old	Presence	Use	JCR
Science	52	7	Pr,Pm,ASP,JSTO	na	24.59
Ecology	48	12	Pb,JSTOR	217	3.57
Nature	47	8	Pb,Pr,Pm,On-I	178	29.49
Oecologia	44	10	Pb	152	2.16
Proceedings - National Academy of Sci.	36	9	Pb,Pm,JSTOR	105	10.26
Canadian Journal of Zoology	33	9	ECO	na	1.02
Oikos	33	9	Pb	98	2.57
Evolution	32	9	Pb,BioOne,JSTO	51	3.73
American Naturalist	30	8	Pb,JSTOR	36	3.93
Ecological Monographs	30	7	Pb,JSTOR	37	4.45
Journal of Wildlife Management	27	6	Pb	109	1.35
Ecological Applications	26	6	Pb,JSTOR	52	2.78
Arctic, Antarctic and Alpine Research	25	5	Pr,Pm	na	1.44
Canadian J of Fisheries and Aquatic Sci.	24	1	ECO	na	1.96
Journal of Mammalogy	24	7	Pb	83	1.01
Biogeochemistry	24	7	ECO	18	2.04
Trends in Ecology and Evolution	23	6	Pb,EWE	83	7.62
BioScience	21	4	Pb,ASP,WSP	na	3.08
Global Change Biology	21	4	ASP,ECO,BSJ	na	3.01
Global Biogeochemical Cycles	20	5	na	na	4.31
Journal of Climate	20	4	Pm	na	3.23
Limnology and Oceanography	19	6	Pb,JSTOR	33	3.02
Climatic Change	19	4	Pm	na	1.87
Journal of Ecology	18	5	ECO,JSTOR	na	2.51
Journal of Vegetation Science	18	4	na	na	1.96

Using the versatility of Microsoft Access, the same basic list is readily resorted by data in the other columns. Table 3 provides a quick overview of those titles for which back runs were considered most important by respondents. The first five titles for back runs are *Ecology*, *Oecologia*, *Evolution*, *PNAS*, and *Canadian Journal of Zoology*.

Table 3. A resorting of the complete Microsoft Excel list of requested journals on data in the Old column, showing the 25 titles for which back runs were considered most important.

Journal Title	Votes	Old	Presence	Use	JCR
Ecology	48	12	Pb,JSTOR	217	3.57
Oecologia	44	10	Pb	152	2.16
Evolution	32	9	Pb,BioOne,JSTO	51	3.73
Proceedings - National Academy of Sci.	36	9	Pb,Pm,JSTOR	105	10.26
Canadian Journal of Zoology	33	9	ECO	na	1.02
Oikos	33	9	Pb	98	2.57
American Naturalist	30	8	Pb,JSTOR	36	3.93
Nature	47	8	Pb,Pr,Pm,On-I	178	29.49
Biogeochemistry	24	7	ECO	18	2.04
Science	52	7	Pr,Pm,ASP,JSTO	na	24.59
Ecological Monographs	30	7	Pb,JSTOR	37	4.45
Journal of Mammalogy	24	7	Pb	83	1.01
Ecological Applications	26	6	Pb,JSTOR	52	2.78
Trends in Ecology and Evolution	23	6	Pb,EWE	83	7.62
Limnology and Oceanography	19	6	Pb,JSTOR	33	3.02
Plant and Soil	16	6	ECO	na	1.28
Journal of Wildlife Management	27	6	Pb	109	1.35
Marine Ecology Progress Series	17	5	Pb	92	2.02
Arctic, Antarctic and Alpine Research	25	5	Pr,Pm	na	1.44
Journal of Ecology	18	5	ECO,JSTOR	na	2.51
Soil Science Society of America Journal	15	5	Pb	15	1.60
Canadian Journal of Botany	14	5	ECO	na	1.04
Journal of Computational Biology	15	5	na	na	na
Applied and Environmental	11	5	Pb	31	3.54
Global Biogeochemical Cycles	20	5	na	na	4.31

Two of the most important sortings are those of the far right columns, for actual in-library use of paper-form issues and for Journal Citation Reports impact factors. The BioSciences Library, like many others, has long recorded use of journal issues in paper form at the time they are reshelfed by student employees. These data are minimal counts insofar as journals are often reshelfed directly by users, but as such they are all the more meaningful. Thus in Table 4 it can be seen that the five most used titles, using counts for calendar year 2000, are *Ecology*, *Nature*, *Oecologia*, *Journal of Wildlife Management*, and *PNAS*. A little farther down the complete list it can be seen that the five most used AMSF titles are *Marine Ecology Progress Series*, *Marine Mammal Science*, *Marine Biology*, *Journal of Fish Biology*, and *Limnology and Oceanography*.

Unfortunately, use counts for online journals are not yet available, and the sorting represented in Table 4 is, therefore, only partly representational. Use data for online journals will be worked into this component of the optimization process in due course.

Table 4. The 25 most used journals received in paper form in the BioSciences Library. As indicated, some are now also received online.

Journal Title	Votes	Old	Presence	Use	JCR
Ecology	48	12	Pb,JSTOR	217	3.57
Nature	47	8	Pb,Pr,Pm,On-I	178	29.49
Oecologia	44	10	Pb	152	2.16
Journal of Wildlife Management	27	6	Pb	109	1.35
Proceedings - National Academy of Sci.	36	9	Pb,Pm,JSTOR	105	10.26
Oikos	33	9	Pb	98	2.57
Marine Ecology Progress Series	17	5	Pb	92	2.02
Trends in Ecology and Evolution	23	6	Pb,EWE	83	7.62
Journal of Mammalogy	24	7	Pb	83	1.01
Journal of Biological Chemistry	5	2	Pb	72	7.67
Animal Behaviour	10	2	Pb	71	2.15
Canadian Journal of Forest Research	17	4	Pb,ECO	67	1.06
Marine Mammal Science	3		Pb	65	0.97
Environmental Science and Technology	3	1	Pb	64	3.75
Journal of Zoology	6	1	Pb,ECO	63	0.96
Soil Biology and Biochemistry	15	4	Pb,EWE	63	1.49
Forest Ecology and Management	9	3	Pb,EWE	58	0.96
Auk	9	1	Pb	53	1.49
Ecological Applications	26	6	Pb,JSTOR	52	2.78
Condor	10	2	Pb,BioOne	52	1.22
Evolution	32	9	Pb,BioOne,JSTO	51	3.73
Wildlife Society Bulletin	11	1	Pb	49	0.71
Journal of Neuroscience	8	2	Pb	45	8.95
Marine Biology	8	2	Pb	45	1.53
American Journal of Physiology	11	4	Pb	44	0.88

Table 5 is the first 25 titles in yet another sorting of the complete list, this time by JCR impact factors, using the most recent data readily available, those for 1999. These factors, produced by the Institute for Scientific Information, do need to be interpreted within the context of the various subject areas represented. *Limnology and Oceanography*, for example, has an impact factor of 3.02, which appears modest compared with the much

higher factors for the highest 25 titles listed in Table 5. Nevertheless, in the subject area of *Limnology and Oceanography*, 3.02 is a quite respectable rating.

While the prioritization represented in Table 5 cannot be used in isolation to make retention and cancellation decisions, it supplements the three preceding prioritizations. Some thought has been given to combining the respondents' title vote data, the in-library use data, and the impact factors into a single factor for each title. Price should also be brought into the formula. That would facilitate a really conclusive prioritization, but a valid formula for calculating, from these diverse data, such a factor for each title has not yet been discovered or devised.

Table 5. The same list as represented in the preceding tables, sorted again to show the 25 journals requested by survey respondents with the highest ISI JCR impact factors.

Journal Title	Votes	Old	Presence	Use	JCR
Cell	9	3	Pb	23	36.24
Nature Genetics	3	1	Pb	12	30.69
Nature	47	8	Pb,Pr,Pm,On-I	178	29.49
Nature Medicine	2	1	na	na	26.58
Current Opinion in Cell Biology	3	1	na	na	25.63
Science	52	7	Pr,Pm,ASP,JSTO	na	24.59
Physiological Reviews	3	1	Pb	5	23.95
Chemical Reviews	3	1	Pr	na	21.24
Trends in Neurosciences	2		Pb,EWE	7	19.93
Genes and Development	4	2	Pb	9	19.22
Neuron	3	1	Pb	na	16.78
Journal of Cell Biology	3	1	Pb	9	12.88
FASEB Journal	6	2	na	na	11.88
Accounts of Chemical Research	2		Pr	na	11.8
Trends in Pharmacological Sciences	1		Pb,EWE	2	11.70
American Journal of Human Genetics	3	1	Pb	6	10.43
Proceedings - National Academy of Sci.	36	9	Pb,Pm,JSTOR	105	10.26
Circulation	3	1	Pb,PQN	9	9.90
Molecular and Cellular Biology	5	2	Pb	6	9.87
Human Molecular Genetics	1		ASP	na	9.36
Current Opinion in Neurobiology	3	1	Pb	na	9.29
Diabetes	3	1	HSN/C	na	9.02
Journal of Neuroscience	8	2	Pb	45	8.95
Nature Neuroscience	4	2	na	na	8.86
Chemical Society Reviews	1		Pr,ECO	na	8.80

2. Journals format. Request two in the three-part user survey described above under the first optimization activity called for an indication of the extent to which journals should be provided online for desktop access. As expected, a majority of respondents, 42 of the 53, or 79.2 percent, expressed interest in desktop access either additional to or, mostly, instead of in-library paper-form access. Moreover, there is much anecdotal, circumstantial and direct evidence that most journal users who did not respond to the survey also prefer desktop access. The BioSciences Librarian is confident that the few respondents who indicated a preference for traditional access will grow more favorable toward online access as they learn more about its considerable advantages. This, it is believed, will be particularly so when those individuals can be provided with greater assurance that back issues will continue to be available, either online, as in JSTOR, or on the shelf in the library.

Beyond these local findings, the PublicLibraryofScience (PLOS) initiative, now receiving enormous and unprecedented attention, lends undeniable urgency to the transition from paper-form to electronic journals with desktop access. The PLOS initiative and numerous supporting documents, at www.publiclibraryofscience.org/, are promoting a sea change in scholarly publishing, and the implications for the closely related sea change in desktop journals access are clear. The inevitability of the trend is further emphasized by Nature Web Debates (2001).

Notwithstanding the PLOS initiative, confirmation by way of the user survey of a local consensus favoring desktop accessibility greatly facilitates the process of optimizing journals access. Some users responded to request two in the survey with an indication of interest in traditional, in-library paper-form journals. However, those users were mostly older, and the BioSciences Librarian suspects a certain amount of inertia or even nostalgia. Be that as it may, most of those voting for paper also favored the online format. Thus the Librarian is free to focus on moving all journals potentially available online to that format, and that will greatly facilitate the one-stop-shopping objective of the optimization process.

3. To compare respondents' titles with what is currently available in BSL or elsewhere on campus, information in the fourth, or Presence column of the list of 328 titles is provided. In this column, several different codes indicate the availability of currently received issues to UAF personnel and others. Table 6 is a list of those codes.

Table 6. Journals presence codes, indicating availability of current or near-current issues to University of Alaska personnel in paper and electronic forms. Asterisks indicate databases with frustrating embargo periods of up to one year on the full text of many of their scientific journals.

- ASP*** = Academic Search Premier in the EBSCOhost service
BioOne = BioOne, a non-profit company providing journals of several life sciences societies online
BSJ = Journals in the Synergy package of the publisher Blackwell Scientific
EBSCO-Olm = EBSCO Online service, accessible in Mather Library only
ECO = Electronic Collections Online in the OCLC FirstSearch Service
EWE = Elsevier Web Editions in the ScienceDirect Service from Elsevier Publishing
HSN/C* = Health Source, Nursing or Consumer Editions, in the EBSCOhost Service
JSTOR = Journal Storage from JSTOR, a non-profit company providing back runs of journals online, up to within 3-5 years of the present
KOJ = Kluwer Online Journals from Kluwer Academic Publishers
na = not currently available to University personnel. In many cases runs of older issues, previously subscribed, are available. In the Use column, na = not applicable.
On-I = online individually, designating titles available directly from the publisher, not as part of publisher or vendor packages
Pb, Pm, Pr = available in paper form in the BioSciences, Mather or main Rasmuson Library
PQN* and **PQP*** = ProQuest Nursing and ProQuest Psychology Journals
WSP* = Wilson Select Plus in the OCLC FirstSearch service

Of the 328 essential journals, as requested by survey respondents, 81, or 24.7 percent, are “na” titles, meaning that current issues are not received in paper or online forms. Some of these titles were subscribed in the past such that back runs are on the shelves, but they were canceled because of budget cut or other decisions made in earlier periodicals reviews. Now, however, the fact that as many as 81 are wanted by respondents imposes a distinct mandate into the broader process of optimizing journals access. The next step will be to extract these titles onto their own prioritized list. Then, if it is necessary to be selective with the titles on that list, elimination should be straightforward insofar as the respondents’ vote totals for these 81 titles are mostly quite low, ranging from one to seven. Some of them also have quite low JCR impact factors, often less than one. But others have substantial impact factors, readily differentiating the few high-priority “na” titles.

The converse of the “na” title situation is that of the 461 titles on the BSL list of 651 currently received journals that were not mentioned by survey respondents. While a few of these are produced by local agencies and are received at little or no cost (e.g. *Newsletter of the North Pacific Anadromous Fish Commission*), many are prominent

journals with substantial impact factors. At first glance this is embarrassing by suggesting that Rasmuson Library, of which BSL is a part, is spending lots of money on major and costly titles that don't happen to be needed for teaching and research in the University of Alaska.

However, as many as 155, or 33.6 percent, of the 461 currently received non-requested journals have only recently begun to be received. They are now accessible online as components of new package deals from the publishers and certain other of the sources listed in Table 6. Therefore, the presence of these journals is not a result of specific, individual-title selection. Of the *other* 306 non-essential journals (not requested by users but currently received), many do qualify as accessory journals, and few if any are no more than peripheral journals, as these three categories of journals were defined earlier. Indeed, many of these 306 journals are in paper form and receive substantial use in BSL, as is revealed by their use counts. Moreover, most of the 155 non-selected package-deal titles qualify, in the BioSciences Librarian's judgment, as accessory journals, and their recent but inadvertent acquisition is welcome. Examples of these in the AMSF subject realm are *Aquaculture Research, Ecological Management and Restoration, Fish & Fisheries, Global Ecology & Biogeography* and *Phycological Research* from Blackwell Scientific and *Aquaculture International, Aquatic Geochemistry, Fish Physiology & Biochemistry, Journal of Applied Phycology* and *Journal of Oceanography* from Kluwer Academic.

Be that as it may, as the process of optimizing journals access continues, the 461 apparent accessory journals will be extracted from the complete list of currently received titles onto their own list in Microsoft Access or Excel. With use, impact factor and price data, it will be possible to prioritize that list and to select titles that should be retained, to the extent the budget will allow, and others that can be canceled to accommodate new subscriptions to survey respondents' "na" titles. Of course it will not be possible to cancel individual titles in package deals. But on the other hand, this process will facilitate decisions as to whether certain packages should be retained. While the recently subscribed Blackwell Synergy (BSJ) publisher package, for example, provides several accessory journals and a few essential journals, a reasonable alternative might be to add those titles individually to the ECO package in the OCLC FirstSearch service and discontinue subscribing to Blackwell's Big Deal (Frazier 2001). On the other hand, if the BSJ package cost is negligible and promises to remain so, then it should be retained and the corresponding subscriptions in ECO canceled.

Respecting the ongoing and now virtually mandatory migration to all online journals potentially available in that format, it is noted that in the Presence column of the list represented by Tables 1-5, 96 titles, or 29.3 percent of the total of 328 user-requested essential journals, are already provided online in one or more of the publisher and vendor databases identified in Table 6. Moreover, many more titles will soon become available online individually insofar as this form of access accompanies their subscriptions in paper form at little or no additional cost. Currently UAF's individual paper-form journal subscriptions are managed by EBSCO Subscription Services. The delay in adding these titles, such as those from the American Chemical Society, to the many others now also

accessible online has been caused by inadequate staffing to work on the individual license agreements and set up the Web links.

Table 7 is the first 25 titles on the 19-page list of all 651 UAF life sciences titles currently received by BSL or, in a few cases, elsewhere on campus. The first two and a half pages of this list, titled *Primary Life Sciences Journals*, presents explanations, codes and definitions. While all titles are naturally represented in the library catalog, at least when it has been possible to add them, a comprehensive alphabetical list of this sort is very convenient. It facilitates browsing and quick title lookup, and it indicates availability in paper form and/or online. Codes for the online databases are listed in Table 6. Frequently updated paper copies of *Primary Life Sciences Journals* are made available to library users.

The list represented by Table 7 will soon be installed at the UAF Rasmuson Library Web site (www.uaf.edu/library/), along with similar lists for the physical and earth sciences and for medicine, nursing and healthcare. As staffing is available, title-specific URLs for the 356 online titles will be installed to facilitate links directly to those journals' pages, bypassing the various database entry interfaces. The indexing function of all full-text databases except EWE will, of course, be kept readily accessible because of the frequent need of users to do a search before accessing a specific journal.

As 356, or 54.7 percent, of the 651 currently received life sciences journals are online, BSL is well along toward online access to all its journals potentially available in that form. One useful result of a journals access optimization effort of the sort introduced here is confirmation that the right things are already being done.

4. The fourth of the seven prescribed activities in the optimization process is to identify sources of essential journals not already subscribed, as those have been selected from the survey respondents' titles through the prioritizations described above. At the moment it appears that for BSL this will be done mostly in two ways. First, individual subscriptions will be added to the ECO (Electronic Collections Online) database in the OCLC FirstSearch Service through negotiations with the University's representatives at OCLC (Online Computer Library Center in Dublin, Ohio). Second, subscriptions to titles which should be kept in paper form in the Library as well as made accessible online will be entered through EBSCO Subscription Services. It will not be feasible to list these titles individually with the 127 databases on the University's Alphabetical List of Online Resources (www.uaf.edu/library/onlinedatabases). Instead, they will be on the special list *Primary Life Sciences Journals* represented by Table 7.

Table 7. The first 25 titles on the list of 651 currently received primary life sciences journals in the University of Alaska Fairbanks. Date ranges following some titles indicate runs in paper form. Titles in italics are online only.

<i>Acta Agriculturae Scandinavica : Section A, Animal Science</i> ASP 1998—
<i>Acta Agriculturae Scandinavica : Section B, Soil and Plant Science</i> ASP 1998—
<i>Acta Biotheoretica</i> KOJ 1995—
<i>Acta Hydrobiologica</i> 1964—
<i>Acta Oecologica</i> 1990— EWE past 12 months
<i>Acta Physiologica Scandinavica</i> 1950-99 ASP 1998— BSJ 1999— ECO 1997—
<i>Acta Theriologica</i> 1958—
<i>Acta Zoologica</i> 1963-97 MF ASP 1998— BSJ 1999— ECO 1999—
<i>Aerobiologia</i> KOJ 1999—
<i>African Journal of Ecology</i> 1979-99 ASP 1998— BSJ 1999— ECO 1997—
<i>Agricultural and Food Science in Finland</i> 1996—
<i>Agricultural and Forest Entomology</i> BSJ 1999—
<i>Alaska Fishery Research Bulletin</i> 1994—
<i>Alaska Medicine</i> 1959—
<i>Allergy</i> 1978-92 BSJ 1999—
<i>Ambio</i> 1972— BioOne 2000—
<i>American Biology Teacher</i> ERL 1938— BioOne 2000—
<i>American Family Physician</i> ASP 1996— HSN/C 1996—
<i>American Forests</i> 1931— ASP 1994— WSP 1994—
<i>American Journal of Botany</i> 1914— WSP 1999— JSTOR 1914—(5)
<i>American Journal of Epidemiology</i> 1965—
<i>American Journal of Health Studies</i> 1998— ASP 1997— HSN/C 1997—
<i>American Journal of Human Genetics</i> 1949— ASP 1999—
<i>American Journal of Physiology</i> 1919—
<i>American Journal of Sports Medicine</i> 1993— ASP 1992—

5. Optimization activity 5 calls for determining the ideal combination of journals sources, to minimize overlap in coverage between databases and thereby to minimize the overall cost. Examining the list represented by Table 7 reveals that, at present, of the 356 life sciences journals currently received online, 75 are accessible in two different databases. Moreover, as many as 37 are in three different databases. Examples are *Fisheries Oceanography*, *Freshwater Biology*, *Journal of Fish Diseases*, and *Journal of Phycology* in ASP, BSJ and ECO (see Table 6). In a few cases, such as *Conservation Biology*, *Functional Ecology*, *Journal of Animal Ecology*, *Journal of Applied Ecology*, and *Journal of Ecology*, current issues (or near-current in the case of ASP titles) are accessible in three databases, and complete back runs, up to three or five years ago, are accessible in a fourth database, JSTOR. Some of these overlaps are evident in Tables 1-5.

It is increasingly apparent that, given the Great Hodgepodge (this writer's special term) of publisher and vendor efforts, there probably is no ideal combination of sources of online journals with a bare minimum of overlap. There is a strong element of opportunism in the accumulation of online resources. Indeed, Rasmuson Library was convinced to subscribe to the Blackwell Scientific and Kluwer Academic Big Deals (Frazier's (2001) special term) by fairly attractive prices, despite the inclusion of numerous peripheral journals and despite the presence of some of the essential and accessory journals in already available sources, primarily ECO. In addition to the combination of database package sources a library ends up with, it will continue to be necessary to negotiate some needed titles individually, either through a subscription agent like EBSCO or with individual publishers. UAF found it necessary to set up its *Nature* online subscription in the latter fashion and will soon have to do the same for *Science*.

Over the past five years or so Rasmuson Library has accumulated as many as 127 index and full-text databases (www.uaf.edu/library/onlinedatabases). These range from ABI/Inform Global to Zoological Record and are produced by about 20 separate commercial and government entities. This accumulation has resulted from librarians' efforts to provide coverage of all subject areas represented in the University and in response to affordable offers. Even so, certain databases of high priority in the BioSciences Librarian's estimation remain unaffordable, particularly ISI's (Institute for Scientific Information) Web of Science and the American Chemical Society's Web Editions. To acquire such resources as these, it will be necessary to continue the journals prioritizations described above and careful comparisons of databases to identify any which might be canceled, thereby making funds available for the more needed resources. As far as the sciences are concerned, the Librarian suspects that both the recently acquired KOJ and BSJ packages could be canceled insofar as essential and accessory journals in them are otherwise available, particularly as individually selected for the ECO aggregation. On the other hand, his colleagues might rule against this in favor of more adequate journals provision in the humanities, arts and technologies.

It appears that similar opportunistic accumulations of online resources have occurred at many other academic institutions. Moreover, it is to be expected that these accumulations will continue to evolve, with some resources being dropped and new ones added with changing budget priorities and subject area emphases. Much of this evolution will probably continue to be driven by attractive offers of publishers and vendors and the appearance of new Big Deals. Even as a draft of this report was about to be rushed to the editor for publication, an e-mail announcement arrived from the U.S. National Library of Medicine describing a possible and affordable consortium arrangement for 140 online journals in the Journals@Ovid package, some of definite value for the BSL collection.

Thus there seems no point in trying to eliminate overlap in journals coverage between databases, but only to minimize it. As a considerable amount of complexity will remain, efforts should then be directed toward making order out of the chaos by creating locally a few well organized one-stop-shopping user entries.

6. The facilitation of one-stop shopping by way of a few well organized user entries is mostly a matter of putting at a library's web site clean and uncluttered lists of primary titles, of what are defined here as essential and accessory journals. Peripheral journals should be left to the complete JournalWebCite kind of list, with a brief note on the one or very few primary titles list(s) pointing the interested user toward that resource. Essential and accessory journals should also be represented in the library catalog, but not peripheral journals. Of course, journals peripheral to the AMSF and other sciences are not necessarily peripheral in other subject areas for which a university library is responsible. Thus technology, humanities and arts librarians need to create their own lists of essential and accessory journals. Ideally, periodic user surveys would inform the generation of those lists.

The list represented here by Table 7 is an example of an existing list, for the life sciences, that is readily adaptable to web presentation. As such, it will be more convenient for busy students and researchers than the JournalWebCite list already accessible at the library's web site, where links don't bypass the various database user interfaces anyway. Two other lists, for the physical and earth sciences (physics, astronomy, chemistry, geology and climatology) and for medicine, nursing and health care, will be generated in BSL. A substantial portion of the apparent peripheral journals in the several databases listed in Table 6 are, in fact, in the latter broad subject area.

7. Getting the word out, the final activity in the optimization process, involves promoting as widely as possible through a library's constituency the primary journals' one-stop-shopping lists on the web. Besides describing and explaining it orally wherever possible, individually and in seminars, a succinct information sheet or flier must be created and distributed.

For the UAF BioSciences Librarian, this is a particularly compelling activity in the optimization process in that BSL has AMSF-related branch libraries and constituencies in such far-flung locations as (1) Juneau, with the Juneau Center of the School of Fisheries and Ocean Sciences, (2) Seward, with the Seward Marine Center and the nearby Alaska SeaLife Center, and (3) Kodiak, with the Fishery Industrial Technology Center. These facilities were described in some detail by Anderson (2000). In addition, the Librarian is responsible for the information needs of UAF personnel in the Agriculture and Forestry Experiment Station in Palmer. Altogether there are approximately 200 research personnel and graduate students in these several facilities. Because of their separation from the action on the main campus in Fairbanks, it is harder for those students and researchers to deal with the Great Hodgepodge of UAF's online scientific information resources and particularly with the frequent new developments. Thus visits to these facilities to present special seminars and the provision of informational fliers as well as frequent e-mail and telephone explanations are in order.

Conclusions

1. The optimization of journals access for AMSF and other university science personnel will necessarily be an ongoing process, at least until the broader sea change toward desktop access and the closely related revolution in scholarly communication begin to stabilize.
2. The optimization process does require a traditional user survey for identifying essential journals, defined as those actually requested by users. The survey needs to be supplemented by ongoing interaction of the science librarian with the library's users, including casual face-to-face exchanges, somewhat more formal e-mail exchanges, and occasional demonstration seminars.
2. The science librarian's judgment, based on a good knowledge of teaching and research activities throughout the library's constituency, is necessary to identify accessory journals, which might be as many as or more than essential journals.
3. Journals in both categories need to be systematically prioritized according to such data as numbers of users requesting them, use counts, JCR impact factors, and prices. This includes journals already received but not mentioned in the user survey. These prioritizations facilitate selection or cancellation decisions, within budget allowances or constraints and to the extent individual titles can be added to or deleted from currently subscribed publisher and vendor packages.
4. The confusing array of database entry or user interfaces will continue but can be minimized. Minimization is achieved by providing one or a few lists of primary research journals in broad subject areas, comprising essential and accessory journals, with links directly to the journals' contents.
5. The science librarian needs to get the word out concerning the journals access optimization process through the same forms of ongoing interactions as are listed under conclusion 2.

Acknowledgments

Carol Haas and Colleen Sullivan on the BioSciences Library's technical staff were of very substantial assistance in organizing the data from the user survey and updating the Library's *Periodicals Master List* and the list *Primary Life Sciences Journals* extracted from it. Carol's expertise was critical in the writer's attempts to work in Microsoft Access. In the main Rasmuson Library, Lisa Lehman, Electronic Resources Librarian, was of critical assistance in explaining some of the complexities of database acquisition and presentation and in reviewing an early draft of this report. Interactions with two other library colleagues, Pauline Wilson and Dennis Stephens, continue to stimulate the writer in the ongoing journals access optimization process.

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**DISCUSSION OF ENVIRONMENTAL LIBRARIANS GROUP
MONDAY 15 OCTOBER 15.30 – 16.30**

Elisa Paavilainen
Chair
Finnish Environment Institute
Helsinki, Finland

SUMMARY OF THE DISCUSSION:

The participants of the discussion group stated that although environmental libraries are aquatic libraries, they also have many common environmental interests, like aims, collections, network information sources and the field of activities. It was decided to establish an environmental interest group. The group would be connected by an e-mail list which would be a forum of common interests. The group decided that Ruth Gustafson (University of California, Bodega Bay) and Elisa Paavilainen (Finnish Environment Institute, Helsinki) will send an email to EURASLIC and IAMSLIC discussion lists and ask who would be interested in joining the environmental libraries discussion list. Ruth Gustafson offered to take care of establishing the list.

About five years ago EELNET-network (European Environment Library Network) was founded. That NICE-Europe (Network of Information Centres on the Environment in Europe) is a network of contact persons from selected European environmental libraries and information centres. The contact person of EELNET is Lilian Mex-Jorgensen from National Environmental Research Institute in Silkeborg. The group decided that Elisa Paavilainen will get in contact with her to clarify the situation of EELNET. Perhaps it would be reasonable to connect the focal points of EELNET to the discussion list, too.

In the beginning the discussion list of environmental libraries would be a trial. The group will gather experience of the usability of that forum.

ANNUAL IAMSLIC PRESIDENT'S REPORT 2000 - 2001

Linda Pikula
President 2000-2001
Chair

Some Continuity in a "Sea of Change": During this last year I have carried forward the path set by previous presidents and the IAMSLIC Council of Singers -- a group truly representative of IAMSLIC's international nature.

There are now approximately 20 committees or teams in IAMSLIC, charged with various tasks to move IAMSLIC forward. It is the active committee members who produced the following accomplishments, and we all thank them for this.

The Path Followed:

1. **To Share Our Expertise:** We have added 10 new sponsored members from various countries in Africa and are working to extend our boundaries to South America. Membership mailings were made to South America mailings went out to African science centers as well.

Several IAMSLIC grants were awarded for conference attendance, and with the help of the International Oceanographic Commission more grants were extended by both IAMSLIC and EURASLIC to enable representatives from over 15 countries to attend the annual conference.

IAMSLIC shared its members' expertise with the IOC, IODE, GEMIM group by contributing to the IOC web site www.oceanteacher.org.

As President, I represented our group at the 15th IOC/IODE Conference in Lisbon, Portugal in November, 2000. During that meeting I volunteered our membership as a group of experts available to train in the information capacity building programs of the IOC. It is hoped that we can provide these services to the new IOC initiative beginning in South America.

A brief presentation about our organization was given at the Third Water Information Summit supporting Sustainable Water Resources Management Through Information Distribution, held in Miami in November, 2000.

Possible future initiatives in sharing our expertise might be to identify international groups for partnering in training and publication opportunities.

A separate Mentoring Task Force was created during the Executive Board meetings at this year's conference. Kathy Heil has volunteered to chair this group.

2. **To Formalize and Strengthen our Resources Sharing:** In June, 2001 the Resource Sharing Committee developed a beta site for the "Linking Libraries Project" with the assistance of the NOAA Coastal Services Center in Charleston, S.C. The holdings of 15 IAMSLIC libraries are searchable simultaneously on this site www.csc.noaa.gov/CID/iamslic. Four new European libraries have volunteered to participate. Steve Watkins continues to offer and refine his Union List for Resource Sharing. Additionally several IAMSLIC Regional Group mailing lists, continue to provide interlibrary sharing. An interlibrary loan form now will be available on the new web site, functions to be determined by the Resource Sharing Committee. A consortial purchase of ARIEL was again carried out.

3. **To Strengthen our Conference:** The Council of Singers made recommendations to strengthen our conference. A special Conference Task Force was appointed at the Victoria, B.C. conference and the results of the Task Force studies have provided a compilation of historical financial conference planning records, and recommendations on venue, costs and timing and content for future conference planners. The Conference Task Force was made a permanent standing conference committee by the executive board during its meetings in Brest.

Also, as a result of the Council of Singers recommendations, training workshops were held at the Victoria, B.C. conference and the Brest, France conference.

The Publications Committee has recommended a modified peer review of conference presentations and this is presently under discussion by the executive board. Cooperative publishing opportunities are now recommended by the Committee in our newsletter.

4. **To Continue IAMSLIC's Digital Migration and Web site Redesign:** Through the efforts of Ruth Gustafson and her team, the new IAMSLIC web site beta version was unveiled in October, 2001. It will be hosted through the NOAA Charleston, S.C. Coastal Services Center. We all thank Ruth for her work on this. Throughout the coming year the new web site will continue to be refined and content development will take place. Ruth Gustafson also took on the responsibility of our new mailing list "listproc" in April, 2001. The new listproc provides many enhancements.

Beth Avery and Roger Kelly moved our traditional print newsletter online in February, 2001. We thank them heartily for their work. Print versions of our newsletter are available to those members lacking good Internet connections. This next year the Publications Committee will study the content of the new newsletter format.

Chuck Mcfadden completed the scanning of all past IAMSLIC Proceedings and Conferences in March, 2001. These will be available on our web site up to the years agreed upon.

The Future: I hope that the future will bring the following:

Digital/electronic:

1. Continued enhancement of the features and content of our new web site
2. Definition of the newsletter parameters and identification of partners for the URLs collected by the membership
3. Establish an electronic voting ability

Sharing our expertise:

1. Continued identification of international groups for partnering in training and publications opportunities
2. A strong mentoring program

Formalize and Strengthen our Resources Sharing:

1. Continue to add partners to the linking libraries project and clarification of the three-tier approach to resource sharing

Thank you for giving me the opportunity to serve as the IAMSLIC President, and congratulations to all the new officers!

EURASLIC PRESIDENT'S REPORT

Joan Baron Varley

Tuesday 16th October 2001, 1600hrs
Meridienne Room, Le Quartz Conference Centre, Brest, France.

The last 18 months, as I am sure you will all appreciate, has been a very busy period for the Euraslic Board, and an incredibly busy time for the President.

Election of New Executive Board Members

Firstly, you may all be wondering why there are no Euraslic Elections taking place at this Conference. The reason is that this Joint Conference falls six months short of the two year period of office for Executive Board Members, and all of the current members of the Board have kindly agreed to stay in post until the end of April 2002.

Immediately this Conference is over the procedures for electing a new Board will be initiated by the Secretary. Preparations are commencing during this Conference, in that our Secretary is seeking to identify suitable persons to serve on the Nominating Committee for the next Board, as well as the names of individuals who would be prepared to serve on the Board of Euraslic from May 2002.

Overview

Euraslic membership currently comprises 79 members from 22 countries, including 66 Full Members (27 of whom are Joint IAMSLIC/Euraslic members), 11 Associate Members, and two Honorary Members, and I wish to take this opportunity to welcome all new members, and especially those who are attending their first Euraslic Conference.

The Association holds biennial meetings/conferences from which the *Proceedings* are produced and distributed free of charge to all Euraslic members and other conference participants. Other Euraslic publications include the Euraslic Leaflet and the *Euraslic Newsletter*, the latter being published and distributed free of charge to all members twice a year. Since April 2001 the *Newsletter*, thanks to the efforts of Sebastien Saunier, has also been available in electronic format.

Euraslic also maintains a comprehensive web site hosted by the National Centre for Marine Research (NCMR), Athens, Greece, a Discussion List moderated by Barbara Schmidt of the Institut für Meereskunde, Kiel, Germany, and an online *Directory of European Aquatic Libraries and Information Centres*, which is hosted on the Intergovernmental Oceanographic Commission (IOC) web site.

Euraslic business is managed by an Executive Board on behalf of the Membership, and I am very pleased that so many members of the Board have been able to attend this Conference.

Joint Conference

As members will appreciate, the work of the Board during this time has been dominated by preparations for this Joint Conference and I would like to take this opportunity to thank the Board for their support in this respect, and especially our Secretary Ian Pettman, who has been responsible for attracting such a high number of participants through wide dissemination of the Conference literature, not only to Europe, but also extensively throughout Africa, as well as to other parts of the world, and our Treasurer, Michelle L'Excellent who has performed the crucial task of dealing with our sponsored participants, arranging tickets and deposits for accommodation etc.

I would also especially like to thank the French group, OMER - *eau mer*, for generously postponing their own National Group meeting so that it did not detract from the number of French participants at this Joint Conference, and special thanks to Marie-Pascale Baligand for her assistance, especially in identifying the French invited speakers and coordinating arrangements for them. I would also like to acknowledge the extensive support that my husband, Allen Varley, has given me during this busy time, and the work he has done in support of this Conference in relation to the translation of emails and the editing of various Conference literature.

Finally, thanks also go to David Hyett whose work will continue after the Conference, as he kindly agreed to be the Euraslic co-editor of the Joint Conference *Proceedings*.

Sponsorship

For your information, the IOC agreed a grant of US\$5000 to Euraslic to be used to sponsor participants to attend, and Euraslic has almost matched this amount from our own reserves to enable as many members of Euraslic as possible to attend this Joint Conference. Details of how these funds have been used will be disseminated shortly after the Conference.

Special Discussion Sessions

During the Conference in Aberdeen I received representations from some long-standing members of Euraslic with a view to addressing the broader needs of our members from Environment Institutes, and also to consider the setting up of a Special Interest Group for countries bordering the Mediterranean. The Board discussed ways in which we could accommodate these requests and the outcomes were some minor changes to the Euraslic Bylaws, which will be discussed in the Business Meeting, and more especially two special discussion sessions being held during this Joint Conference. A working group of

members from Eastern European institutes will also meet this week, and will report on matters of mutual concern and possible future action.

Working Groups

Also at the Euraslic Business Meeting in Aberdeen, two working groups were set up to (a) review the Euraslic Bylaws, and (b) draft Guidelines for Euraslic Conferences. The recommended changes to the Bylaws were disseminated to members in the last issue of the *Euraslic Newsletter* and will be presented to the Members for ratification during the Business Meeting. The draft Guidelines for Euraslic Conferences have been distributed to Members via the Discussion List, and members will have an opportunity to comment on them during the Business Meeting.

Eighth Euraslic Conference, May 2000

Looking back, I am pleased to inform you that the *Proceedings of the Eighth Euraslic Conference* in Aberdeen, May 2000, are now published and are currently being distributed, and I would like to thank Sarah Heath for her efforts in this respect as well as all others who assisted in the task.

Development of aquatic libraries and information provision in Europe

I have had the benefit of previewing several of the country and institution reports submitted by Members to this Conference, and I thank all of those who have contributed reports.

The overall impression that I gained from them was fairly positive.

- In many of our longstanding member countries they are working hard improving or developing national networks, capitalising on the use of electronic networks and the Internet.
- Libraries appear to be acquiring better equipment and access to resources via cooperative agreements and grants from international organisations, although for some the progress is still slow, and there is still a long way to go.
- I strongly believe that membership of Euraslic has been a catalyst in many of these developments, providing members with contacts and links within and beyond their own borders; and our Association is uniquely placed now to capitalise on these developments.

I believe that Euraslic as a group can achieve much more in increasing the cross-border collaboration between national and regional networks, and in their contribution to international groups. Members of Euraslic have been involved in cooperative projects before, and during the course of this Conference and afterwards, I would very much like to see discussions on the direction we should be moving in the future, and receiving

suggestions and proposals from Members. As noted earlier, almost all of our efforts over the past eighteen months have been channelled into this Joint Conference, and whilst this has been a very worthwhile collaboration, in the coming months I would like to see the Association examining its role in the broader European and International scene, and discussing collaboration with a wider range of both European and International organisations, groups and networks.

THE DEVELOPMENT OF COPYRIGHT WITHIN THE EUROPEAN UNION

Harald von Hielmerone

Head of Research and Special Collections
State and University Library of Aarhus.

Danish representative in the EBLIDA Expert Group on copyright issues

ABSTRACT: The efforts of the European Union to harmonise copyright are caused by two factors

1. The need to adjust copyright to digital technology
2. The creation of an internal market within the European member states

These efforts have resulted in several copyright directives. For libraries the most important directives are the directives on rental- and lending rights, on harmonising the term of protection, and on legal protection of databases. These directives strengthen authors' rights. In the spring of 2001 a new important copyright directive has been adopted. This directive, on the harmonisation of certain aspects of copyright and related rights in the Information Society, attempts to set new standards for authors rights to control the use of their works in respect to reproductions, communication to the public by electronic means, and distribution of hard copies.

Heavy lobbying by the library community had the effect of saving present user and library privileges. However, the list of exceptions to authors rights is now a closed list. No new exceptions are allowed for works on digital media. Therefore, in the future new developments on users' access to information in digital formats have to be dealt with within the framework of licensing agreements. The Commission now contemplates whether there is a need to regulate the activities of the collecting societies.

Introduction

The changes in copyright legislation reflect the transition of the Industrial Society into an Information Society.

In the Industrial Society the main products are goods, i.e. physical objects. Goods are traded and moved around. There are, however, physical limits as to what you can do with them. One of the limits is, that a published book will forever remain available to the public unless all existing copies perish, and this is not likely to happen in countries with legal deposit of printed works. This is due to the simple fact that copies of the book have been spread – sold to whoever wanted to buy them, and once sold, the book is in the public domain.

This fact has been reflected in copyright law. The author has the exclusive right to decide whether a literary work he has produced is to be published or not. But when a book has once been published, the author's legal right to control the distribution has been "consummated" or "exhausted."

In the Information Society the main products or "goods" are immaterial pieces of "information", i.e. literary and artistic works, usually existing also in digital form. A work in digital form is not fixated in the same way as a printed text is. It may be moved via network to any desired place within seconds and at no cost or effort at all, and you may without any effort produce as many copies as you like. The fixation to the medium has become irrelevant. The work can be regarded as a free floating and truly immaterial object.

Instead of publishing a book, you may now choose to publish the same contents electronically in a database accessible via Internet. If you regret it you may at any time unload it from the database. You may also choose to give access only to certain people and not to others. You remain at any time in control of who - if anybody - shall have access to the work.

The difference between what you can do with a physical object, and what you can do with an immaterial object is reflected in the copyright rules concerning authors rights. According to the WIPO Copyright Treaty¹ authors right to control the communication to the public of their works is *not* consummated or exhausted. This means that, in principle, every time you want to access a work published electronically in a database you need the author's permission.

This example highlights what is at stake in the new copyright regimen that is developing on top of the digital technology. It is the question of

- whether the general public in the digital information society shall have freedom of access to published information.
- whether libraries and archives shall have the right to preserve the cultural heritage of digitally published works, and
- whether historical research on the basis of original and undistorted sources can, in the future, be guaranteed.

Below I am going to describe the efforts of the European Union to harmonise copyright legislation, and the impact this may have on these questions.

The Internal Market

The European Union started originally as an European Economic Community. The objective was to establish a free internal market for capital, goods and labour within the member states.

One aim of the EEC was to stimulate the European information industries in an attempt to counter US dominance. A strong copyright protection was seen as a necessary means to achieve this goal. Cultural policy was originally excluded from the EEC- treaties, so copyright was seen only from an economic point of view. The objects of copyright, the literary and artistic works, the "information products", were regarded as tradable commodities.

This starting point has deeply influenced the development of copyright thinking within the Community, and it has not significantly changed since. The reason for this is that the member states do not share the same cultural and democratic values concerning citizens' right to access information. They share some values concerning freedom of speech, but only Sweden has a strong and long standing legal tradition of protecting citizens' rights to information.

Democratic countries provide legal protection of citizens' freedom of expression, but when it comes to the question of *access* to information, it is more a question of lofty ideals than real politics. The conception of freedom of information is often expressed in the official information policy in relation to libraries, and these ideals certainly form an important part of the professional ethics of librarians. But this does not mean that outside the library community there are shared standards specifying citizens right to information.

This has serious implications on the development of copyright in the digital age. When there are no shared cultural or democratic values concerning citizens' right to be informed, there is nothing to counterbalance the interests of authors.

The only quasi legal basis to support citizens rights to information is the Declaration on Human Rights (art. 19):

"Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."

But this is not a strong basis when it comes to fighting the economic interests of the information industries. Only indirectly through legal deposit of printed works the citizens' access to the printed part of the cultural heritage have been secured.

The Directives

After these introductory remarks I will proceed to describe the copyright directives that directly relate to the operations of libraries and the question of freedom of information. Of special interest to libraries are four directives.

- The Directive on rental- and lending rights (1992)ⁱⁱ
- The Directive harmonising the term of protection (1993)ⁱⁱⁱ
- The Directive on legal protection of databases (1996)^{iv}
- The Directive on the harmonisation of certain aspects of copyright and related rights in the Information Society (1997)^v

Initially, however, a few words on the decision making bodies within the European Union:

- The European Commission functions as a kind of European government. It has the right to propose new legislation, directives, and is the executive body.
- The European Council represent the national governments of the member states. All decisions have to be accepted by the European Council.
- The Parliament has only limited power, but in certain types of cases, e.g. copyright issues, the European Council has to take account of the views of the Parliament and, if they disagree, compromise solutions have to be found.

On both national level and European level the library associations try to influence the political process. The views of the European libraries are put forward by the libraries' lobby organisation, EBLIDA, European Bureau of Library, Information and Documentation Associations. (<http://www.eblida.org/>). The Nordic library organizations are deeply involved in EBLIDA.

The Directive on Rental- and Lending Rights

The Lending Directive specifies the terms for public lending. Traditionally in copyright the so-called "distribution right" is "exhausted" when the book is put for sale. The reason, as mentioned above, is obvious: When the books are sold the author can in fact no longer exert control over them.

The novelty of the Lending Directive is Article 1(4) stating that the authors right to control distribution in the form of rental or lending of copies of their works, is not exhausted when the work is sold or otherwise distributed.

This might have been the end of public libraries, if article 1(4) were not counterbalanced by article 5(1) stating, that member states may restrict authors rights to control public lending, provided authors are remunerated. Member states are, however, free to set up different remuneration schemes, and they might exempt certain types of libraries from the obligation to remunerate. Usually this exemption clause is applied to university and research libraries.

So the result is that within the European Union authors have a right to be remunerated for the public lending of their books. How this right may be exerted in practice is another matter.

The Directive harmonising the term of protection

Within the Community member states had different rules relating to the terms of protection. These obviously needed to be harmonised. The main rule now is that literary and artistic works are protected during the lifetime and 70 years after the death of the author.

Some authors' associations protested against the extension of the period of protection, arguing that this would favour descendants of authors rather than the living ones. The implicit but realistic premise is that there is in every country a lump sum for remuneration purposes to be divided among the rightholders, and the more they are to share this sum, the less everybody gets.

The Directive on Legal Protection of Databases

Databases are important products of the information industry. Often databases contain unprotected information, collected and sorted according to certain principles. Traditionally databases like directories, bibliographies &c. were published in the form of printed books. Therefore it was of no importance if information contained in the book was unprotected and available to the public via other sources. If you wanted to take advantage of how the information was collected and presented in the directory, you had to buy it.

When databases are published electronically, the situation differs, as you may copy the whole or part of the database. As the information contained in the database is often unprotected, no considerations of copyright need to delay your endeavours. When the database is only available online, the vendor might control the use by specifying the terms of use in a contract with the prospective user. In this case the user is bound by the contract. The real problem arises, when databases are distributed as CD-ROM products. Many countries do not accept *shrink-wrap licences*, one-sided declarative agreements you are supposed to accept when you break the seal, and then database vendors stand unprotected.

If database production is to be stimulated, database producers need to have their investments protected. To achieve this the European Commission was inspired by Nordic copyright legislation. Since 1961 databases have been protected in the Nordic countries, and these rules were more or less copied in the Directive. What is protected is the compilation and sorting of the data, not the data *per se*. The duration of protection of the database is 15 years after the production or a substantial update.

This Directive stirred a lot of controversy within the European library community, and when the European Commission tried to have it incorporated in the WIPO Copyright Treaty of December 1996, the library associations became active opponents. The result at the WIPO conference was that the proposal for protection of databases was postponed. It was again discussed at the meeting of the WIPO Standing Committee in Geneva May 1999 and also at the November meeting, but there seems to be no serious interest outside Europe to adopt a treaty on this issue. Third world countries are very sceptical, and US seems now more inclined to settle the matter within the framework of trade agreements.

The main argument against the Directive was that it creates a new protection of otherwise unprotected data. This argument rests on a misunderstanding. It is not the data that are protected, but the collection of the data. If the data are publicly available people are free to collect and compile them in their own databases. The Database Directive does not prevent that. It also seems difficult to argue, that one should be free to profit from the "sweat of the brow" of others by copying any amount of data from a database and making them available in competition with the original producer who made the investment of collecting and compiling them.

A serious problem, however, may arise if the database producer has an exclusive right to collect and distribute the data. This may happen when the institution or firm, who generates the data, gives or sells them to one database producer only.

In the first draft of the Directive there was an article specifying that if a database producer would unduly exploit a monopoly situation compulsory licensing might be enforced. This was later deleted, perhaps because there are other rules to secure free competition and cope with firms who abuse a dominant position.

The Directive contains one novelty of great interest to libraries: Article 15 specifies, that contractual agreements which extend the database producers rights beyond the rights granted in the Directive are null and void.

A rule like this ought to be standard in all copyright law. User privileges granted by law should be minimum standards and not to be overruled by contracts. This might be the best weapon against information vendors trying to abuse a dominant position

In non-European countries there is still no protection of databases, and producers and libraries are left to define their relations by contractual agreements.

The directive on the harmonisation of certain aspects of copyright and related rights in the Information Society

Since December 1997 the *Proposal for a Directive on the harmonisation of certain aspects of copyright and related rights in the Information Society* has been on the political agenda. It was finally adopted in May this year.

With this directive, the European Commission attempted to harmonise authors' rights to control

- use of their works with respect to reproductions;
- communication to the public by electronic means;
- distribution of hard copies.

The Commission also tried to have the main elements of this directive included in the WIPO Copyright Treaty at the Diplomatic conference in December 1996.

The rights specified for authors of intellectual and artistic works do normally also apply to related rights, i.e. the rights of performers, producers of phonograms and films and broadcasting organizations. But in order not to complicate matters I will disregard related rights here, as they are usually of no special importance to libraries.

Reproduction rights

Reproduction rights are dealt with in Article 2 of the draft Directive and the related exceptions in Articles 5(1) and 5(2). Article 2 states that:

- “Member States shall provide for the exclusive right [for authors] to authorise or prohibit direct or indirect, temporary or permanent reproduction [of their works] by any means and in any form, in whole or in part...”

The European Commission tried to have this article incorporated into the WIPO Copyright Treaty. However, telecommunications companies and library associations lobbied heavily against this. The telecommunications companies claimed that this would mean that cache copies would be prohibited and the whole functionality of the Internet would thereby be severely impaired. They also feared incurring liabilities if network traffic passed through a country which had no exceptions for cache copies. The library lobby argued that prohibiting temporary reproduction would prevent any browsing or viewing of protected material on the Internet.

The proposal was eventually rejected at the WIPO Conference. It has now re-emerged in this draft Directive. However, the obligatory exception as specified in Article 5(1) seems to deal with this problem. Article 5(1) makes an exception for:

- “temporary acts of reproduction...whose sole purpose is to enable
- a transmission in a network between third parties by an intermediary or
- a lawful use...”

This exception, however, is the *only* obligatory exception to the authors’ right to authorise any kind of reproduction. Other exceptions to the reproduction right are *optional*, and whether they are implemented is to be decided at national level.

One obvious consequence of this is that copyright laws will not be harmonised to any great extent within the European Union. The library lobby have argued that the optional exceptions should be obligatory minimum exceptions, allowing member states to extend user privileges even further if they wish. This view has not been accepted, neither by the Council nor the European Parliament.

The optional exceptions to the reproduction right have changed quite substantially since the first version of the proposal. For libraries, the most important limitations to the authors’ exclusive right to control reproduction are the following from Article 5(2):

Member States may provide for exceptions or limitations to the reproduction right provided for in Article 2 in the following cases:

- a) in respect of reproductions on paper or any similar medium, effected by the use of any kind of photographic technique or by some other process having similar effects, with the exception of sheet music, provided that the rightholders receive fair compensation;
- b) in respect of reproductions on any medium made by a natural person for private use and for ends that are neither directly nor indirectly commercial, on condition that the rightholders receive fair compensation which takes account of the application or non-application of technological measures referred to in Article 6 to the work or subject-matter concerned;
- c) in respect of specific acts of reproduction made by publicly accessible libraries, educational establishments or museums, or by archives, which are not for direct or indirect economic or commercial advantage;
- d) in respect of ephemeral recordings of works made by broadcasting organisations by means of their own facilities and for their own broadcasts; the preservation of these recordings in official archives may, on the grounds of their exceptional documentary character, be permitted;
- e) in respect of reproductions of broadcasts made by social institutions pursuing non-commercial purposes, such as hospitals or prisons, on condition that the rightholders receive fair compensation.

Comments to 5(2)(a): Sheet music appeared for the first time in the amended proposal prepared by the Commission in spring 1999.^{vi} The sudden appearance of sheet music in this article demonstrates the powerful influence of the music industry. It will present libraries, researchers and musicians with a problem, albeit a minor one, provided that the national implementation of Article 5(2)(c) will allow libraries to make safety reproductions of rare items, for example, for lending purposes.

Comments to 5(2)(b): before the second reading by the Parliament the wording of this article was: “in respect of reproductions on any medium made for the private use of a natural person and for non-commercial ends, on condition that the rightholders receive fair compensation ...”

Note the difference between the two versions:

- “made for the private use of a natural person ...”
- “made by a natural person for private use ...”

The first version implies, that the library may assist the patron in making the copy. The second version may be interpreted to imply that patrons have to do it themselves.

In most cases, when it comes to copying material found via the Internet, this is of no importance as researchers often do the searches themselves. But when it comes to inter library lending problems may arise.

In Denmark art. 5(2)(b) has been implemented in such a way, that it will prevent library staff from making digital copies for patrons. In consequence Danish libraries may only send paper copies via surface mail or fax machines until the problem may be solved by some form of collective agreement with the rights owners

I have recently been informed, however, that the Commission in a commentary to the Parliaments decision, has made it clear that – the change of wording notwithstanding – art. 5.2.b. does not preclude library staff in making digital copies for the private use of patrons.

Libraries should be aware of this fact.

There is a general proviso to Articles 5(2)(a-b) that the exceptions to the reproduction rights presuppose that rightholders are remunerated. This may result in additional costs for libraries, depending on how the remuneration schemes are construed in the member states.

The UK is said to have vehemently opposed this proviso, because there is no tradition of collective remuneration in the UK. In the Nordic countries, on the other hand, there is a long tradition of collective remuneration: either the state provides the funds or remunera-

tion is financed by levies. This was not therefore a big issue for Nordic libraries. UK libraries, however, may expect increased costs, all things being equal.

For much of the time during negotiations, libraries were restricted to making reproductions for "archiving or conservation purposes" only, according to Article 5(2)(c). It was important for libraries that this restriction be lifted, because it could prevent libraries from making use of new technological developments in its internal operations.

Communication to the public

Article 3 states that:

- "Member states shall provide authors with the exclusive right to authorise or prohibit any communication to the public of originals and copies of their works..."
- "The rights...shall not be exhausted by any act of communication to the public..." including their being made available to the public.

A paragraph of similar content was proposed and accepted into the WIPO Copyright Treaty. The consequence is that all signatories of the WIPO Copyright Treaty are now obliged to incorporate this article into their national law upon ratifying the Treaty.

The consequences of this article should be seen in conjunction with the related exceptions as stated in Article 5(3):

- "Member States may provide for limitations to the rights referred to in Articles 2 and 3 in the following cases:
 - a) use for the sole purpose of illustration for teaching or scientific research,...to the extent justified by the non-commercial purpose to be achieved;
 - b) uses, for the benefit of people with a disability,...
 - c) reproduction by the press,...
 - d) quotations for purposes such as criticism or review,...
 - e) use for the purposes of public security or to ensure the proper performance or reporting of administrative, parliamentary or judicial proceedings;
 - f) use of political speeches as well as extracts of public lectures or similar works...
 - g) use during religious or official celebrations organised by a public authority;
 - h) use of works, such as works of architecture or sculpture, made to be located permanently in public places;
 - i) incidental inclusion of a work or other subject matter in other material;
 - j) use for the purpose of advertising the public exhibition or sale of artistic works,...
 - k) use for the purpose of caricature, parody or pastiche;
 - l) use in connection with demonstration or repair of equipment;

- m) use of an artistic work in the form of a building or a drawing or plan of a building for the purposes of reconstructing the building;
- n) use by communication or making available, for the purpose of research or private study, to individual members of the public by dedicated terminals on the premises of establishments referred to in paragraph 2(c) of works or other subject matter not subject to purchase or licensing terms which are contained in their collections;
- o) use in certain other cases of minor importance where exceptions already exist under national law, provided that they only concern analogue uses...”

This list of exceptions demonstrates that, in reality, the Communication to the Public Right is not harmonised at all, giving member states the option to maintain their existing exceptions.

Apart from the exceptions not being obligatory i.e. being optional, libraries should welcome this development. Instead of the very restrictive first version of the proposal, we have ended up with a text which is decisively more liberal. This may even result in more liberal amendments to national legislation.

Special attention should be given to Article 5(3)(n). The combination of Articles 5(2)(c) and 5(3)(n) will enable libraries to digitise their collections and provide access to these collections on the library premises. A similar exception in Danish copyright law has proved very valuable, particularly for research libraries.

As a whole, the exceptions seem to cover most library needs. A library may provide access to a work, provided the library actually owns a copy of the work in question, unless the work is subject to purchase or licensing terms which prohibit access. But who would buy a work without being allowed to give access? This is hardly conceivable.

However, many libraries are making the move from “collections” to “connections”. Instead of acquiring an electronic copy of a work and physically installing the work on the library server, the library simply subscribes to a service accessible via a gateway with an Internet address. This has obvious advantages, but it does remove access control from the hands of the library and places libraries and their patrons at the mercy of suppliers and authors.

It is reasonable to expect that if there is a commercial interest in a work it will remain available. But use of a work may become so rare, that it no longer covers its costs. Many libraries try to overcome this issue by obliging suppliers to guarantee “eternal access”. Such guarantees are worthless, however. In the first place, the supplier may not be able to fulfil these obligations, for example, if the supplier goes out of business. Secondly, the author may enforce the communication to the public right and withdraw the work. This may happen, for example, when an author regards an earlier work as a youthful aberration whose contents or quality do not meet the author’s present standards. If the work is published in print form, there is nothing the author can do. But if it is published electroni-

cally in a database, the work may simply be removed. The consequences for historical research are obvious.

To prevent such a scenario, the communication to the public right for authors must be balanced by regulations for legal deposit and public access on the library premises to deposited works. The first issue is taken care of by Article 9 and the second issue by Article 5(3)(n). It only remains for member states to implement legal deposit regulations for works published in databases, an issue of the utmost importance.

Finally it should be noted, that all exceptions have to pass the *three step test*, mentioned in art. 5 (4)

- “The exceptions and limitations provided for in paragraphs 1, 2, 3 and 4 shall only be applied in certain special cases that do not conflict with a normal exploitation of the work or other subject matter and do not unreasonably prejudice the legitimate interests of the rightholder.”

The wording of this article conforms with Article 10(2) of the Berne Convention, and so is in line with international copyright law. However, whereas the Berne Convention is open to exceptions provided they pass this test, the list of exceptions of the Directive is closed.

The probable consequences of this is that the development of copyright in the digital age may come to a halt, and be replaced by licensing contracts.

This development presents libraries and their patrons with two major practical problems.

1. It may be quite difficult for libraries to manage a great variety of contracts. The terms specified have somehow to fit into the daily routines and the general pattern of access given to patrons.
2. It is usually impossible to get in contact with the author or rightsowner in order to get a permission or make a contract. When it comes to multimedia this gets even worse. A single work may have many authors and other rightsowners. Rights have to be managed by (authorised) collecting societies or clearing-houses, authorised to make collective agreements clear rights even for authors who are not members of the society.

To solve the practical problems of managing copyright there must be developed

- standard licensing contracts and
- collective licensing

Otherwise libraries may not be able to utilise the new technology and rightsowners are not likely to profit from their copyright..

This may be the most important long term consequence of the Directive.

Technical protection

Throughout the negotiations, the question of technical protection measures, e.g. encryption, was an undecided issue. By introducing encryption, rightsowners could prevent users from taking advantage of lawful exceptions as specified in Article 5.

Article 6.4 deals with this issue. The text reads:

- “...Member States shall take appropriate measures to ensure that rightholders make available to the beneficiary of an exception or limitation provided for in national law in accordance with Article 5(2)(a), (2)(c), (2)(d), (2)(e), (3)(a), (3)(b) or (3)(e) the means of benefiting from that exception or limitation..”
- “A Member State may also take such measures in respect of a beneficiary of an exception or limitation provided for in accordance with Article 5(2)(b)...”

Note the different use of the words “shall” and “may”. This means that member states may force rightsowners to allow digital reproduction of works in digital format, as covered by Article 5(2)(b), but they don’t have to.

This highlights the general thrust of the Directive, which leaves it to libraries and other interested parties to argue their case at national level. Libraries should not regret this, after all, it is easier to influence national politicians.

It should also be noted, however, that license agreements may override the exceptions when it comes to on demand services:

- The provisions of the first and second subparagraphs shall not apply to works ... made available to the public on agreed contractual terms in such a way that members of the public may access them from a place and at a time individually chosen by them.

That contracts override the exceptions is quite normal in copyright law. Even if we may regret this it is difficult to complain. The crucial issue here is that even click-on contracts are recognised as being “agreed contractual terms”. The libraries fought this, claiming that the provider and the user are not on equal terms in a “click-on situation” - but without success.

The consequence of this is that the exceptions may be of little value.

Distribution right

The rules concerning distribution rights are different in the EU member states, and they must be harmonised. Otherwise there can be no Internal Market for copyrighted works.

Some member states have “national consumption” and others have “universal consumption” of distribution rights.

- National consumption means that the authors’ right to control distribution is only exhausted in a particular country, if copies of his work with his consent are sold or otherwise distributed in that country. His right to control distribution in other countries is unaffected.
- Universal or international consumption means, that the authors’ right to control distribution is exhausted all over the world after the first sale or distribution with the authors consent no matter in which country the sale or distribution has taken place.

Small-language countries like the Nordic ones, have traditionally been in favour of universal consumption and large-language countries have traditionally favoured national consumption. The reason why is obvious if one thinks in terms of publishers interests. English, French or Spanish publishers clearly have an interest in dividing up the world market into separate countries. This gives them the opportunity of setting the price of their products according to the population’s ability and willingness to pay. If this kind of division of the world market shall be possible national or regional consumption of distribution rights is necessary in order to prevent parallel import from countries where the price is lower.

Publishers from small-language countries like Denmark do not care about the world-market, as the only market for Danish books is Denmark. On the other hand, having to rely heavily on foreign literature for research and higher education, small-language countries have a clear interest in being able to import books from wherever they are best and cheapest.

The European Commission opted for regional consumption. This means that if a book is published in any member state of the Community the distribution rights will be exhausted for the whole Community, but not for other countries. This is quite logical as national consumption within the Internal Market of the Community is a contradiction in terms. The European Commission, however, could also have chosen universal or international consumption, and thereby furthered free trade of information products, books and other copyrighted works. As it is the directive gives publishers a very strong position, and prevents consumers from neutralising unreasonable prices by parallel import. The interests of the consumers are disregarded.

One should note that strictly speaking the wording of the article does not prevent anybody from importing copyrighted works. Booksellers may import books from countries

outside the European Union, but they are not allowed to sell them, without the author's consent.

There are within the European Union many ethnic minorities who will be affected by this. Books and other culture products from their original homelands are seldom also published in EU member states, but must be imported directly from the country of origin. In these countries publishing is not organised in a manner that makes it possible to acquire the author's consent. Booksellers, music- and video shops may therefore have difficulties in legally supplying these type of customers. This seems hardly to be in keeping with the Declaration on Human Rights.

In sum: Authors' rights to control distribution will *de facto* if not *de jure* hinder free trade with copyrighted works. As a result ethnic minorities may be discriminated against.

Conclusion

During the last decade, the European Union has launched several directives in an attempt to deal with copyright issues raised by the transition to digital technology and the creation of the internal market. This has resulted a considerable strengthening of authors' rights with respect to:

- remuneration for public lending
- prolongation of the term of protection
- legal protection of databases
- remuneration for reproduction in certain cases
- communication to the public right
- distribution rights

In the political process the library lobby has concentrated its efforts on securing reasonable exceptions to the reproduction and communication to the public right with quite successful results.

The decisive factor, however, in attaining this positive result was that member states were not, in the final analysis, willing to give up exceptions contained in their national legislation. This is hardly surprising. Exceptions to the exclusive right of authors do not usually come out of the blue. Instead, they are the result a long development process, of many years political bargaining and the careful balancing of interests. No government can be expected to easily give up these national positions.

On can conclude that, except for distribution rights, the European Commission did not succeed in harmonising the present laws on copyright. The Member States are allowed to keep their present exceptions.

The harmonising effect will be seen in the future, as no new exceptions are allowed. New uses and technical developments have to be dealt with within the framework of licensing contracts.

There will be a need for

- standard licensing contracts, and
- collective licensing

Otherwise neither libraries nor rightsowners are likely to profit from the new technology.

This may be the most important long term consequence of the directive.

ⁱ WIPO Copyright Treaty, December 20, 1996.

The World Intellectual Property Organization (WIPO), is a United Nations organization with headquarters in Geneva, Switzerland. WIPO's objective is the promotion of the protection of intellectual property, and the administration of international treaties dealing with intellectual property, most notably the *Berne Convention* and the *Rome Convention*.

A WIPO conference in Geneva adopted the *WIPO Copyright Treaty* and the *WIPO Performances and Phonograms Treaty* on December 20, 1996. Before becoming binding law the treaties have to be ratified by the member states. It is not mandatory for WIPO member states to ratify the treaties; however, the most important Contracting Parties are expected to do so.

At the WTO (World Trade Organization) conference in Seattle, 1999, the European Union proposed that the *WIPO Copyright Treaty* and the *WIPO Performances and Phonograms Treaty* are included in a new WTO Treaty.

ⁱⁱ Council Directive 92/100/EEC of November 1992 on rental right and lending right and on certain rights related to copyright in the field of intellectual property. (Official Journal L 346, 27/22/1992 p. 0061 – 0066)

ⁱⁱⁱ Council Directive 93/98/EEC of 29 October harmonizing the term of protection of copyright and certain related rights. (Official Journal L290, 24/11/1993 p. 0009 – 0013)

^{iv} Directive 96/9/EC of the European parliament and of the Council of 11 March 1996 on the legal protection of databases (Official Journal L 077, 27/03/1996 p. 0020 – 0028)

^v Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society (Official Journal L 167 , 22/06/2001 P. 0010 – 0019)

^{vi} Amended proposal for a Directive on copyright and related rights in the Information Society. 97/0359/ COD (21 May 1999)

VIRTUAL LIBRARIES AND THE NEW BUSINESS MODEL IN SCHOLARLY PUBLISHING

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ABSTRACT: New issues are emerging for mediators in changing from traditional to virtual library. It could offer the opportunity to stress some trends of new business model in scholarly publishing.

What we, yesterday, called New Economy or Net Economy was overvalued, as everyone knows now. Today, everybody speaks of economy, just economy (not “new” or “old”) even with regard to the Internet and electronic services. But this more realistic way of thinking does not hide the dramatic changes that have come, and still go on, in many areas. Scholarly publishing may be affected the most.

My goal here is not to present the results of particular research, but to share with you some reflections we made after several years of scanning this field in the Research Group on Information Services (GRESI).

First, in order to clarify the analysis, I have to point out three significant elements:

- In economics, there is an alternative form of obtaining goods or services: you can choose to produce them yourself (organisation) or to buy them (market). According to whether it is more expensive to organise a process of production or to negotiate the access to the required good or service, the stakeholders will choose one or the other solution. In the field of electronic scholarly communication, we have a typical example of this alternative, with the organisation of free archives by the scholars themselves on one hand, and the distribution of articles by the way of commercial portals proposed by the publishers in the other.
- For many years, the connection between publishers and libraries was the model that could preserve both the necessity of disseminating the reviewed scientific literature around the world (publishers) and the necessity of free access for patrons in a particular place (libraries). Economics of science and economics of publishing coexist in a strange but efficient wedding between profit and non-profit (even if there are domestic squabbles, specially on the cost of the subscriptions). I want to stress that it was a strong model, and still a reference one. But nobody can say that this model is an eternal one.
- At first sight, libraries look like small islands of relative calm and stability in a sea of change of the digital age. They are accustomed to cooperate sometimes even on a very large scale, they currently share their resources as it is the rule on the Internet. They do not need to sell anything, which is particularly difficult on the Net. They are

not concerned by the fluctuations of Nasdaq. They are founded mainly by the communities which they serve. Lastly, the disorder which characterizes the Internet, stresses the need for order, i.e. the librarians' skills. It is true that all of these strengths have allowed libraries to develop some of their traditional services (reference, ILL, etc.) on a very large scale. But, at the same time, digital services so deeply change a library that one can say it's not a library any more, just a new unnamed institution.

Let us compare a traditional library of scholarly journals with a virtual one.

The traditional library builds a world of limited knowledge for a limited number of people: the documents are classified into collections, which remain in the institution and could eventually be borrowed for a short time. Patrons are counted; time itself is regulated by the opening hours and the periods of loan. The economy of the traditional library is based on the service for an identified community of people. This community is limited and, in most cases, the external patrons are very few. This service is a service for a neighbourhood based on the handling of material objects (documents in paper). The justifications of a library are: mutualisation of the costs (an item for several patrons), opportunities of reading (discovery of documents by the effect-collection, "just in time..") and insurance (preserving the access "just in case"). Thus, the representatives of the communities they are serving mainly fund libraries.

Information retrieval systems opened a gate in the walls of libraries by offering access to outside resources. Indeed, the community of patrons remains limited and the sophistication of the tools clearly showed the need of information specialists.

In the virtual library, the walls are down and its business model is shaken. We can illustrate these new issues by the changes for collections and for patrons. The collections of a virtual library are made up mainly of:

1. Local collections, the documents that could be recorded on the server of the library. Publishing no longer makes an obvious difference. The virtual library does not loan anything to anybody, it gives access, often to everybody connected on the Net. A sign of this change is the new stress (at least in France) on intellectual property: libraries must have the copyright of documents they provide on the Net. Usually these documents are those of the public domain (heritage) or the non-published works (gray literature) of the members of the community (theses, reports, etc.).

This new role for the library produces new costs unknown in traditional librarianship. The librarian not only catalogs the document but formats it in a readable and accessible file, and even trains local authors in electronic publishing. Some works look like publishers' or printers' works in the old paper world.

And, in most cases, these changes are managed in a collaborative way with other libraries. Networks are built to share skills, experiences and digital collections. These networks could reduce costs tomorrow.

2. Licensed collections. Publishers offer libraries a license to access their full-text journals. The terms of the licenses are negotiated. Gradually new rules are emerging. Once again, the changes are significant. The librarian does not really hold collections any more, and, at least partly, he does not even build the collection in his own way. In a way, librarians and publishers have reversed their roles, and librarians with licensed collections are now some kind of agents.

Consequences are serious. The increase of transaction costs has an obvious effect on concentration of the two involved parties, publishers and libraries. Both are interested in reducing the number of their partners to decrease the time spent in negotiations and the costs of technical adaptation. This effect is transitory (just the time of building a new system), but the result will continue. The librarians build consortia to reinforce their capacity in negotiation and to build technical platforms. Publishers become bigger and bigger, sometimes increasing their portfolios in quasi-monopolistic ways. The already inelastic market can become still more rigid. Against the perverse effects on subscription prices, librarians have supported non-profit publishers.

Free collections. Many scientific articles are now available for free on the Internet. How to control a collection, which, by definition, is wild? How to separate valid documents from those that are dubious? How to be sure of the stability of the URL or even of the documents themselves? These issues, and many others, are still discussed and different solutions are proposed, according to the different nature of the collections. We can find three categories of free collections:

- Archives of scientific articles organized by researchers themselves or learned societies. These self-services have been developed very quickly. The deposit and access to the text are direct. The fast evolution in some very organized scientific communities could prefigure changes in traditional functions of scientific publication. This new way of publishing, controlled by the concerned scientific community, is bypassing mediators, i.e. librarians and publishers, since authors and readers, belonging to the same group, access the text directly.
- Self-publishing. Researchers can offer their own productions online and develop specialized web sites. This practice is very current. Nevertheless to publish, even in a rough way, takes time, presupposes a minimal know-how and demands sufficient detachment. After the current boom of exchanges in the "invisible colleges," the majority of authors will be tired of working on their own research, for which they are not trained and do not receive any remuneration, in money, career or reputation. The best web sites will become professional. It is a traditional dynamics in the history of the media.
- Free access publishing. Profit or non-profit publishers could, for various reasons, offer journals online for free. They may do this either for political

reasons (democratization of science), or for strategic reasons (loss leader). These policies could be short lived; in future years the publishers may charge. Generous at first sight, such a policy can also support the actors who have these means, i.e. powerful ones and thus reinforce their dominant position.

Thus the concept of collection could be upset in the digital world, and we have only suggested some aspects, forgetting for example the mission of conservation, up to now reserved for the libraries.

Let's take the problems now from the patrons' point of view.

In a virtual library, it does not cost, a priori, more to offer services to the community of original members or to the entire Internet; and conversely it is possible to offer its original patrons a much broader panel of resources without excessive cost. We can stress three kinds of change according to whether we analyze the related services from the mediators (publishers and librarians), from the patrons themselves or from their organized communities.

From the point of view of the mediators, two funding issues have arisen. These are:

1. If access to a document is free for everyone, how can one fund publishing?
2. If everyone has equal access, how can fees charged to a particular community be justified?

For libraries, the answer to the first question was to keep only for their affiliated members the use of documents for which they had negotiated access. For outside users, they could offer their local collections and eventually document delivery services, when the objective is to show that they are leaders in their specialized fields of knowledge. In these ways they can enrich their community, by adding value inside and offering existing value outside.

The first observations of the evolution of the practices of electronic reading in science could appear paradoxical. On one side, the surveys insist on the attachment of many scientists to paper; on the other side the statistics indicate a great burst of downloading as soon as a critical mass is online. We think there is a breaking point. Readers prefer paper when electronic resources are neither accessible enough, nor abundant enough. But they dramatically change their practices and opinions as soon as there is enough on screen to monopolize all information retrieval and reading time. If this assumption is founded, as predicted by statistics, the economy of publishing will have to be rebuilt on another basis tomorrow. No stakeholder today can negotiate reasonable prices for uses whose behaviors change so rapidly; that is probably the main reason why negotiations still remain what they were in the paper world. But to be present and seen on the Net is crucial; there is a race of investments in order to be the first that cannot be ignored.

In the scientific world, some consider that the literature would become a “public good” accessible to all, without mediation, allowing an optimal development of science and knowledge. Authors do not need (and don’t have any) royalties from publishing; they are paid by their peers’ recognition, which has direct consequences on their careers. In order not to stay a utopia, these considerations suppose a very structured and consensual (particularly about its mode of regulation) community. In this case, the cost of certification (reviewing) of documents is included in the common uses of the community, implicit for the researcher who could publish online only “legitimate” articles; if he doesn’t, he does face exclusion or, at least, being banished from the community. As soon as other considerations rise, like industrial applications, media or just a less regulated organization of the discipline, the mediation of an external party could help to legitimize the content of publications.

In addition, researchers sometimes forget they are publishing not only for their peers. Industrialists, researchers of other disciplines, students, and various politically enlightened citizens are readers. Even if only occasional readers, they are essential for inserting science into society, for its renewal, and for exchange between different parts of science. For these readers, mediators are important.

Thus we are facing dramatic changes. It is impossible today to draw the true future design of scientific publishing and to predict the future role of the mediators. Nevertheless, we can locate some structuring movements and incite the stakeholders to take care of it. In conclusion, we want to underline that, if one wants to succeed:

- The access to the reading must be free. All the barriers (technical, financial, etc.) to the text should be banished. In particular, the commercial transactions must be removed, either before (subscription, license), or after (invoice), but not at the time of reading.
- For the mediators, publishing and librarianship have been models in the paper world, but do not work in the same way in the digital world, even if they remain a reference for commercial transactions. So it’s very important to conduct experimentation and avoid getting locked into one mechanism. The financial negotiations will be rebuilt tomorrow on new bases.
- Lastly, the movement in progress is also the occasion to redefine the places of public interest and market in scientific publication. These polemical debates and contradictory initiatives are not exceptional in the history of media. Private or public sectors are alternatively accused of oppressing or freeing publication. In the field of science, the connection between publishers and libraries was the old compromise; scientists and mediators have to find a new balance for the new situation

The chaotic construction of the virtual libraries illustrates also major transformations in the processes of construction of science itself.

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SCHOLARLY COMMUNICATION IN THE MARINE AND AQUATIC SCIENCES

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Abstract: We initiated an evaluation of the scholarly communication and publishing process in marine and aquatic sciences. This involves three components: describing the core journals for the discipline; examining the mechanics of publishing; and learning the mindset of authors and editors. We identified a core list of 19 journal titles and examined their pricing history. We engaged in a dialog with editorial board members of marine and aquatic science journals. Finally, we initiated discussions with faculty to learn the role of publications in the promotion and tenure process. Once our evaluation is complete we hope that it will encourage the transformation of scholarly publishing in marine and aquatic sciences.

Introduction:

Library budgets rarely increase at the rate that journal costs inflate. This strains our budgets and exercises our creativity. We all want to maintain viable collections that support our researchers and students. Core lists are drawn up, hands wrung over the price of some of the titles, and we devise new ways to tell senior faculty that we cannot afford their favorite journal anymore. IAMSILC librarians have shared strategies to identify which journals to cancel and which to keep (Wible 1990; Wiest 1998; Williams 1990). Ultimately, librarians experience a great deal of frustration over the seemingly endless cycle of price increases and journal cancellations.

During the 2000 IAMSLIC conference in Victoria, Carla Stoffel explained the Tempe Principals (www.arl.org/scomm/tempe.html) as well as the SPARC Initiative (Scholarly Publishing & Academic Resources Coalition; www.arl.org/sparc). The SPARC initiative has recently celebrated two successes. Its alternative journal "Organic Letters" has surpassed the commercial equivalent "Tetrahedron Letters" in the ISI impact factor rankings. And, SPARC has received the "Service to Not-For-Profit Publishing Award" from the Association for Learned and Professional Society Publishers. Ms. Stoffel encouraged each of us to talk with our customers and work creatively on ways to keep information flowing and prices controlled. We feel this discussion should take place among the entire science community including authors, editors, publishers and librarians.

In the wake of recent journal cancellations, our two institutions (Oregon State University and University of Oregon) took Ms. Stoffel's advice seriously and set out to enlighten faculty about the scholarly publishing process, starting with those involved in the editorial process. Our provosts asked all editorial board members to identify themselves and discussions with these faculty members are underway. In addition, our respective University Librarians encouraged the two of us to consider proposing a new SPARC produced journal in the field of marine science.

Before embarking on this endeavor, we needed to know more about trends in marine and aquatic sciences publishing. The first step was to describe the nature of a "core" collection for marine and aquatic libraries. Next, we measured fluctuations in journal prices and examined other costs associated with journal production. Finally, we have begun to examine the mechanics of the publishing process, the mindset of authors and editors, and are learning about the promotion and tenure process that drives scientific publication.

Describing the Marine and Aquatic Science Field:

The first problem is defining the field of marine and aquatic science, and its journals. The wide variety of IAMSLIC libraries suggests that the field is indeed multi-faceted (Williams 1990). For example, the shift to molecular and genetic research in many of our labs during the past decade has changed the nature of some library collections. There are also traditional differences among our collections. The Guin Library collection has a strong focus on marine fisheries and aquaculture as well as a bias towards work on the Northeast Pacific, but the core oceanography journals are kept on the main campus where the oceanographic modelers are stationed. The Oregon Institute of Marine Biology, on the other hand, has a smaller collection appropriate for a teaching field station and highly reflective of local faculty interests.

We compiled a core list of publications from data published in IAMSLIC Proceedings and other sources since the mid 1980s (Fuseler 1989, Fuseler 1990, Norton 1985, Sieburth 1991, Wiest 1998, Williams 1990). A second list of journals was compiled using the journals with the highest ISI Impact Factors in the categories of Freshwater and

Marine Science (1995/2000), Oceanography (2000), and Fisheries (2000). The two lists were merged and the 19 titles appearing in both lists are the focus of this preliminary study (Table 1.)

Data from a 1996 Scripps Institution of Oceanography study on journal page costs (<http://scilib.ucsd.edu/sio/guide/prices/index.html>) was updated with the 2000 subscription prices paid by University of Oregon. We compared journal subscription rates and calculated the percentage change they have undergone during the past five years (Table 2). We also calculated the percentage change in cost-per-page over that five year period (Table 3).

Journal production and pricing can be very confusing. It may be difficult to distinguish a commercial journal from a society-based journal. Allen Press is a publishing house that produces many society journals. They provide a market analysis and price recommendation that is generally approved at society business meetings (Breithaupt 1995). According to some studies, 60%-70% of journal production costs are incurred before the physical production begins (Stankus 1999). It is difficult to understand why commercial (for-profit) journals are so much more expensive than society-supported journals. Author page charges by society journals appear to allow for lower subscription prices. However, some would argue that commercial prices remain artificially high because of a "third party" payment system. The publisher produces the journal, the researchers want access, but a "third-party", the library, pays the bill (Stoller, et al. 1996).

Observations:

- Many journal prices, but not all, inflate at a higher-than-normal rate. The American Institute for Economic Research (www.aier.org) shows an inflation rate of approximately 12.5% between the years of 1996 and 2000. Our calculations show that 14 of the 19 core journals increased at substantially higher rates.
- Subscription costs, particularly increases, are the first thing we notice about journal prices. However, cost per page seems to be a more accurate way to gauge the true cost of a journal. The \$250 journal may be as expensive as the \$2500 journal if you look at the number of pages you get for your money. Factor in color, and the \$2500 may look like a real bargain. Only 10 of the 19 journals showed substantial page cost increases. Six rose less than 12.5% and two fell considerably.

Our next steps:

- Examine a larger list of core titles.
- Evaluate copyright charges.
- Evaluate relationship between page charges to authors and subscription prices to libraries.

The Mechanics of the Publishing Process:

Now that we have identified a core list of journals, we are contacting editorial board members from these and other journals. We do not always contact the editor-in-chief but

will contact the individual we think most likely to respond to our request for an interview. The "Declaring Independence" (www.arl.org/sparc/DI) brochure gives the framework for our interviews with editors. "Declaring Independence" is a very thorough survey, but because it is so lengthy we are limiting our interviews to seven key questions (Appendix A.)

None of the editorial board members surveyed are involved in setting the price for their journal with the exception of one society-based journal where the editor is a member of the society executive board. Some receive honoraria or token monetary support from their publisher but generally used the money to cover administrative support costs. There is no concern that publishers made undue profit from a particular journal and only two respondents feel the need for a non-commercial alternative journal in the marine science field. One editor recently attended a presentation on the BioOne and SPARC. Two other editors have a limited knowledge of the BioOne and SPARC initiatives. None of the interviewees report a bias for or against societal or commercial publications in terms of value for promotion and tenure. The most frequently voiced concern is the time it takes for articles to be published in society journals.

We evaluated each journal to see if it had a clear copyright transfer statement limited to the print publication and its electronic analog and that did not limit the author's right to post the work on the Web. This was generally not the case and was not always easy to identify. Another aspect to copyright is the ability of a faculty member to use a copyrighted work as assigned reading for a class. Editorial board members were not always aware of these restrictions.

When asked if being an editor was rewarding, we received a range of replies. Dr. James T. Carlton, editor of *Biological Invasions* describes editorship as "A vast black hole of nothingness" simply because of the enormous workload involved. A former regional editor for *Marine Biology* says, "I just realized how much of my life I gave them for free". Other respondents provide a contrasting view. Jennifer Nielsen, editor of *Reviews in Fish Biology and Fisheries* offers: "*Editing a world-class international journal on fish and fisheries is a highly creative outlet for me. The challenges to understanding the broader, global issues in fisheries were never fulfilled by work or publication in local, i.e. North American, journal outlets. This job forces me to take a broader view of the issues and focus attention in areas I feel are neglected by other geo-centric journals. The rewards are found in the synthesis of ideas and people*".

Observations:

- We need to do more to inform authors and editors about alternative publishing efforts.
- We need to learn more about the commercial publishing industry and what it takes to be able to publish a high quality journal in a timely manner.
- We need to help authors understand the consequences of assigning their copyright to the publisher.

- Our next steps:
- Examine copyright statements more thoroughly.
- Interview additional editors.
- Investigate the role of BioOne.
- Investigate the costs of publishing and identify a range of acceptable profit.

Faculty Mindset:

To understand the faculty perspectives of the scholarly publishing process, we developed a set of questions to ask faculty involved in promotion and tenure decisions (Appendix B.) Discussions with faculty have been informal, yet focus on the importance of publications in the review process, and their perception of the most prestigious journals in their field. Few seemed concerned with the basic concept of promotion and tenure or the reliance on prestigious journals in their careers.

One researcher takes a stand:

Several years ago an untenured faculty member at University of Southern California began to take issue with the very high cost of Marine Biology (\$1900/year during the time of these discussions, \$3880 and \$1.70/page today.) Upon reviewing an article for this journal he informed the editorial board he had spent five hours in review, his time was worth at least \$20 per hour and would they please reduce his library's subscription to *Marine Biology* by \$100. The editorial staff did not agree and several heated letters were exchanged. The faculty member decided he would no longer publish in anything except non-commercial journals such as *Development*, *Invertebrate Biology*, and *Biological Bulletin*. He continues to advise students against publishing in commercial journals saying that to do so "steals money from your library." In two cases, his students felt the need to publish research in high profile journals so the researcher is a co-author in those commercial publications. Taking a stand against commercial publishers did not adversely affect this researcher. He was awarded promotion and tenure and has never been without grant support.

Is this an isolated case? If more researchers took this approach would we see a change in commercial journal pricing?

Observations:

- Publications figure quite prominently in promotion/tenure evaluations because this is the concrete evidence that research has been completed and disseminated.
- The quality of the publications matters, not the quantity
- Faculty have little understanding of the difference between commercial and non-commercial journals. In the case of society-based journals this can be complex because commercial publishers produce some as well.
- Timeliness of publication is the main reason that researchers choose commercial journals over societal journals for their publications.

Our next steps:

- Interview additional faculty.
- Compare faculty perceptions of valued titles with our core journal lists.

The future:

Does this work alleviate our frustrations over journal pricing and possibly more cancellations? Does it answer our administrator's question of promoting a new journal? No, rather it does begin to involve us in our community of science. By including authors, editors and publishers in this discussion that has traditionally been limited to librarians we may help to transform the scholarly publishing process.

Appendix A:
Questions asked of editorial board members

1. Do you as editors help establish the price of your journal?
2. Have you noticed any changes in subscribership during the past 10 years and could those changes be associated with the cost of the journal?
3. Do you know the amount of profit your publisher makes from your particular journal and do you believe this amount is fair?
4. What sort of assistance do you receive from the publisher and are these services valuable enough to warrant the price differences seen between commercial and societal journals?
5. As researchers in your field, you are probably called upon to review the research of colleagues (whether publications, grant proposals for promotion request). Do you notice if researchers publish in society (not-for-profit) vs. commercial (for-profit-journals and do you have an opinion about the value of either type of publication?
6. Are you familiar with initiatives such as SPARC and BioOne and do you see a need for a non-commercial journal in the marine and aquatic sciences?
7. Does your publisher ever allow authors the right to maintain an electronic archive of their own articles for use when teaching or must they pay copyright royalties when using their own work for classroom reading?

Editorial board respondents:

- *Advances in Marine Biology* (Craig Young, editorial board)
- *Aquatic Microbial Ecology* (John Dolan, Deputy Managing Ed.)
- *Biological Bulletin* (Richard Emlet, editorial board)
- *Biological Invasions* (James Carlton, Editor)
- *Estuarine Coastal and Shelf Science* (Stephen Sulkin, Regional Editor)
- *Invertebrate Biology* (Vicky Pearse, Editor)
- *Journal of Experimental Marine Biology and Ecology* (Anthony Underwood, Managing Editor)
- *Journal of Physical Oceanography* (Lynne Talley, Editor)
- *Marine Biology* (Otto Kinne, Editor-in-Chief)
- *Marine Ecology Progress Series* (Otto Kinne, Editor)
- *Reviews in Fish Biology and Fisheries* (Janet Nielsen, Editor)

Appendix B

Questions for Researchers Regarding Promotion and Tenure

1. How are you involved in the promotion and tenure process? (serve on a departmental committee, help others prepare dossiers, etc.)
2. What is the importance of publications in the promotion and tenure process?
3. Is publication in a non-profit journal a detriment to promotion and tenure? Examples of a non-profit journal are those published by the Ecological Society of America or the American Fisheries society.
4. Besides *Science* and *Nature*, what do you consider the three most prestigious journals in your field?
5. What do you consider the next tier of journals?
6. What value do you place on regional journals or those that address a sub-discipline? Examples are *Northwest Science* and *Journal of Aquatic Animal Health*.
7. Where do you encourage your graduate students to publish?
8. Any other comments?

Faculty respondents

- Dr. Richard Emlet (University of Oregon)
- Dr. Dan Edge (Oregon State University)
- Dr. Charles Miller (Oregon State University)
- Dr. Robert Olson (Oregon State University)
- Dr. William Percy (Oregon State University)
- Dr. Bruno Pernet (University of Oregon)
- Dr. Gil Sylvia (Oregon State University)

Table 1: Core Titles in Marine and Aquatic Science

Journal Title	Norton 1984	Fuseler 1989	Williams 1989	Fuseler 1990	Sieburth 1991	ISI 1995	Wiest 1998	ISI 2000
<i>Advances in Marine Biology</i>		•				•		•
<i>Canadian J. of Fisheries & Aquatic Sciences</i>		•	•		•	•		•
<i>Deep-Sea Research I & II</i>	•		•	•				•
<i>Estuarine Coastal & Shelf Science</i>		•	•	•	•	•		•
<i>ICES J. of Marine Science</i>		•				•		•
<i>J. of Experimental Marine Biology & Ecology</i>		•	•		•	•	•	•
<i>J. of Fish Biology</i>		•				•		•
<i>J. of Marine Research</i>				•	•			•
<i>J. of Phycology</i>					•	•		•
<i>J. of Physical Oceanography</i>			•	•				•
<i>J. of Plankton Research</i>		•	•		•	•		•
<i>Limnology & Oceanography</i>		•	•	•	•			•
<i>Marine & Freshwater Research</i>		•	•	•				•
<i>Marine Biology</i>	•	•	•		•	•	•	•
<i>Marine Chemistry</i>			•	•	•		•	•
<i>Marine Ecology Progress Series</i>		•	•	•	•	•	•	•
<i>Marine Environmental Research</i>		•	•		•	•		•
<i>Oceanography & Marine Biology: annual review</i>		•		•		•		
<i>Progress in Oceanography</i>				•				•

Notes:

ISI 1995 reflects data from the ISI Impact Factors for Marine and Freshwater.

ISI 2000 reflects data from the ISI Impact Factors for Marine and Freshwater, Oceanography and Fisheries.

Other data is from papers presented to various IAMS LIC conferences.

Table 2: Subscription Cost Comparison of Core Titles: 1996 to 2000

Journal Title	Publisher	1996	2000	% change from 1996 to 2000
<i>Advances in Marine Biology</i>	Academic	\$71	\$123	73%
<i>Canadian J. of Fisheries & Aquatic Sciences</i>	NRC	\$441	\$658	49%
<i>Deep-Sea Research I & II</i>	Pergamon	\$2801	\$3205	14%
<i>Estuarine Coastal & Shelf Science</i>	Academic	\$847	\$1821	115%
<i>ICES J. of Marine Science</i>	Academic	\$373	\$596	60%
<i>J. of Experimental Marine Biology & Ecology</i>	Elsevier	\$2572	\$3213	25%
<i>J. of Fish Biology</i>	Academic	\$1070	\$1614	51%
<i>J. of Marine Research</i>	Yale	\$105	\$125	19%
<i>J. of Phycology</i>	Blackwell	\$289	\$366	27%
<i>J. of Physical Oceanography</i>	AMS	\$304	\$442	45%
<i>J. of Plankton Research</i>	Oxford	\$400	\$560	40%
<i>Limnology & Oceanography</i>	Allen Press	\$184	\$372	102%
<i>Marine & Freshwater Research</i>	CSIRO	\$288	\$527	83%
<i>Marine Biology</i>	Springer	\$3316	\$3882	17%
<i>Marine Chemistry</i>	Elsevier	\$1153	\$1565	36%
<i>Marine Ecology Progress Series</i>	Inter-Research	\$3667	\$2867	-22%
<i>Marine Environmental Research</i>	Elsevier	\$787	\$1143	45%
<i>Oceanography & Marine Biology: annual review</i>	Taylor & Francis	\$157	\$180	15%
<i>Progress in Oceanography</i>	Elsevier	\$891	\$1624	82%

Note:

Subscription costs are primarily from University of Oregon. If not subscribed to, the information is from Oregon State University. The costs include any vendor charges and reflect actual invoices.

Table 3: Cost per Page Comparison of Core Titles: 1996 to 2000

Journal Title	Publisher	1996	2000	% change from 1996 to 2000
<i>Advances in Marine Biology</i>	Academic	\$.18	\$.48	172%
<i>Canadian J. of Fisheries & Aquatic Sciences</i>	NRC	\$.20	\$.26	32%
<i>Deep-Sea Research I & II</i>	Pergamon	\$.72	\$.54	-26%
<i>Estuarine Coastal & Shelf Science</i>	Academic	\$.52	\$ 1.06	104%
<i>ICES J. of Marine Science</i>	Academic	\$.30	\$.32	4%
<i>J. of Experimental Marine Biology & Ecology</i>	Elsevier	\$.70	\$.79	12%
<i>J. of Fish Biology</i>	Academic	\$.80	\$ 1.00	25%
<i>J. of Marine Research</i>	Yale	\$.09	\$.12	41%
<i>J. of Phycology</i>	Blackwell	\$.26	\$.31	17%
<i>J. of Physical Oceanography</i>	AMS	\$.22	\$.14	22%
<i>J. of Plankton Research</i>	Oxford	\$.17	\$.23	41%
<i>Limnology & Oceanography</i>	Allen Press	\$.10	\$.20	98%
<i>Marine & Freshwater Research</i>	CSIRO	\$.28	\$.63	131%
<i>Marine Biology</i>	Springer	\$ 1.50	\$ 1.70	13%
<i>Marine Chemistry</i>	Elsevier	\$.83	\$.92	11%
<i>Marine Ecology Progress Series</i>	Inter-Research	\$.74	\$.58	-22%
<i>Marine Environmental Research</i>	Elsevier	\$ 1.01	\$ 1.09	9%
<i>Oceanography & Marine Biology: annual review</i>	Taylor & Francis	\$.27	\$.41	50%
<i>Progress in Oceanography</i>	Elsevier	\$ 1.20	\$ 1.20	0%

Note:

Subscription costs are from Table 2. The page counts are from the 1996 Scripps study with 2000 data and other missing data compiled from the Oregon State University collection.

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INTRODUCTION

Recently there's been a great deal of publicity about the "Digital Divide." As you read the various articles you begin to see, as is often the case, the same term means many different things. First, having access to technology and the ability to use it. Second, knowing how to read is essential to using information. However, the gap between those who can make effective use of information and those who can't isn't a new topic. Librarians for years have been teaching users how to find and evaluate information. Discussions at IAMSLIC conferences have talked about the problems with using information technology and the Internet for communication. It seems many of us have varying degrees of access, if we have access at all. So what is this Digital Divide we talk about?

WHAT IS THE DIGITAL DIVIDE?

Many people accept a narrow definition that focuses on the lack of access to the Internet. Some also add lack of access to a computer. that is, the physical components of the technology. Some go a bit further and talk about the digital divide as being the differential effective access to Information and Communication Technology (ICT).

The American Library Association (2001) defines the "digital divide" as the "differences due to geography, race, economic status, gender, and physical ability in:

- 1) access to information through the Internet, and other information technologies and services, and
- 2) the skills, knowledge, and abilities to use information, the Internet and other technologies.

Access and ability is not enough. Another important part of the issue is the ability to create and share relevant information.

But how do you define access? Ernest J. Wilson, Director of Center for International Development and Conflict Management at the University of Maryland, and Senior Advisor to the Global Information Infrastructure Commission of the Center for Strategic and International Studies suggests that there are several meanings for the term and that there is a distinction between formal access and effective access. Effective access requires that most of the following components are in place:

1) Physical Access: Is the physical infrastructure in place and the proper equipment available?

2) Financial Access: Does the user, whether it is an individual or an institution have the ability to pay consistently for the ICT services needed?

3) Cognitive Access: Does the user have the intellectual and training capacity to be able to find and access the needed information? Is the user able to process that information, evaluate, and consume it? In addition, does the user have the knowledge to be able to send or broadcast information as well as to receive it?

4) Production or Content Access: Is the information accessed available in the user's native language? Users will find all of this access hollow if when they gain access to the Internet there is nothing in their languages or nothing relevant to their needs. This is particularly critical in developing countries where locals, such as fishermen, speak only the local dialect.

5) Political Access: Do the agencies and individuals involved have some democratic say in how the services will be designed and distributed? When that is the case suppliers are more likely to be responsive to their needs and concerns.

To focus only on the boxes and wires to connect to the Internet is to identify the tip of the iceberg. The deeper aspects of access have not been addressed. For access to be effective people must be able to understand, pay for and get the information they need once they are connected. Because of international and domestic differences, the digital divide occurs on many levels; local, country, continent and global.

Another little discussed aspect of the Digital divide is that while the gap in a particular technology appears to be shrinking, such as PC ownership, there are still great differences in application. While the "haves" purchase new equipment and the training to use it, the "have nots" as still struggling to obtain basic equipment and training. Thus the gap continues to widen.

So the Digital Divide is not a single thing, but a complex web of issues and technologies.

Add to that the realization that there is no one "Digital Divide" -- haves versus have nots or developed versus developing nations -- and one begins to see the enormity of the problem being faced not only by our organization but by the scientific community and countries.

GROWTH OF THE INTERNET

The number of Internet domains has grown from 213 in August of 1981 to almost 110 million in January of 2001 (Internet Software Consortium).

In the first quarter of 2001, there were an estimated 429 million people online, 41% of them are in North America, 27% in Europe, the Middle East and Africa, 20% in Asia and the Pacific and only 4% in South America. However, that 429 million represents only 6% of the total world population. Some 33 to 57% of those not online have no intention of going online, due to perceived lack of need (40%), no computer (33%) and cost (16%) (Digital Divide Network).

By the second quarter of 2001, there were 459 million people online with the United States and Canada losing ground and accounting for only 40% of the online population. For the first time the Nielsen/Net Ratings survey showed that in some nations, home was not the main place people accessed the Internet (Featherly 2001) . By August 2001 NUA Surveys (2001) was reporting 513.4 million online having grown from 16 million online in 1995.

THE INTERNATIONAL OR GLOBAL DIVIDE

When looking at the problems to be addressed there are some basic statistics we should keep in mind. Start with the fact that one third of the world's population has never made a phone call. Over seventy percent of the world poor live in rural and remote areas where there is, at best, scarce access to information and communications technology (ICT). The predominate language used on the Internet is English, which is the native language of less than ten percent of the world's population. (DOT Force)

In many cases, decision-makers remain skeptical or unaware of the contribution that ICT can make to a country -- or, as we will later discuss, to a community, even when aware of the successes of other countries.

There are real disparities in the ability to access and use ICT between countries. There are about 14 million phone lines in all of Africa, significantly less than in Tokyo or Manhattan (Bridges.org n.d.). Despite recent rapid technological advances and perceived decreasing costs there are more Internet providers in Manhattan than in all of Africa. High connection costs, low incomes, poor infrastructure, illiteracy, lack of trained personnel, disinterest and a failure to understand the benefits of Internet all contribute to the expanding digital divide and the tremendous gaps in many of our colleagues' ability to take advantage of information access and delivery.

The Digital Opportunity Task Force (DOT Force) (2001) was created by the G8 Heads of state at the Kyushu-Okinawa Summit in July 2000. It includes public and private sector groups, non-profit organizations and international organizations representing developed and developing countries. The priority areas identified were:

- 1) Fostering policy, regulatory, and network readiness
- 2) Improving connectivity, increasing access, and lowering costs.
- 3) Building human capacity through targeted education and training programs
- 4) Encouraging participation in global e-commerce and other e-networks for sustainable economic development.

Many organizations, including the United Nations, the Benton Foundation and The Digital Opportunity Task Force of G8, the ITU, The World Bank, The World Economic Forum, and national donor agencies (including USAID, the UK's DFID and a Scandinavian Government initiative) have been studying and/or working to implement ICT in developing countries. With so many organizations working on the same problem it is essential that their stories be widely distributed. The stories need to include how the success can be replicated in the same country or region, if the success can be transported to other environments, and if the project is scalable. Then most important and the most difficult is that the studies must be put into practice. This is where many of the projects are coming up short.

THE REGIONAL DIVIDE

Looking at statistics, such as those even we quoted above, does not tell the whole story for a region. For example, in 2000 there were 1.5 million people online in Africa, of whom 1 million were in South Africa (United States Internet Council & International Technology and Trade Associates, 2001). In Latin America, Argentina, Brazil, Chile and Mexico account for 85% of the Internet accounts in the region (NUA, Yankee Group, 2001). In Asia Pacific, South Korea accounts for 45% of the number of households with home Internet access. Germany, Britain and Italy account for half of the European Internet population (Pastore, 2001).

THE DOMESTIC OR COUNTRY DIVIDE

Many people find it difficult to understand that not all access to the Internet is equal. Those areas with smaller density of population are often underserved. The common folklore about this is that it is in rural areas of developing countries, such as Bangladesh or Vietnam that there is no Internet connectivity. However, this isn't necessarily true.

While discussing this paper Martha and I found we had much in common when trying to gain Internet access on a reliable, cost-effective basis. After moving to rural Colorado I began to experience many of the "joys" that one encounters in a rural area. Many people find that what was not expensive in the city, such as ISDN, cable modem or a T1 line, is simply not available at any realistic price or is too unreliable. Our own T1 line could be had for about \$1,800 per month, or ISDN for about \$350.00 per month. The cost of cable modem was more attractive, \$60.00 per month, but it is very unstable and available only about 40% of the time. In some communities there are no options, you either have a local isp or cable modem (Carol Wilson, 2001). A Digital-subscriber-line (DSL) is not an option for many because the customer must be within 17,500 feet of a telephone switching center. So unless there are enough potential customers to make it a money-maker, the phone company is not interested in providing the service (Chapman 2001). This is the situation in many places in the United States, South Africa and the United Kingdom (Annison). This does not even mention the problems with black/brown outs, computer viruses, or system downtime which pose their own sets of problems.

Niall Guerin (2001) bemoans the fact that the technological innovation in Dublin has not been mirrored across Ireland and often waits twenty minutes to get on the Internet only to have to reconnect several times in a session.

In many countries the wait for a phone line is impressive. In Mongolia it's six years and Nepal is a close second at 5.9 years. (Clark 2001). However, some countries, such as China have made concerted efforts to expand their telecom structure through land lines and satellite.

THE IAMSLIC COMMUNITY

In early 2001 Beth and Roger Kelly sent out a notice that the IAMSLIC Executive Board would like to see the *IAMSLIC Newsletter* published online. We wanted to know how many of our members could retrieve the *Newsletter* in .pdf format from the IAMSLIC web page. At the 2000 conference we had heard many stories of people being able to access the Internet for only an hour or two a day, infrequently, not from their desk, with a very slow connection, etc. So we were concerned that this might not be a good solution for distribution of the *Newsletter*. Much to our surprise out of the 343 members only 30 responded that they would prefer to receive the *Newsletter* in print form. To our further surprise, fourteen of those were from the United States and eight were libraries, which we

think preferred to have a hardcopy to display on their shelves. Of the sixteen non-U.S mailings, six were libraries.

Martha surveyed the IAMSLIC members in Africa . There were 36 questionnaires returned.

South Africa	16
Nambia	4
Lesotho	3
Zimbabwe	3
Botswana	2
Malawi	2
Mauritius	2
Swaziland	2
Zambia	2
Tanzania	1

Of those libraries, 80.5% indicated that they had access to the Internet all or most of the time. The rest said they experience regular problems and one was never able to access the Internet.

In preparing for this paper, we sent out an e-mail survey to look at Internet access among our members. Our original survey about Internet use among IAMSLIC members received ten responses, all from the United States. We sent out a second one via e-mail. We received an additional 68 responses. Of those

- 61.5% were from the United States and Canada.
- 14.1% were from Europe and Scandinavia
- 12.8% were from Australia, Asia and the South Pacific
- 5.1 % were from South America
- 3.9% from Africa
- 2.6% from the Carribbean

Since there were multiple responses in many categories, the total number responses was 132.

Looking at how we accessed the Internet, over 90% have access from their desktop.

72 of the 78 had access from their desk top.

31 had access from home. One person specifically said, she did not access the

net from home. One retiree only accessed the Internet at home.

4 people had access to the Internet only in their libraries, not on their desktops.

In addition 14 others had access through their libraries.

One person only had access through his institution and ten others accessed it this way.

There is great variation in the telecommunications we use to access the Internet. Though half have access via a T1 line.

50.0% accessed it via a T1 line

13.6% via ISDN, two people commented this was not an option in their area.

26.5% via a modem with various speed connections. The most common comment here was that even though the connection might be a 56k connection the speed was often slower.

9.9% accessed it in other ways, such as leased phone lines and cable

Most found their connections to be reliable (77.3%) all day. Though one person commented that theoretically it was available all day, but not reliably so. Many commented on the slowness of the connect at various times, even though they had access through a T1 or ISDN connection. 15.2% found their connection reliable 75% of the day or more, while 6.8% had regular problems connecting and 0.1% rarely were connected. Several people commented on the problems connecting when traveling, especially from hotel rooms.

THE FUTURE

While many groups are working on the multitude of problems that make up the digital divide, the strategy outlined by the DOT Force (2001) makes great sense. They call for improving connectivity and lowering costs, helping establish national Internet strategies, and deploying information technology in health care, development aid and fostering entrepreneurship. The intended focus is the 95% of the world's population who have never been online (Christian Science Monitor 2000). Many things will have to fall into place, such as flat local phone call rates.

If wireless is to be the wave of the future, that the Europeans and Japanese will have the lead. At the same time we can hope that Guerin is wrong when he wonders if many first world countries are in danger of "creating their own digital black holes."

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WEB SITES

Bridges.org, <http://bridges.org>

Digital Divide Network, <http://www.digitaldividenetwork.org/>

DIGITALDIVIDE List. To subscribe send an email message to listserv@cdinet.com, include the following line: subscribe digitaldivide yourname.

Electronic Journal on Information Systems in Developing Countries.
<http://www.is.cityu.edu.hk/ejisdc/ejisdc.htm>

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THE STATE OF AQUATIC INFORMATION IN SOUTHERN AFRICA

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ABSTRACT: In order to determine the state of aquatic information in Southern African countries, a questionnaire was designed and relevant information collected from information specialists, librarians and researchers in ten countries in the region. A total of 36 questionnaires were returned and analysed. The results indicate that while South African libraries have access to and make use of a wide range of information resources, libraries in other Southern African countries are in a difficult position, having to cope with severely limited resources. The paper concludes with a few recommendations to IAMSILIC for future support of struggling libraries in the region and their staff.

INTRODUCTION

The International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSILIC) is a truly professional organisation and its members represent institutions from all over the world. The majority of its members work in well-developed libraries or information centres, where modern technology provides them with easy access to the widest range of international information resources.

Unfortunately, most IAMSILIC members representing developing countries, especially those coming from the African continent, are working in totally different environments. Library budgets are normally extremely limited (or non-existing) and due to lack of sufficient infrastructure, access to the Internet and everything it has to offer, is severely limited.

As an organisation committed to promote the sharing of aquatic information resources among its members, IAMSILIC regards it as being its task to develop the capacity of members in developing countries and to facilitate or assist, where possible, access to international information resources. The *where*, the *what* and the *how* of such an undertaking, however, has thus far been extremely difficult to ascertain.

At the 2000 IAMSILIC Annual Conference in Victoria, Canada, the need for regular reporting on the state of aquatic information provision in selective geographical regions was identified. This review of the current state of aquatic information in the Southern

African region is an attempt to address the expressed need, and the results will assist the IAMSLIC Executive in formulating a policy of support to developing countries.

INFORMATION PROVISION IN EASTERN EUROPE

In 1996, Mr. Ian Pettman, on behalf of the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC), compiled a report for the Intergovernmental Oceanic Commission in Paris, on the state of information provision for the aquatic sciences in Eastern European countries (Pettman 1996). Since 1989, countries in Eastern Europe experienced enormous political, economical and social changes and the results of years of environmental mismanagement required urgent remedial actions. In order to solve these problems, close collaboration with Western European countries was essential. Such collaboration was even more essential in the library and information services of the aquatic sciences in order to make optimal use of existing resources and to prevent duplication. The Report made several recommendations for the development of information resources in Eastern European countries, as well as for effective information sharing in the whole of the European continent. Whether these recommendations were ever turned into action, is unknown.

RECOSCIX-WIO

Any attempt to review the aquatic information resources in any region of the African continent, needs to take note of the contributions of RECOSCIX-WIO (Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean Region). This initiative, funded mainly by UNESCO's Intergovernmental Oceanographic Commission (IOC) with further support from a few Belgian institutions, has made a major contribution in building capacity and facilitating information exchange in the Western Indian Ocean region, i.e. East African and Indian Ocean island countries. The project is coordinated by the Kenya Marine Fisheries Research Institute (KMFRI) and is based in Mombasa, Kenya.

Participating marine libraries in the region have been equipped with a wide range of computer equipment, including PCs, scanners and CD-ROM writers. Training in the use and application of equipment were also provided. Through RECOSCIX-WIO, journals are received in Mombasa, after which contents pages are distributed to all member libraries. Copies of articles may then be ordered from Mombasa, which are delivered to them, using Arial software and equipment.

A similar initiative was recently established in the Eastern Atlantic Ocean region, involving west African countries. West African countries, mainly in the northern hemisphere participate in this initiative.

QUESTIONNAIRE

To collect relevant information for this paper, a questionnaire was designed and submitted for evaluation of its scope and relevancy to Ms Edna Nyika, an IAMS LIC member from the University of Dar es Salaam, Zanzibar, Tanzania. Thereafter, questionnaires were distributed and results collected as follows:

- Delegates attending the **6th Bi-annual Congress of the Southern African Online User Group (SAOUG)**, 20-21 June 2001, Midrand, South Africa. Members of SAOUG are highly skilled librarians and information professionals, on par with their colleagues in Europe and Northern America. These information specialists handle information on a wide range of subject areas, and only a small portion concentrate on the aquatic sciences.
- Representatives from eight Southern African countries, invited to attend a training session on the use and application of *SAWINET*, an Internet-based information resource, containing details on *integrated water resource management* initiatives in the Southern African region, 16-17 July 2001, Harare, Zimbabwe. The development of SAWINET is sponsored by the Global Water Partnership (GWP) and is managed by the Institute for Water and Sanitation Development in Harare, Zimbabwe. Attendants represented the government sector, as well as academic and research institutions.
- Southern African members of IAMS LIC

Questionnaires were also mailed or faxed to librarians (mainly South African) with a direct involvement in aquatic information and who had not been approached previously. This included, for example, librarians from the Department of Water Affairs & Forestry, Rand Water and Umgeni Water.

SCOPE OF QUESTIONNAIRE

Southern Africa is a region with a low annual rainfall, limited groundwater resources and characterised by an absence of large, sustainable rivers. Management of water resources in general, is therefore of extreme importance in the future economic development of the whole region. The Southern African region also includes several landlocked countries: Botswana, Zimbabwe, Lesotho, Swaziland, Zambia and Malawi. It was therefore decided to collect information from both freshwater and marine science libraries.

Questions addressed the following subjects (a copy of the questionnaire is attached):

Organisational details

Personal details

Contact details

Type of organisation represented

Library staff and training level
Information about traditional information resources
Number of books in library collection
Number of journal titles received
Subscription to electronic journals
Involvement in formal information exchange
Details on catalogues of library holdings and format
Current awareness services
Information provision to outside clients
Document delivery service
Information products developed
Users of information and type of information required
Main clients/users of information
Information subject areas served
Use of bibliographic databases
Use of international databases
Use of local/in-house databases
Details about computer equipment and Internet access
Age of PC currently used
Access to Internet
Reliability of Internet connection
Web site, if any
Responsibility for web site development
Financial resources
Funding agents

RESULTS

- a. A total of 36 questionnaires were returned, Were collected from the SAOUG Congress, From Southern African IAMSLIC members, From the SAWINET training session in Harare, and Were returned by librarians who were approached individually. The questionnaires provided information on aquatic information resources in the following countries:

Country	Number of questionnaires	Percentage of total
South Africa	15	41.7
Namibia	4	11.1
Botswana	2	5.6
Lesotho	3	8.3
Swaziland	2	5.6
Zimbabwe	3	8.3
Zambia	2	5.6
Malawi	2	5.6
Mauritius*	2	5.6
Tanzania*	1	2.7

** Members of RECOSCIX-WIO*

b. Organisations represented

The breakdown for organisations represented in the questionnaires, is as follows:

Organisation	Number	Percentage of total
Government department	12	30.0
Semi-government*	6	15.0
Non-government Organisation	3	7.5
University	10	25.0
Research Institution*	6	15.0
Consultant	1	2.5
Industry	2	5.0

** Some respondents indicated that they work for a semi-government organisation, doing research*

c. Number of people on library staff and training levels

South Africa (excluding university libraries)	
With university qualification	7
With college training	7
No formal library training	9
Non-South African countries	
With university qualification	13
With college training	6
No formal library training	13

Note:

Among the institutions without libraries were:

Department of Water Affairs, Zambia, the Ministry of Water Development, Malawi, and the School of Engineering, University of Zambia

d. Number of journal titles received:

The numbers varied from several thousand titles received by South African university libraries, down to so low as **four** titles received by both the University of Dar es Salaam, Tanzania and the Department of Water Affairs in Zambia. Other noteworthy numbers were:

Department of Water Affairs, Maun, Botswana	10 titles
Institute for Water and Sanitation, Zimbabwe	10 titles

e. Journals received in electronic format:

Excluding South African universities, **twelve** institutions received a total of only **twenty eight** journals in electronic format.

f. Member of consortia for information exchange

Only **seventeen** respondents indicated that they are participating in consortia activities (including IAMS LIC).

g. Use of current awareness service

A total of **twenty four** respondents indicated that they subscribe to a current awareness service, with *Current Contents* and *Uncover* being the most popular.

h. Interlibrary loan or document delivery service:

The majority of respondents (twenty one) are providing a document delivery or interlibrary loan service.

i. Clients or users of information:

A breakdown of the users of information provided the following interesting results (respondents were asked to indicate all categories of users, without indicating frequency or number of users in each category):

Researchers	28
Academic staff	17
Students	20
Government staff	13
Consultants	16
Industrial sector	5
School pupils	6
General public	5
Other	3

It is clear that the *academic community* (including students) is served by the majority of respondents, with the *research community* a close second.

j. Subject areas covered:

Information on the marine environment	1
Information on both marine and freshwater	9
Information on the freshwater environment	24

k. Access to international bibliographic databases:

Respondents were requested to indicate and list the international databases to which they had access, either via the Internet, or on CD-ROM. A total of twenty respondents indicated that they did not have any access to such databases. Among the most popular databases used by the other respondents, were ASFA (4), Water Resources Worldwide - NISC (6), Waterlit (6) and CAB (4).

l. Age of PCs used by respondents:

One year	12
Two years	8
Three years	10
Four years	
Five years	5
More than five years	1

m. Access to the Internet

Respondents were asked to indicate where their closest connection to the Internet was located.

From his/her desk	26
In the library	9
Central point in the building	6
Outside their building	2

Some respondents indicated that they had access from both their desk as well as from the library.

n. Reliability of Internet connection

Respondents were requested to indicate how reliable their Internet connection is. *Unfortunately, they were not asked about the quality of the connection, in terms of speed, ability to download files and general flexibility.*

Internet availability	All respondents	South Africans	Non-South Africans
Available most of the time	28	15	13
Regular problems	7	0	7
Unavailable most of the time	1	0	1

o. Web site and responsibility for development of site

Only **nine** respondents (all non-South African) indicated that their organisation did **not** have its own web site. For the rest, the site development is done internally, with only **two** institutions using the services of an outside company.

p. Funding received from outside sources (mostly international):

Among the international agencies providing funding to either individual institutions, or to the libraries of such institutions are SIDA, DFID, GTZ, the EU, UNESCO, etc.

ACCESS TO NON-BIBLIOGRAPHIC INFORMATION RESOURCES

Over the last few years, several overseas institutions funded the development of 'pockets' of non-bibliographic information in the Southern African region. Unfortunately, no central list or other source of reference listing details of all these isolated collections of information exist in the region. Information resources of **any** kind are so limited in the Southern African region that it has become of utmost importance to collect the relevant details and make it available to all interested parties in the region. Perhaps, if we learn to share **data**, we may also realise the value of sharing **bibliographic** information.

CONCLUSION

No survey is complete without drawing certain conclusions from the results of the survey. Interpreting the above results, the following should be noted:

- There are only a few specialised aquatic libraries in countries outside South Africa. Keeping in mind that countries like Botswana and, to a lesser extent, also Namibia, have vast areas of desert and semi-desert regions, this is understandable.
- Apart from marine libraries participating in RECOSCIX-WIO, no formal information resource sharing exist between aquatic libraries in the region.
- Libraries in the region have very limited access to traditional bibliographic databases available either via the Internet or on CD-ROM.
- Limited funding is available for purchasing and development of information resources.

- The survey indicated that, on the average, computer equipment used is not outdated.
- Internet access
Judging from the results of this survey, Internet access is easy and reliable in the southern African region. These results are surprising, especially in the light of the paper presented by Ms Beth Avery, "*Is it the Global Net?*" which projected a dim picture of the digital divide between developed and developing countries. This pessimistic view is supported by two articles recently published in South African publications^{2,3} and as expressed by a visiting agricultural consultant⁴. Unfortunately, as was indicated previously, the questionnaire could not establish the *quality* of the Internet links in the region. It could well be that, since the majority of institutions reviewed in this survey are government and academic institutions, they have access to modern equipment and better Internet accessibility! However, a researcher from Botswana mentioned that it normally took about 30 minutes before a successful Internet connection could be made. Any attempt to download a file from the Internet caused the whole system to 'bomb out'. Certainly Internet access was available to this researcher, but was it effective and useful?

IAMSLIC SUPPORT

How best can IAMSLIC assist Southern African (or other developing countries) to build capacity and establish functional and successful aquatic libraries:

- Training of aquatic library staff, e.g. by awarding scholarships to librarians from developing countries.
- Encouraging libraries in developed countries to donate duplicate publications and other information resources to working libraries in developing countries.
- Providing of funding to librarians in developing countries which will enable them to attend the annual IAMSLIC conference.
- Supporting libraries in developing countries in their application to international institutions and organisations for funding.

The ideal would be for IAMSLIC to establish a sustainable information resource sharing initiative for the Southern African region similar to RECOSCIX-WIO. Such an initiative will obviously have to be a long-term commitment, which will be costly and therefore, will most probably, fall outside the means of the organisation!

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“We found, in our brief reviews in Zimbabwe, Kenya and Pakistan (and the brief experience in Eastern Cape* was no different) that many frontline practitioners, and even university lecturers have very little, if any, access to the Internet. Again, I recognise that the RSA** is far ahead of the rest of Africa in this regard but the extension offices I saw were certainly not over rich with computers, with or without Internet access.” 29 September 2001.

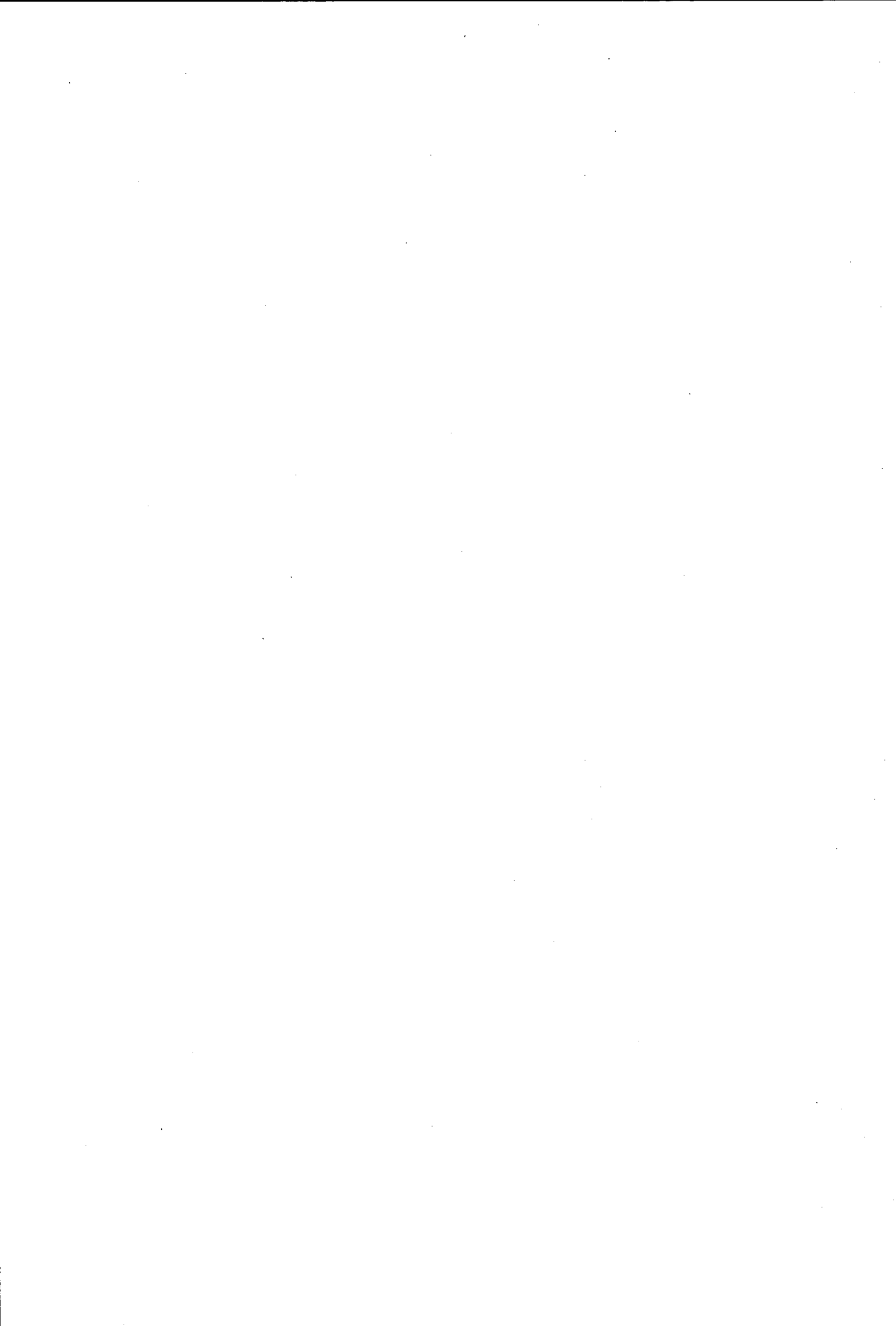
* Region in South Africa

** Republic of South Africa

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AVANTI: IMPLEMENTING A WEB-BASED "ARTICLES-ON-DEMAND" SERVICE

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ABSTRACT: Avanti is an "articles-on-demand" delivery service that allows patrons to request articles for transmission via the web. Requested articles are scanned into bitmapped PDF files (Adobe Acrobat Portable Document Format) and posted on the web in a passworded account. Users can read articles online, then print or save a copy at their desktop for reference. Since February 2000, Avanti document delivery service has been available at no charge to faculty, staff and graduate students of the Scripps Institution of Oceanography. This paper explains the Avanti document delivery service, discusses management and implementation issues and presents the usage statistics.

KEYWORDS: document delivery, public services, library management, Avanti

As more full-text, full-image electronic journals became available electronically, the Scripps Institution of Oceanography (SIO) Library at University of California San Diego (UCSD) identified a need for electronic access to its sizable print collection that is not available in electronic format. In February 2000, SIO Library implemented Avanti, a free, web-based, "articles-on-demand" service that allows patrons to request articles for transmission via the web. Librarians in UCSD's Science and Engineering (S&E) Library developed Avanti as a web-based alternative to Ariel document delivery using Adobe Acrobat Portable Document Format (PDF). Since we implemented Avanti in the SIO Library, our print collection is delivered electronically to library users at their desktops and labs in convenient, timely manner -- a seamless connection between print and digital content.

From a public services and management perspective, Avanti is an effective document delivery service because:

- Avanti is a production-oriented service utilizing efficient scanning equipment and low-cost student workers. As a "scan-and-post" operation, there is no document cleanup; documents or pages are re-scanned only if a patron asks. Turnaround is within 4-8 hours (maximum 2 business days) from receipt of email request.

- Avanti is platform-independent; it delivers articles through the World Wide Web to the patrons' desktop. The patron can print a few pages or an entire article.
- Avanti provides online access to scanned copies of articles not already published electronically.
- Documents are scanned "on demand" and are deleted automatically after a period of time, usually two weeks; SIO will maintain documents for a longer period at the patron's request.
- Avanti utilizes *ERes* software, a program licensed from Docutek Information Systems that is tailored to the document delivery function. The customized version of *ERes* software provides a document control interface that is very flexible and easy for staff and students to use.
- Avanti may be easily expanded to include more departments at UCSD.
- Requested articles are scanned into bitmapped PDF files (Adobe Acrobat Portable Document Format) and posted on the web in a passworded account. Users can read articles online, then print or save a copy at their desktop for reference.
- Avanti makes it easy for patrons to get free, web-based, "articles-on-demand" they can view using their Adobe Acrobat Reader because documents are in PDF, the standard document format for most of our electronic journals.
- Because Avanti patrons are registered with their own, unique username and password and may access their list of documents only after agreeing to adhere to copyright provisions for Fair Use, this services allows secure posting of articles in compliance with current copyright fair use provisions.

The web interface [<http://scilib.ucsd.edu/sio/avanti/>] was developed for all Avanti transactions; no print or on-line forms are used. Avanti transactions are conducted primarily through email, which is also used for problem solving and communication about the request, for example: when a complete/correct citation is needed, if an electronic journal is available, when an item is not available in the library (an ILL, interlibrary loan, request is automatically filed for the patron). To register for SIO Avanti service, eligible users (SIO academics, graduate students and staff) send an email message requesting an Avanti account. They include their name, email address, and phone number so library staff can confirm their SIO status; an email is sent back to the patron, with a unique Avanti username and password. Then the patron can order documents via Avanti.

The patron must first check the online Roger Catalog to see if an electronic version is available; articles from electronic journals will not be delivered using Avanti. If it is available electronically, they may use the link on the Roger page to go directly to the journal site. If the article is not available electronically and is in print in the SIO or S&E libraries, the patron can request delivery via Avanti. To submit a request, the patron sends an email to avanti@sio.ucsd.edu directly or through the SIO Avanti web page (their browser must be set up to send and receive e-mail), or they login to their existing Avanti account and click on "Request a document for delivery via Avanti". They must provide their name, email address and complete article citation(s) for the desired documents.

Patrons may request articles, papers, and chapters of 50 pages or less, from journals, proceedings and books found in the SIO or S&E Library print collections. Materials found at other UCSD Libraries are automatically ordered for the patron through SIO's Interlibrary Loan Department. Any item not found in the UCSD Libraries will be passed along and filled through Interlibrary Loan (ILL). If a large number of articles are requested patrons prioritize them according to those they wish to get first. Avanti document delivery service really starts when the user's email request is received. Library staff confirm the patron's Avanti account and the accuracy of the citation(s). Then staff/students search the Roger Catalog to confirm "print only" status and to get the call number of the journal, proceedings, or book. If the article is not available electronically, students pull the requested title from the shelves. Students scan and post the article(s) on a web server in the patron's own, passworded account.

E-mail is sent when the article has been posted to the patron's Avanti account, usually within 4-8 hours. The patron uses a web browser to access the Avanti account; when a username and password are entered and the copyright acceptance button is clicked, the list of requested articles appears. The patron clicks on a hypertext link to open a document with the Adobe Acrobat Reader. Documents can be read online or printed or saved as a file on the computer's hard disk for subsequent use.

Avanti articles are scanned in black & white; the files are saved and posted as PDF. On a limited basis the library will provide a color image file that is sent to the patron as an email attachment, if the SIO patrons asks for specific page(s) scanned in color. The patron notifies us if the quality of an Avanti document is not good, and the document or selected pages are re-scanned and posted to the patron's Avanti account. Avanti articles are available for 2 weeks, after which they are automatically deleted. Patrons must ask for their articles to be available for longer than 2 weeks.

Usage data (Fig. 1) indicates Avanti document delivery service was instantly popular. In the period February 14 through 29, 100 SIO patrons registered for Avanti service; there are an average of 15 new registrations per month. The number of new registrations increase after email announcements and when new SIO Grad student orientations in the Fall. A steady number of articles are requested throughout the year, including intersessions and during the summer. This steady-stream of work helps us maintain regular student staffing levels in the library.

February 2000 - September 2001	
383	Total Number Registered Users
3,602	Total number articles scanned from SIO collection

Figure 1: Usage data

Implementation of Avanti service required planning and coordination within the SIO Library and among other UCSD Library departments as well as obtaining funds from the SIO Director to support staffing a new service. The Head of Public Services was assigned responsibility for managing implementation, including: staffing, budget, equipment (hardware and software), staff/student scheduling, outreach/PR, rollout and troubleshooting.

Before asking the SIO Director for funds we analyzed the cost and usage data from the S&E Avanti pilot project, including the average amount of student time needed to do the scanning and processing for each document (estimated by S&E to be a total of 10 minutes per document), estimated per document cost (\$1.25-\$1.50) and volume of work (10-20 articles per day).

Existing staffing resources for Avanti at the SIO Library include one ILL Manager (0.5 FTE) who runs Avanti service at SIO along with Ariel and other ILL operations and one Library Assistant III (5 hours per week) directing the work of students who do the Avanti tasks, along with ILL lending and borrowing support duties. Additional student assistant hours enable Avanti service at SIO. Student assistants (2.6 FTE) process Avanti requests, scan and post Avanti articles; these are the students who normally assist with other ILL tasks (pulling materials, photocopy, processing ILL materials for mailing, etc.) Students in the Circulation Unit do shelving; shelving is not part of the Avanti-funded workload.

Students can do most of the Avanti operation, which costs less than using career staff. Students open email, search the Roger Catalog to get call numbers and confirm "print only" status, pull the volumes from the stacks, scan the articles using the Minolta scanner and convert them to PDF. Students have a fairly high level of access on the Eres part of the Avanti system. Using Eres, students can add documents to the Avanti server and link the articles to patron accounts. To complete the transaction, students use an email template to compose and send an email to the patron when the article is available.

Career staff are responsible for the higher-level tasks of the Avanti operation. The ILL/Avanti manager and Library Assistant III have Manager level of ERes access. Staff responsibilities include: handling all new accounts, receiving the email & managing the Avanti email box, looking up call numbers on Roger, verifying incorrect/incomplete citations on an appropriate database and providing email reference service by informing users when the article is available electronically, being forwarded to S&E's reciprocal Avanti service, or requested from another UCSD Library or Interlibrary Loan. The ILL Manager handles the difficult ILLs generated from Avanti requests. SIO's Head of Public Services oversees the Avanti budget, statistics and spreadsheets with assistance from the ILL Manager and Library Assistant III and notifies the Department Head when Avanti funding runs low.

The Director of SIO funded startup in the amount of \$5,575 to support scanning staff (students). SIO's initial funding request was based on S&E's estimate of per document scanning time (equates with student staffing resources and per document cost) combined

with anticipated use of this new service by SIO patrons. In advance (annually, or when money runs low), the Scripps Library Director solicits funds from the SIO Director to continue the service. At this time, Avanti service is fully funded at approximately \$4800 per year (\$400 per month). Hereafter is the method used to calculate the amount needed to continue the service.

In May 2001 (when \$1200 of the initial funds remained), data from 18 months of Avanti service at SIO were used to calculate continuing cost of SIO's Avanti service. Nailing down exact costs in a project like this is not easy; despite the fact that students and staff keep a log of the amount of time actually spent scanning each Avanti article, the log does not reflect pre- and post-processing time. Because we needed more precise data, one student worked exclusively on Avanti for two months. Based on the Avanti log this student processed 201 Avanti scans in 17.2 hours (average scan time per document = 5.2 minutes); he recorded 46.75 hours on his time sheet. The difference between the time sheet and the Avanti log is the processing time, or 29.55 hours = 1773 minutes. Then divide 1773 minutes by 201 documents scanned; the result is 9 minutes, which is the processing time per document (see Fig. 2). The combined scanning and processing time averages a total of 15.3 minutes per document. Based on the student salary rate, \$7.14 per hour, the cost is approximately \$1.80 per document.

<i>Average length of a scanned article</i>	15 pages
<i>Average time to scan an article</i>	6.3 minutes
<i>Average time to process email, verify citation and page the volume from the shelves</i>	9.0 minutes
<i>Average combined scanning and processing time</i>	15.3 minutes
<i>Average number of documents posted per day (includes weekends)</i>	6.2 per day
<i>Average PDF document size</i>	~1.9MB
<i>Average no. of Avanti hours per week (students)</i>	13 hours
<i>Student salary rate</i>	\$7.14 per hour
<i>Average cost</i>	\$1.80 per document
<i>Continuing cost per month (student staffing)</i>	~\$400 per month

Figure 2: Avanti data

Other start-up costs were covered by UCSD Library-wide Document Delivery/Interlibrary Loan funds, including:

- Scanning workstation computer (~\$1,500)
- Minolta PS3000 face-up scanner bundled with cable, ISIS drive, EPIC Software (~\$14,000)
- Microcomputer ~ \$1,500
- Largest size monitor afforded at the time
- Laser printer: minimum 8MB
- Adobe Acrobat Exchange (~\$200)
- Samba software (~\$200) to eliminate the ftp step
- Table and high chair (~\$1000); a hip-high table/surface works best, so the operator can stand or sit on a high chair
- Network connection (undetermined Library Systems' cost)
- Server space for PDF documents (undetermined; Avanti files are stored on an existing server. The library may have to buy more hard disk space or migrate to Electronic Reserves server, later.)
- ERes software version 4 with Document Delivery module (~\$2500)

Avanti's limitations such as black and white scans and a 50-page limit on the size of a requested document were trivial. Obtaining and setting up the requisite popmail account was frustrating and held up implementation for months. The most egregious problems we experienced were related to the quality of the delivered product (the PDF files) and the inability to get a timely and satisfactory explanation from Minolta as to the cause. A patron noticed that Avanti PDF documents were "grainy" as compared to a photocopy. Upon further investigation, we discovered that Avanti scans were 5.2% smaller than the original or a photocopy! There was also no discernable difference between 300 dpi and 600 dpi nor does Minolta's proprietary *Epicwin* software allow one to scan at a higher percentage (increase or decrease the size). The Minolta service representative could not explain this "shrinkage", nor confirm or deny that this was the best their scanning equipment and software could produce. After months of persistent phone calls, Minolta finally sent two engineers to look at the equipment and our documentation of the problem. They concluded 1) the shrinkage was "standard" because of the camera position on the PS3000 scanner, 2) *Epicwin* software does not allow for correction (re-sizing), and 3) newer models such as the PS7000 use Adobe software, which is more flexible. Therefore, the shrinkage problem may be ameliorated when we migrate to the newer Minolta face-up scanner.

When Avanti was put into service, outreach/PR to the SIO research community included articles in the weekly electronic newsletter (*SIO Log*), email to the SIO distribution list (all-at-sio) and signs in the elevators and near public photocopiers and microcomputer workstations. Library instruction/orientations and a quarterly email promote the service and bring in more new registrations. Avanti is prominently located on the SIO Library homepage and was showcased at a development event. These outreach/PR efforts will continue because new and continuing students, staff and academics at SIO must be informed about Avanti service. Avanti is the highest priority of SIO Library's document delivery services followed by ILL borrowing for SIO patrons, then (in priority order): S&E Avanti and other UCSD requests via Ariel/Fax/Photocopy, other University of

California (UC) requests and non-UC (including IAMS LIC). Avanti is one-stop shopping for SIO with reciprocal service from Science & Engineering Library. If an ILL is needed, the requested information is transferred into an OCLC request.

Plans are underway to implement Avanti in other UCSD Library Departments. The Medical Center and Biomedical Libraries are implementing Avanti service (funding from School of Medicine) in 2001/2002 FY. There are a few projects similar to Avanti. The California Digital Library (CDL) is looking at ILL delivery of PDF articles to end-users or ILL units, possibly with Northern and Southern University of California (UC) servers. The Southern Regional Library Facility (SRLF) is experimenting with PDF scanning and delivery. Virginia Tech offers ILLiad, [<http://www.ill.vt.edu/>] electronic delivery of articles via their proprietary software. For more information, see the Atlas Systems website [<http://www.atlas-sys.com/>]. Ohio State offers Prospero [<http://bones.med.ohio-state.edu/prosporo/>], a Web-based document delivery system that was designed as a complement to the Ariel software system. Ariel [<http://www.rlg.org/ariel/>] is a product of the Research Libraries Group (RLG), which allows libraries to use the Internet to exchange documents through interlibrary loan.

Because of Avanti, SIO Library staff has gained experience in implementing and using scanning technology for high-production document delivery. As new programs evolve we will be ready to step up, scan and deliver the service to our patrons.



DIGITAL DOCUMENT DELIVERY AND INTERLIBRARY LENDING TO DISTANT RESEARCH STATION BRANCHES

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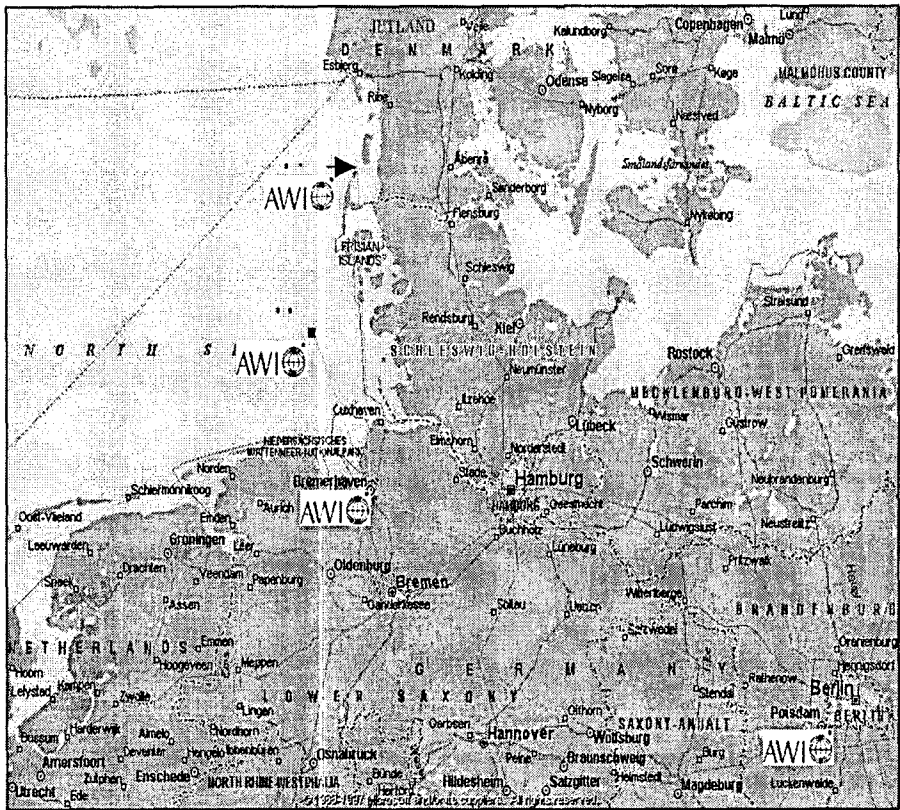
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ABSTRACT: In 1999 the library of the Alfred Wegener Institute in Bremerhaven incorporated the library of the former Biologische Anstalt Helgoland Hamburg into its collection. No longer did the library serve just the needs of scientists in Bremerhaven, for now the Institute had grown to include researchers on the islands of Helgoland and Sylt as well as the branch station in Potsdam. It was necessary to find a means to supply books, documents and journal photocopies quickly and inexpensively which would not be labor intensive. A high quality book scanner was acquired with software to scan and mail packages of tiff or pdf files to library users via their e-mail accounts. Intraloin requests are sent via e-mail to the library and interlibrary lending request are processed via an intraweb site form that inputs loan data into a Sybase server for further manipulation with *DataEase* client software.

In the beginning there was just the Institute for Marine Research in Bremerhaven. It was a very small marine research institute with just one librarian and a part-time library assistant to provide service to less than 63 full-time research scientists in the field of marine biology, chemistry and marine physics. In 1981 the Alfred Wegener Institute for Polar Research opened its doors with one librarian and about the same number of scientists. Both institutes merged in 1986 under the new name Alfred Wegener Institute for Polar and Marine Research. There were now two librarians and one full-time library assistant. The number of employees had increased to 149

At the beginning of 1999 the AWI had two librarians and one library assistant providing services to less than 507 potential library users and it was in 1998 the Biologische Anstalt Helgoland in Hamburg was merged with the AWI and its library moved to Bremerhaven in the autumn of 1999. The Alfred Wegener Institute Foundation for Polar and Marine Research now has four librarians, one full-time and three part-time library assistants, and has 684 employees.



In the years from 1979 to 1987, or pre Internet, the library had limited bibliographic tools with which to verify interlibrary loan requests and to ascertain possible lending libraries. Available to the library were the *World List of Periodicals* and the *Biosis List of Serials*, both useful for deciphering journal abbreviations. The University of Bremen Library had placed a COM fiche of its holdings, as well as yearly retired copies of *Books-in-Print* and *Ulrichs Guide to Periodicals* at the library's disposal. The library had also acquired an early German union catalog of periodicals on microfiche, *ZAG*. Bremerhaven is not a university town and there is only one small academic library at the technical college located in Bremerhaven. The nearest university library is over 65 kilometers away in Bremen.

Verified requests of periodicals were sent directly to lending libraries when locations could be determined and unverified forms were sent to the University of Bremen Library for verification and further processing. The University of Bremen was a major supplier of books and photocopies.

Library patrons placed their requests by filling out a one-part form. These requests were verified and typed out onto red and green ILL cards with an additional carbon copy for the library's own records. These forms were then either mailed or sent by courier to Bremen. Few requests were sent to international addresses.

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The computer age dawned on library ILL processes starting in 1987 with the beginning of online access to bibliographical databases. The library now had access to Dialog, STN, ESA, Orbit, and DIMDI and thus to many databases like *Chemical Abstracts*, *Biological*

Abstracts, Books-in-Print, and some library catalogs also became available such as the *Library of Congress MARC*, the *Technische Informations Bibliothek at the University of Hannover* and the *Deutsche Bibliothek* which facilitated bibliographic verification of requests. The first use of the IAMS LIC BB was made in 1988 for requesting items not available in Germany. Also CD-ROM tools such as *ASFA*, *PolarPAC* and the German Periodical Database (*ZDB*) greatly facilitated verification and locating lending libraries.

Access to Melvyl and the Scripps Institute of Oceanography collection was made in 1989. This enhanced verification greatly but did not mean a need to borrow directly from Scripps. ILL libraries were almost always found closer to home. Loan requests were still placed by typewritten forms sent out by mail or courier.

Toward the close of 1995 the World Wide Web and the Intranet transformed the way in which ILL was conducted at the AWI. The exponential growth of German libraries with online access to their collections as well as the formation of the new union catalog collection of the GBV greatly assisted verification and location of appropriate lending libraries. Now borrowing directly was possible obviating needing to use the University of Bremen Library as a routing center, thus increasing the speed with which requests could be processed.

The transformation of handwritten unverified requests to type forms had always been a labor intensive process and the advent of the internet provided a technology that could be used throughout the institute for researchers to place their ILL requests. An intranet site was already in place and pages were written for the library among which was an ILL page. This page was an electronic order form for either books or periodical articles. Bibliographic information was thus entered into a Sybase database that could then be downloaded into the library's own integrated system. No longer was it necessary for library personnel to key in the bibliographic information from handwritten requests.

The library's ILL database, which was powered by the relational database *DataEase*, was able to generate full patron information i.e. full name, telephone, address, and working groups as well as automatically transforming abbreviated periodical titles to their full form including possible library locations (should there have been a prior request for the serial) Now requests could be printed out from the database onto the appropriate German ILL forms: University of Bremen, regional libraries, and special libraries. Returned requests whether filled or unfilled, whether photocopies or books loans could be processed and filed within the ILL database. No longer was it necessary to file and store copies of ILL requests, another reduction in task time. Duplicate orders could also be automatically identified, eliminating superfluous redundant orders being placed. ILL requests were downloaded daily and batched for printing and mailing to loan libraries each Friday.

With the merger of the Biologische Anstalt Helgoland (BAH) and the AWI in 1998, the library now had an additional service to provide materials to the research stations on Helgoland and Sylt. Since 1992 the research station at Potsdam had already been sending

by courier internal request forms. These were later downloaded directly from their ILL database to speed up the delivery time. The BAH Library in Hamburg had supplied copies of journal articles by mail and courier. Recent journals were also sent out or routed to the island research stations, additional copies were kept for some frequently or heavily needed journals. The printed version of *Current Contents* was subscribed and also made available as were photocopies of the table of Contents from many held journals. No Intraloean or document delivery was provided for researchers in Bremerhaven even though the institute is housed in eight separate buildings throughout Bremerhaven, albeit all within 15 minute walking distance from the central library.

Faced with the task of providing ever more services with fewer personnel, increasing turnaround time and the rising cost of journals, it was quickly decided that routing journals, providing duplicate copies and massive photocopying and postal mailing was costly, ineffective and expensive. Routing journals to distant research stations removed issues from the hands of users in Bremerhaven or any of the other research stations. Tracking and mailing journals was a labor intensive task. Photocopying was also costly and mailing copies was time consuming and postage rates were not insignificant.

Interlibrary loan request from the island research stations also needed to be considered and how they could be provided with faster service with less hands handling the materials.

The dawning of the electronic journal, made possible by the Internet, PDF and HTML document file standards, paved the way for increasing services, lowering costs and speeding delivery. The library now has consortial agreements with Elsevier, Wiley, Academic, Kluwer-Academic, Science and Nature. Many other electronic journals are included with their print subscription at no additional costs, as is the case with Springer publications. Not only does the library now provide online access to journals to which it subscribes but it also has expanded its holdings to journals for which it has no print holdings. This situation has enhanced the document delivery for the research stations in Potsdam and on Helgoland and List, and also the researchers in Bremerhaven profit from this development. Many interloan requests are now unnecessary due to the consortial agreements that have made many more journals available as online full-text.

The inception of *Subito* was the beginning of electronic ordering and delivery of periodical articles throughout Germany. At a cost of DM7.00 for 3 days turnaround or DM34.00 for 24 hours turnaround, it is possible to place orders directly with a lending library that is capable of scanning journals articles and faxing, mailing by post or sending via e-mail. This means that orders can be passed on quickly to distant research stations without repackaging and re-mailing. After joining the *Gemeinsamen Bibliotheksverbundes (GBV)* in 2000, *GBV* is the Common Library Network of the German Federal States Bremen, Hamburg, Mecklenburg-Vorpommern, Lower Saxony, Sachsen-Anhalt, Schleswig-Holstein and Thuringia. The head office of the *GBV* is located in Göttingen, Lower Saxony. The AWI could use the electronic ILL ordering system at no additional cost. This, however, did not include scanning documents and

sending them as e-mail, which is most unfortunate. Also, the orders have to be keyed into the system. There is no way of automatically transferring orders from the AWI ILL Database into the *GBV* or *Subito system*, although *Subito* does provide for bibliographic citation input for journals after 1995 in conjunction with *Swets Online Contents*.

The library patrons at our distant research stations required special considerations so as to have efficient unbureaucratic access to the library's collection. It was decided that requests could be places with e-mail and a special e-mail address was established only for Intraloan. The link for the Intraloan was conveniently placed on the same page as the start page of our online catalog with a note that it was not to be used by researchers in Bremerhaven.

As early as 1998, before the library collection of the BAH Hamburg and AWI Bremerhaven were merged in the autumn of 1999 in Bremerhaven, it was recognized that a good high-speed book scanner would be needed to provide copies of journal articles to the scientists working on Helgoland and on Sylt. Ariel was only briefly considered but was not a serious contender as it was not necessary with the present technology to deliver either TIF or PDF files directly to the end user. In 2000 the decision was made to purchase the *BookEye Scanner* from the *Image Ware Company*. In addition a *HP Scanjet* was acquired for high color resolution scans of table and pictures should they be required. The *BookEye Scanner* can scan up to 300 dpi with gray scales and it is sufficient for most articles requested, however, should a user request greater resolution for better table or picture quality, the pages in question are rescanned and e-mailed. Now the photocopiers are rarely used by the library to deliver documents, and e-mail is almost exclusively used for delivery. Every researcher at the institute has a computer with internet access and e-mail. Adobe Acrobat Reader is installed as standard equipment and scanned documents are e-mailed as PDF files.



The electronic full-text journals available to the research stations reflect the library print subscription holdings and more. This means for titles beginning with 1993 or 1995 no Intraloan order need be placed. This reduces the time and effort on the library part meeting these demands for information. Journal routing could also be eliminated thanks to the advent of internet web sites of journals, which even if they should or do not provide full-text edition, generally do offer the table of contents and abstracts of available issues. Initial requests from Helgoland and Sylt for copies of table of contents proved that for all but three journals online sources were already available that could be freely accessed. For the journals without online table of contents, these are scanned in Bremerhaven and posted on the library's web page for electronic journals. Journal routing is a thing of the past!

Obviously books are still required and requested. Alas, this does mean the library has to package and prepare for mailing books to be sent out on Intraloan. The institute, unfortunately, has no mailing room that does packaging. Books requested on interlibrary lending are also first sent to Bremerhaven before they can be repackaged and mailed on to the island stations for loan. This does mean some loss in time for delivery and use!

Interlibrary loan in Germany has under gone revolutionary changes within the past five years. The increase of regional union catalogs and cross union catalog searching such as the *Karlsruhe Virtuel Catalogue* has made verification and access to documents faster and easier than ever before imagined. The system software developers of *GBV* will carry *PICA* forward to updates that promise more comfort of use and greater access to

international libraries for ordering documents as well as implementing journal contents features to implement online ordering of journal articles, thus reducing keying in bibliographic information. This is called *PICARTA*. There will be better access to dissertations throughout Europe and within Germany. The prevalence of electronic full-text dissertations will increase although this is still largely in a project stage.

Intralloan will profit from the expansion of electronic journals and the retrospective digital conversion of journal collections as in the *JSTOR* project. This means older journals on the shelves will not necessarily be dispensed with but rather could be complemented with additional electronically access at nominal cost. In time, more books will be available electronically and it seems not overly speculative to assume that proceedings will be prime candidates which would appeal to the scientific community for sale as electronic versions. In many cases the entire proceedings volume is never truly needed just a few chapters or papers from it. At present CD-ROM titles are loaded on to our networked servers and copied onto virtual drives, this makes more sense than circulating them as physical volumes.

Librarians are still necessary to verify many interlibrary loan requests. All too many citations are incomplete, incorrect, and unclearly abbreviated. The library patron needs professional assistance in such cases. Librarians have the skill, training and tools to provide accurate verification of bibliographical citations and to track down lending sources. This notwithstanding, it is not helpful or necessary for researchers to be impeded by the information professional when the way is clear to finding and obtaining the required document. The researcher should be able to place direct orders for materials when it is clear that the library does not hold the items needed. The problem is cost. Who pays for misuse of direct ordering? Who decides if an order is highly crucial to warrant 24 hour fax or e-mail delivery at DM 35.00 or more? Should the library carry these costs or should the user or his research section. Still too much time is wasted re-keying user request information into the document delivery system, and time wasted re-routing the material to the user. A more efficient, cost effective and expedient way must be found to handle future document delivery better to our patrons.

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IMPLEMENTING ELECTRONIC DOCUMENT DELIVERY USING PROSPERO: A CASE STUDY AT THE UNIVERSITY OF CONNECTICUT

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Abstract: The University of Connecticut began testing an Electronic Document Delivery program in June 2000. EDD was chosen as a library-wide goal and promised to provide users on all six campuses with electronic photocopies in Portable Document Format, which could be accessible anywhere in the world. The test period continued through the Spring 2000 semester with more than 450 participants. This presentation will document, illustrate and highlight the effort made by the Document Delivery/Interlibrary Loan team as it brought together several software applications (including Ariel, Adobe Acrobat, Prospero and others), as well as new hardware technology to make this project a success by Fall 2001.

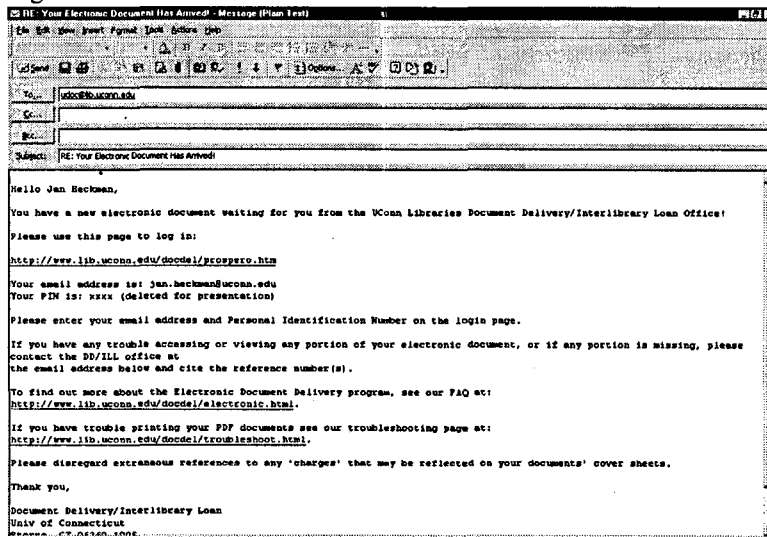
Electronic document delivery (EDD) is one of the latest innovations in libraries. A patron no longer needs to enter the library physically to pick up a document; it can be accessed from any computer that is linked to the Internet. The patron does not have to access an e-mail application in order to receive these documents. Ariel, a software package developed by the Research Libraries Group (RLG) and often described as "Internet fax" has been very useful, but now there is a new development in document delivery that most would say is an improvement on many levels. The generic name for this trend is electronic document delivery (EDD), and the software used as the engine behind this service at the University of Connecticut is Prospero, a publicly licensed open source (PERL) free product. The discussion of Ariel 3.0 and its incorporation of Prospero functions follow an explanation of the capabilities and benefits of Prospero.

One of the benefits of EDD is the overall quality of the document, which can include graphics, charts, grayscale and color images. Another is the convenience of the system, which is probably the most popular aspect of the service. By shifting regular photocopy delivery to EDD, there should also be a reduction in the reliance on paper used by the library. Ariel is used in conjunction with Prospero in that Prospero converts the Ariel TIF to PDF (Portable Document Format), which can be read by an easily downloadable viewer/web browser plugin called Adobe Acrobat Reader. While incoming Ariel files

may not reflect a marked improvement in quality, locally scanned documents can be greatly enhanced. Locally, one can scan documents directly into Adobe Acrobat and preserve most of the original document's overall quality and readability. Also, PDF files cannot be easily edited, thus removing a copyright obstacle that was present with desktop delivery of Ariel documents. Convenience is greatly enhanced and patron feedback has been extremely positive. In a somewhat extreme example, consider that a traveling scientist may access documents from any computer that can access the World Wide Web. Reduction in paper costs for libraries can occur because the library is no longer printing off incoming Ariel transmissions; the patron now absorbs that expense. If outgoing documents are scanned directly into PDF format, they can be sent to the server and no photocopying is necessary, which also improves graphic quality.

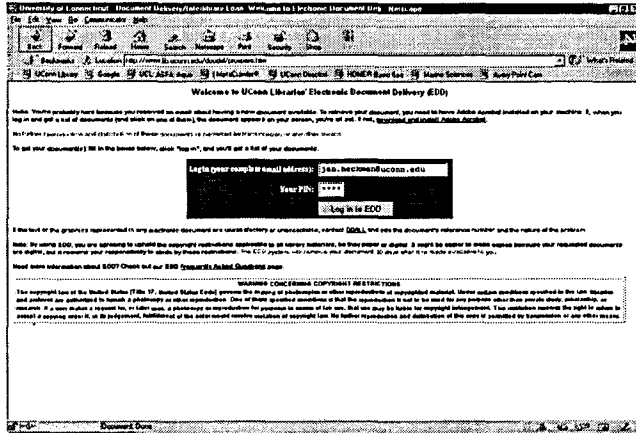
Prospero has two modules. The configurations for the Web server, e-mail function, and local Ariel directory are controlled from these modules. Two flowcharts for the workflow at the University of Connecticut Libraries are attached (*addendum 1&2*). The first module captures and converts Ariel files into PDF and includes a patron database for authentication, which is each patron's e-mail address and an assigned Personal Identification Number (PIN). This module also generates an e-mail message informing the patron of the incoming document and reminding her of the URL of the server and the individual PIN.

Figure 1.



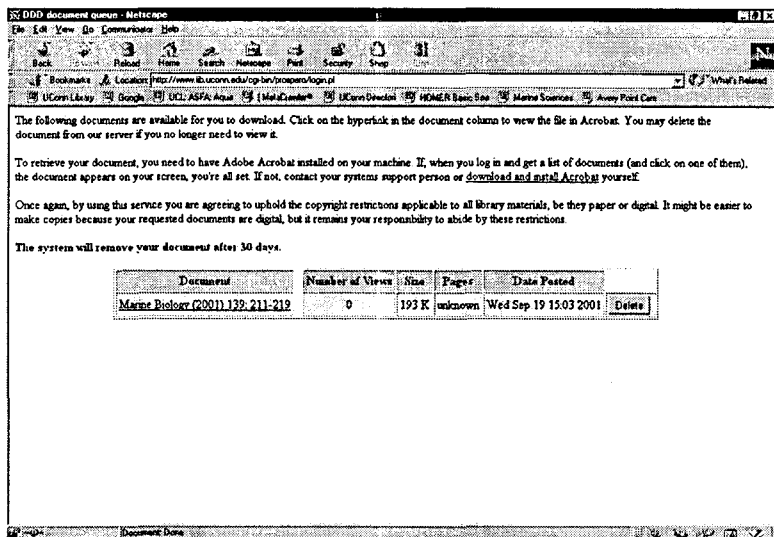
The second module is the Web server interface. When patrons go to the designated URL they see a login screen.

Figure 2.



After logging in, the patron is presented with a listing of the documents that are ready for viewing. The library can customize the individual patron page and information in the document listing. The documents will by default stay on the server for two weeks or after five viewings, whichever occurs first, unless the patron manually deletes the document. The time period and number of viewings can be customized. The advantage of having the documents stay on the server is that even with faulty Internet connections, the desired document is not lost and can be downloaded when the connection is better.

Figure 3.



The details of the Prospero software are that it is publicly licensed (GNU), it is written in PERL (an open source code that can be customized), it is free, and its web server module will work with UNIX, Linux, and Windows. The staff/client module can run on any Windows 2000/NT/98/95 machine. Imbedded into Prospero is the functionality that allows it to convert Ariel TIF files into PDF without additional software, such as Adobe Acrobat Capture.

Hardware and Software:

While it may not be necessary to add hardware or software (besides Prospero) if your library already has Ariel capabilities, there is the need for server space for the World Wide Web delivery of documents. The University of Connecticut Libraries did purchase new hardware and software in order to improve service. The added software was Prospero and Adobe Acrobat (used to edit and crop scanned documents).

Added hardware:

HP Digital Sender 9100C

- Supports color scanning to PDF and TIF formats
- Sends to any e-mail address
- Sends to any other IP
- Will scan and copy to any HP printer on a network

Dell Dimension XPS B1000 PC

- A powerful workstation (1 Ghz) to handle all aspects of EDD
- Receives incoming Ariel documents
- Manages documents scanned by Digital Sender

- Processes all electronic documents via Prospero
 - Edits PDF documents with Adobe Acrobat
- Minolta Microform Digital Scanner MS2000
- Converts microform images to PDF or TIF
- Ricoh Digital Copier/Scanner
- Scans black and white document to PDF and TIF
 - The majority of documents are scanned using the Ricoh copier/scanner
 - Scanned documents placed on staff server then retrieved and processed using Prospero

The Future:

One of the fantastic things about open source computer programs is that non-profit organizations, like libraries, can offer very useful products that are not cost prohibitive. The Research Libraries Group, a non-profit organization, developed Ariel. The source code for Ariel is not open source, but RLG has recently released Ariel 3.01, which incorporates the many of the functions of Prospero. Version 3.0 was released earlier in 2001 with many problems, but those who ordered 3.0 will receive, at no charge, the debugged 3.01 version. The following are the features of Ariel 3.01 as taken from the RLG website.

- Support for 24-bit color scanning and printing
- Support for 8-bit grayscale scanning and printing
- Support for TWAIN as well as ISIS drivers for scanners—see www.rlg.org/ariel/ariscan.html for the latest list of Ariel-supported scanners
- Support for scanners that use either the USB or the SCSI interface
- Support for higher resolution (up to 600 dpi) scanning
- Support for scanning and printing up to 11"x17" (ledger) or A3 paper—if supported by your scanner and printer
- Ability, while sending a document, to add an address to the address book "on the fly"
- Ability to add, delete, or replace a page or pages in a scanned document
- Ability to view thumbnails of all pages in a document
- Use of Windows Printing management for printing a single page or range of pages from a document
- Ability to send documents to patrons in PDF or TIFF format
- Ability to send documents in PDF or TIFF to a Web server and schedule their maintenance
- Ability to set the subject line for e-mailed documents
- Control of the patron database for document delivery to patrons with a link to RLG's ILL Manager patron database
- Support for firewalls by using Net Address Translation or by restricting the data port range

- Improved log viewer messages for tracking and diagnostic

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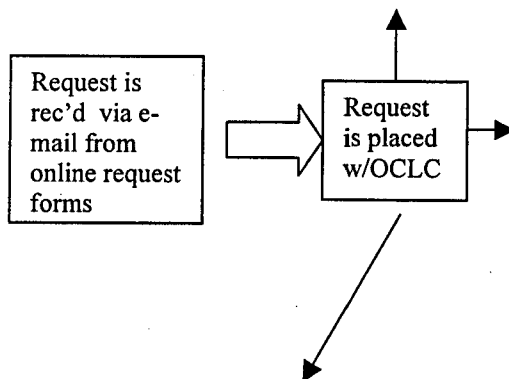
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Keywords: Electronic Document Delivery, EDD, Prospero, Ariel

Addendum:

Addendum 1. (Heckman, Natale)

Flow chart for Electronic Document Delivery at the University of Connecticut



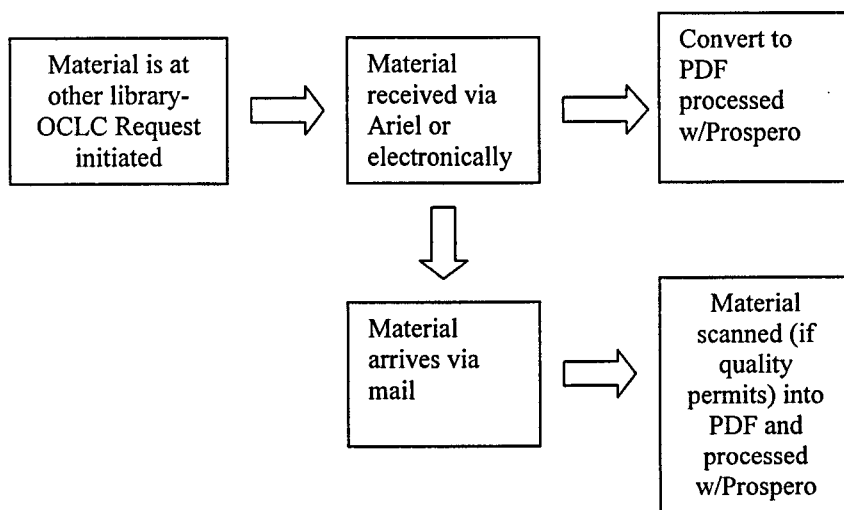
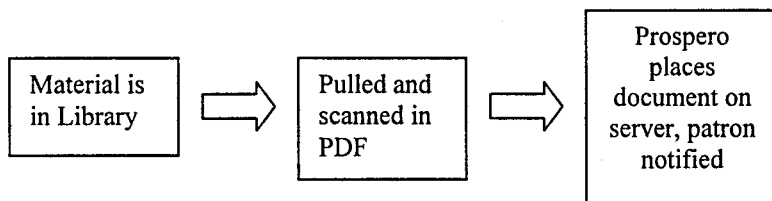
Item rec'd via Ariel, converted to PDF, processed by Prospero

Item is rec'd via fax or mail, graphic quality checked, scanned into PDF, processed by Prospero

Item rec'd as PDF e-mail attachment,
Processed by Prospero

Addendum 2. (Heckman, Natale)

Flowchart for processing Electronic Document Delivery using Prospero at University of Connecticut





IODE TODAY, READY FOR TOMORROW

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ABSTRACT: The paper provides an overview of the progress of the IODE programme since the IODE-XVI Session held in Lisbon, Portugal in October/November 2000. It also describes the Marine Information Management (MIM) Programme within the new IOC structure framework as well as the support staff situation. The paper then proceeds with an overview of progress achieved by the main MIM activities i.e., GLODIR, OceanTeacher, OceanPortal and the ODIN projects (ODINAFRICA and the planned ODINCARSA).

The 16th Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) was held in Lisbon, Portugal between 30 October and 9 November 2000. Attended by representatives from over fifty National Oceanographic Data Centres in as many countries, the Session defined the way forward for the IODE programme.

Although the Session was attended by Linda Pikula, President of IAMS LIC, very few Member States sent a marine information expert to the Session. With regard to Marine Information Management, the IODE Session commended the success of the Global Directory of Marine and Freshwater Professionals (GLODIR) and strongly endorsed the development of the Ocean Portal and IODE Resource Kit.

During the year 2001, the IOC Secretariat re-defined its structure which will now be composed of the Ocean Sciences, Ocean Services and Operational Oceanography Sections. A fourth Section, Regions and TEMA, will be transversal. The Ocean Services, after several years of staff reductions (resulting in only one professional staff member at the Secretariat during the year 2000), was able to welcome several new professionals during 2001: Mr Mika Odido (Kenya) as ODINAFRICA regional coordinator for the IOCINCWIO region based in Mombasa, Kenya; Dr Sekou Cisse (Guinée) as ODINAFRICA regional coordinator for the IOCEA region, based in Conakry, Guinée; Dr Murray Brown (USA) as Editor of the OceanTeacher system, based in New Orleans; Mr Greg Reed (Australia) joined the Secretariat in Paris to deal with technical aspects of data exchange; as did Mr Benjamin Sims for web-based information services.

The Marine Information Management Programme of IODE is guided by the IODE Group of Experts on Marine Information Management (GE-MIM). At the 6th Session, held in 1999, Dr Muari Tapaswi (India) was elected Chair. The

membership further includes Mrs Pauline Simpson (UK), Heather Cameron (Cameroon), Suzie Davies (Australia), and Sofia Goulala (Greece). The major activity scheduled by GEMIM-VI was the development of a Marine Information Management (MIM) module for the IODE Resource Kit. This was subsequently passed on to the IODE Steering Group for the IODE Resource Kit in which we find Murari Tapaswi, Pauline Simpson, Linda Pikula and Paul Nieuwenhuysen as MIM experts (and IAMSLIC members). Core activities of the GE-MIM are (i) GLODIR; (ii) the OceanPortal; (iii) the OceanTeacher (IODÉ Resource Kit); (iv) the development of regional networks (eg ODINAFRICA); and (v) cooperation in MEDI.

GLODIR development has continued in 2001 and has reached nearly 13,000 records. However, the addition of new records has slowed down and renewed efforts to publicize the product are necessary. A GLODIR poster is therefore planned for early 2002 and will be distributed widely to, inter alia, IAMSLIC Libraries.

The year 2001 has seen the launching of the web-based OceanTeacher composed of two sections: (i) the OceanTeacher manual; and (ii) the OceanTeacher Resource Kit. The Manual is a collection of outlines, notes, examples and miscellaneous classwork documents that should be used together with the Resource Kit. The content of the manual is based on classroom-based training events in ocean data and information management. The Resource Kit contains a range of ocean data and information management materials including software, quality control and analysis strategies and IOC publications. The OceanTeacher system is used during IODE training courses but can also be used for self study. It is available on line through the URL <http://www.oceanteacher.org> but also on CD-ROM.

The MIM section of the Manual contains the following chapters: (i) Introduction Information Centres and Libraries; (ii) The Marine Information Centre; (iii) Library Automation: working with information technology; (iv) MIM: building connections; and (vi) Data Centres vs. Information Centres. Whereas a first version of the MIM module has been completed in September 2001, substantial work still remains in further enriching the module and IAMSLIC members are invited to participate and contribute in this project.

A first version of the OceanPortal was launched in August 2000, in preparation for IODE-XVI. It was a static set of web pages containing links to ocean data and information URLs categorized according to subject. Whereas this site was quite successful (approx. 10,000 visits/month) it was felt that a database-based solution was called for. The new OceanPortal was thus launched in July 2001 using the URL <http://www.oceanportal.org> and pre-populated with 2,000 URLs of web sites providing online data and information sources. The system allows users to submit URLs (together with description and category keyword). New

submissions are reviewed and cleared by the Editor (Murray Brown). After 2 months an additional 1000 URLs were submitted.

Going back to the definition of a Portal: "A Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and on-line shopping malls." It was realized that additional services would be required to make the OceanPortal a really valuable service. A project proposal was submitted within the framework of intersectoral programmes within UNESCO. The project 'The development of Regional OceanPortals' was approved by the selection committee with a budget of US\$ 400,000 over a period of two years. The project aims at developing three Portals: one for Africa, one for the Caribbean and South America and one for the Western Pacific. The proposal will be submitted to the UNESCO General Conference in October 2001 for approval as part of the workplan for the biennium 2002-2003.

The project will have 2 major objectives: (i) Portal that can provide information, packaged differently for different audiences. These audiences will include decision makers, research & academia, private sector, schools, and general public; (ii) Portal that provides different types of information: URLs (current OceanPortal), Documents (e-Library), Expert information (GLODIR), Events (IODE calendar) and news items. As the portals aim at audiences in developing countries it was realized that a web-only approach would not be successful and thus a printed product is planned as well (newsletter).

UNESCO is currently investigating different portal solutions. It is expected that a choice will be made before the end of 2001. The concepts used by oneFish are used as a guiding example.

At the regional level 2001 has been the start for the Ocean Data and Information Network for Africa (ODINAFRICA). This project, in which 20 African countries participate, and co-financed (US\$ 4 M) by the cooperating countries, the Government of Flanders, and the IOC has the following objectives: (i) assist countries in developing and operating ocean data and information centres; (ii) establish networking between the cooperating countries; and (iii) assist the cooperating countries in developing ocean data and information products and services serving a wide range of audiences including scientists, private sector, decision makers and general public. In its first year of operation the project has identified national coordinators, has organized a first training course (in a series of 3) in ocean data management, has provided nearly 60 PCs for the data and information centres and developed the ODINAFRICA web site, providing information for the project participants, as well as providing a news service on ocean research and management in Africa. The site is developed and maintained by a team composed of Mika Odido, Sekou Cisse, Clive Angwenyi, Sam Ngete, Kizzie Osore, Eunice Onyango, and Estehr Fondo. All, except Sekou Cisse (who provided the translations into French), work at the ODINAFRICA Information

Services Centre based at the Kenya Marine and Fisheries Research Institute, Mombasa, Kenya.

A first Marine Information Management Training Course will be held in Cape Town, South Africa between 29 October and 9 November 2001.

A major priority within the GE-MIM programme has been the development or identification of an Integrated Library Management System (ILMS) for use mainly in developing countries. Whereas many developing countries have been using UNESCO's Micro CDS/ISIS software to develop library catalogue databases, the software has never been developed further into an ILMS and was therefore not considered as an option. The IODE ResourceKit MIM members compared a number of small to medium size ILMS packages and selected INMAGIC. The software is now being distributed to all ODNAFRICA cooperating countries and an intensive training will be part of the Cape Town training course. The cooperating countries will be requested to develop (or convert their existing CDS/ISIS catalogues) their catalogues with the new software and send regular updates to IOC Paris, where the 20 country catalogues will be merged and served over the WWW.

Following the success of the ODINEA and ODINAFRICA projects, IOC Member States in the Caribbean and South American regions have requested the development of a similar network. A planning workshop for this possible future project will be held in Guayaquil, Ecuador between 24 and 26 October. Possibly a first MIM training course could be organized jointly with the IAMSLIC 2002 conference in Mazatlan, Mexico.

Technological Undercurrents and Global Information Circulation.

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ABSTRACT: Briefly reviews some of the wide range of technological developments arising from and driven by the Internet. Focuses on explaining the developments in librarianship terms and indicates some opportunities offered to library and information workers through these developments. Discusses how some of these technologies have been used in some aquatic Internet information services and how some developments might be used in the near future. Uses examples from several aquatic and fisheries information services such as *oneFish* and *Freshwater Life*.

KEYWORDS: Information services; information scientists; Internet; subject portals; Z39.50; XML; RDF; taxonomies; ontologies; classification; metadata; thesauri

Introduction

Although this session of the Conference is actually meant to cover Internet Systems and Tools in the sense of “services,” I thought it might be useful to try and give a fairly basic overview of the *underlying* systems and tools which will be driving the new Internet portals and services. Whilst doing this, I hope that there will be many areas where you can see opportunities for us, as library professionals, to assist with the further development of these as well as how we can use them in order to achieve that primary library objective Peter Brophy articulated as “To enable users to gain access to the information they need.”

Any Internet site has the potential to contribute to effective global information circulation. There are certain challenges – many of which will be very familiar to us as librarians. However, this familiarity can sometimes be obscured by the terminology used and I hope that I may also be able to assist with overcoming this barrier for those of you who have been bemused by the unnecessary techno-babble.

The Aquatic Sciences Libraries and Information Centres (IAMSLIC, EURASLIC, BIASLIC etc – the Aquatic SLICs) have been making wide use of the Internet with their email; discussion groups; and websites for many years now. These services are constantly being refined and further developed e.g. the latest IAMSLIC and EURASLIC sites at www.iamslc.org and www.euraslic.org.

The Aquatic SLICs are also trying to bring both some order and added value to the library side using the Z39.50 initiative. EURASLIC was involved in some of the early work in developing multiple catalogue searching and Inter Library Loan using Z39.50 – as partners in the European Union UNiverse Project. IAMSLIC is now actively utilizing Z39.50 using the NOAA sponsored gateway to make multiple Aquatic SLIC catalogues simultaneously searchable over the web. <http://www.csc.noaa.gov/CID/iamslic>.

As John Akeroyd said, in his Keynote Paper to this Conference, librarians have been at the forefront in the uptake of the Z39.50 standard. There are some problems in applying Z39.50 to heterogeneous systems such as library catalogues. These can be and are being overcome and libraries will continue to use this standard for some time to come. However, although he did not elaborate the point, John also said that he thought Z39.50 might give way to other standards or systems, possibly based on XML. As this paper progresses, it should be possible to see how this may come about.

However, with the rapid growth in availability of full text documents, other media (especially data) and a wide range of technological developments (the *technological undercurrents* of the title) there are further opportunities for libraries and librarians both to bring order and to add value to this broader field of information resources and activities.

Technological Undercurrents – an overview from a librarian's viewpoint

The last 3 to 5 years have seen some tremendous innovations in relation to the underlying technologies of the Internet. The terms and general concepts are often heard at Conferences such as this, but it is not always easy to see how these fit together and how we might take advantage of them. The terminology can confuse and discourage us.

Consider a possible example – you and your colleagues may have decided to pursue another of John Akeroyd's points and decide to become more active in exploiting the available global knowledge base. You have a good idea for an Internet global information service or Gateway (similar to oneFish [1] or FreshwaterLife [2] say)– it looks big – you don't feel confident - you go out to a specialist company – you get a proposal something like the following:

What is Z39.50? Z39.50 is a communications standard which describes the rules and procedures for communicating between two computer systems for searching and retrieving information from databases. Most library system vendors have incorporated the standard into their cataloguing and other applications. By using one of these systems, the searcher is able to search many different databases accessible through Z39.50 servers and retrieve results. The searcher uses the same search interface for all searches and does not require a detailed knowledge of the system being searched.

“The Information Architect will analyse your proposed Gateway and produce a report that will detail the Vortal strategy; Markup Language options; interoperability requirements; metadata standards. The report will also provide an analysis of the ontologies and taxonomies arising from the subject content to underpin the browsing, navigation and searching systems and present you with a technical blueprint from which the website development team will be able to build your site’s infrastructure.

To complete this stage there would be a one-off charge of: \$45,000”

This is a real world example – not a construct just for this paper! Intimidating isn’t it? How does this design guru – the Information Architect - cope with this complexity? No wonder she can charge such sums of money. What do all these technological undercurrent words mean?

If we extract the jargon terms and phrases from this proposal:

- Vortal strategy
- Markup languages
- Interoperability requirements
- Metadata standards
- Ontologies and Taxonomies

they all pivot around the central essential concept for a global information system – INTEROPERABILITY. Because of both the quantity and the transitory nature of Internet information, no global information service will be sustainable if it cannot handle distributed data effectively. In order to do this, every aspect of systems design and all the underlying technologies have to be centred on interoperability.

Vortal Strategy - Gateways, Portals and Vortals

As we all know, web based information resources are growing exponentially. Gateways, Portals and Vortals are all approaches to try and introduce *selection policy* into/onto Internet information resources.

Koch [1] has reviewed definitions and suggested typologies for gateways that are useful, not least in showing the differences that exist between broadly similar services. Working definitions will, however, do for our purposes:

Gateways provide search services to other people’s web resources - *Subject gateways* provide search services to other people’s web resources selected from a particular subject area - ‘*Quality controlled subject gateways*’ make quality assessments before including resources.

The word *Portal* means gateway and sometimes is synonymous but portals often offer more services than gateways i.e. provide more than just a search service to other people’s web resources. The first web portals were online services, such as AOL, that provided

access to the web plus services, such as e-mail, forums, search engines, and on-line shopping malls. Now most of the traditional search engines have transformed themselves into web portals to attract and keep a larger audience.

Specific subject Portals, *Vortals* (Vertical portals), offer extended services into their specific subject areas. Vortals typically provide news, research resources (documents etc), data, discussions, newsletters, online tools, and many other services that educate users about a specific subject. oneFish is an example of a Vortal.

oneFish is an Internet vortal for fisheries and aquatic resources research which adopts a participatory approach, allowing users to submit knowledge as well as discover it – stakeholder selection policy. [<http://www.onefish.org/>]

FreshwaterLife is a proposed distributed web vortal co-ordinating data and information on the taxonomy and ecology of freshwater plants and animals in Europe and North America. It is also envisaged that it will enable data analysis and community building. [<http://www.freshwaterlife.org>]

Any worthwhile vortal, like its special library counterpart, and with regard to the distributed nature of its resources, needs a constantly evaluated *Collection Development Policy* and *Service Definition Document* as well as a wide range of *Consortium Agreements* – or in Internet-speak, a vortal strategy.

Opportunities for librarians

- Involvement with Collection Development Policy
- Advising on Service Definition
- Negotiating Consortium Agreements for Information Quality and Provision

Since we are considering a service with distributed content, there obviously has to be interoperability between the data on the various content holder sites – i.e. standards for the way information resources are structured, cataloguing standards, and standards for data manipulation. This brings us to Markup Languages, Metadata Standards and Resource Description Framework.

Markup Languages and Interoperability Requirements

Up to three years ago, any Internet site would have been based its content and display on Hypertext Markup Language (HTML) and the consideration of other markup languages would not have been necessary. This all changed in 1998/99 when a new language was released - XML. What is it, and why has there been so much excitement about eXtensible Markup Language?

Markup Languages

HTML

The web's main language is (or was) HTML. Although HTML is the most successful electronic-publishing language ever invented, it is superficial. In essence, it describes how a web browser should arrange text, images, etc on a page. HTML's concern with appearances makes it relatively easy to learn, but it also has its costs.

One major cost is the difficulty in creating a web site that functions as more than just a fancy fax machine sending documents to anyone who asks. People want web sites that take information from distributed sources (and sometimes users), transmit and manipulate both textual and data records, even run scientific instruments from half a world away. HTML was never designed for such tasks.

HTML uses tags to tell the computer about layout. The solution to getting more interactive websites is, in theory, very simple - use tags that say what the information is, not what it looks like.

XML and the "X-Files"

Extensible Markup Language (XML) is a new language designed to do just that, to make information self-describing. XML lets everyone create her own tags to annotate web documents for meaning e.g <Favourite malt whisky> or <Guin Auction Item>. Thus XML-defined web pages can function like database records.

This simple-sounding change in how computers communicate has the potential to extend the Internet beyond just information delivery to information manipulation and analysis and has been taken up very rapidly.

Another source of XML's unifying strength is its reliance on a still fairly recent standard called Unicode, a character-encoding system that supports intermingling of text in all the world's major languages. Thus, XML enables exchange of information not only between different computer systems but also across national and cultural boundaries.

Unlike most computer data formats, XML markup also makes sense to humans, because it consists of nothing more than ordinary text.

Of course, it is not quite that simple. Although XML does allow anyone to design a new, custom-built language to describe his information resources, if we want to "interoperate", we have to get groups of interested people to concentrate on agreeing exactly how they want to represent the information they commonly exchange (cf the development of MARC).

Groups of people have, however, gotten together and developed agreed "Activity-specific interchange languages". Indeed, a shower of new acronyms ending in "ML" testifies to the inventiveness unleashed by XML in the sciences, in business and in the scholarly disciplines [see Applications section below].

Before they can draft a new XML language, these groups must agree on three things:
which tags will be allowed,
how tagged elements may nest within one another and
how they should be processed.

The first two--the language's vocabulary and structure--are typically codified in a Document Type Definition, (DTD) or Schema.

XML DTDs or Schemas then enable data exchange - but XML tags offer no inherent clues about how the information should look on screen or on paper. So now we have excellent data interoperability but no display. We now need to apply rules organized into "style-sheets" to reformat the work automatically for various devices so that the information can be displayed or rendered.

XSL

The standard for XML style-sheets is called the Extensible Stylesheet Language, or XSL.

The *latest* versions of several web browsers can read an XML document, fetch the appropriate XSL style-sheet, and use it to sort and format the information on the screen. (or even as audible speech or a Braille print out or a tune if the text was music). However, for users with earlier versions of browsers, the XML has to be formatted by XSL to HTML. At the present time, therefore, XML is mainly used as a server side language. It has been so successful and generated such excitement because *it is a simple, standard way to interchange structured textual data between computer programmes* – essential for interoperability.

XSL formats the output into the required format such as HTML, PDF or Comma-Separated Values but a first step is often needed – that of *transforming* the structure of the incoming XML document to a structure that reflects the desired output.

XSLT

XSL Transformations (XSLT) can be used to transform one form of XML into another form of XML. XSLT is a powerful language for transforming XML data in many ways. These may involve selecting data, grouping it, sorting it, or performing arithmetic conversions.

An example would be to take an XML format for monthly sales figures and produce a histogram as its XML output using the XML-based SVG standard for vector graphics. A more leisure-based example would be to take a piece of musical notation (ChordML) and, using XSLT, generate a Musical Instrument Digital Interface (MIDI) file and play the music on a synthesizer.

With this scope for transformation, XSLT also enables and empowers interoperability.

XLink

One of the web's main innovations was "hypertext," its billions of pages connected by hyperlinks--those underlined words you click on to get whisked from one page to the next. Hyperlinks, too, will do more when powered by XML. A standard for XML-based hypertext, named XLink, allows you to choose from a list of multiple destinations and, perhaps most useful, enables authors to use indirect links that point to actual entries in databases.

XPath

XML Path Language (XPath) seems to have taken over from XML-QL as the preferred form of query language within XML -- allowing you to perform queries on XML documents and data [the equivalent of SQL (Standard Query Language) for relational databases].

So, if you need extensibility (user defined tags) and interoperability, it makes sense for you to use XML as part of the basis for your site development. If you do, which subject and activity specific interchange languages (the applications) should you consider?

The Applications – the MLs

XML is a mother tongue for other languages, so application markup languages to suit your specific needs become possible. There is so much activity in this area that whatever subject or activities you are considering for your vortal there may already be a working group and possibly a draft ML. To find out, one initial port of call would be <http://xml.coverpages.org/sgml-xml.html> Under "Applications", the site has several hundred entries under "XML: Proposed Applications and Industry Initiatives". Examples include:

VocML - Vocabulary Markup Language

this will support the structured representation of authority files, hierarchical thesauri (including those with poly-hierarchies), classification schemes, digital gazetteers, and subject heading lists.

BSML - Bioinformatic Sequence Markup Language

The proposed Bioinformatic Sequence Markup Language (BSML) is a public domain protocol for Graphic Genomic Displays. The project goals are in some respects similar to those of the Chemical Markup Language.

IDML - International Development Markup Language

IDML would become a data exchange standard for information that is specific to international development, making it much easier to share information with regional offices, partner agencies and with the public.

These MLs can describe either *resources* or *activities* and give us the *standards* enabling us to inter-change or inter-lend our globally distributed information stock.

Many *metadata standards* are now also being expressed in XML.

Dublin Core is probably the most widely known metadata standard but there are very many more e.g.–

OAMS - Open Archives Metadata Set

- presents a technical and organizational framework designed to facilitate the discovery of content stored in distributed e-print archives.

EAD – the Encoded Archival Description

Vortals need catalogue data in order to work efficiently just like any library.

Internet documents, pages or resources do not necessarily have detailed metadata (a catalogue record). This makes it difficult to get accurate search results, increases search time, and leads to several other problems and inefficiencies. The uptake of standards, such as Dublin Core, by Internet authors is still slow but does seem to be growing.

Metadata and Metadata Standards: “Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use or manage an information resource. Metadata is often called data about data or information about information.” [Hodge ²] Traditional library cataloging is a form of metadata, and MARC 21 and the rule sets used with it such as AACR2 are metadata standards.

Dublin Core:

In 1995, 52 researchers and practitioners concerned with libraries and networking gathered in Dublin, Ohio, to attempt to arrive at a list of descriptive metadata elements intended to promote *author generated* resource description for web based documents. It was thought that Internet authors might use a simple element set of about 15 elements (Title, Creator etc). This became the **Dublin Core** element set. It has been translated into more than 15 languages, is in use in more than 50 projects, and is the basis for describing official documents in at least 2 countries. On 5th October 2001, the Dublin Core Metadata Element Set was approved by ANSI as a recognised standard (**Z39.85-2001**).

Extensions and Profiles

Despite the recent development of many of these metadata schemes, most have already been subject to the changes brought about by implementing them in real world situations. These modifications are of two types: *extensions* and *profiles*.

An *extension* is the addition of elements to an already developed scheme to support the description of an information resource of a particular type or subject or to meet the needs of a particular interest group.

Extensions increase the number of elements.

Profiles are subsets of a scheme that are implemented by a particular interest group; profiles can constrain the number of elements that will be used, refine element definitions to describe the specific types of resources more accurately and specify values that an element can take.

Although the original objective of the Dublin Core was to define a set of elements that could be used by *authors* to describe their own

web resources, the library community, particularly our digital library colleagues, have begun the process of developing a Library Application Profile for Dublin Core. A draft version is available at <http://dublincore.org/documents/2001/08/08/library-application-profile/>

Another interest group working to develop an application profile of Dublin Core is The Agstandards Discussion Group. This is a group of information management specialists in the domain of agriculture that discusses various issues on agricultural information management. In June 2001 a draft **Metadata set for the description of agricultural documents and document-like resources** was issued for discussion and trailing as a potential application profile of Dublin Core <http://www.fao.org/agris/MagazineArchive/magazine/TaskForceonDCMI.htm>.

As stated previously, most of these metadata standards are now expressed in XML – and some pre-XML metadata standards have been “translated” into XML e.g.

BiblioML - XML for UNIMARC Bibliographic Records

However, what happens if you want to incorporate elements from more than one metadata standard in your resource description? From the outset, part of the XML project

Profiles

This has also happened with Z39.50. As the number of libraries using Z39.50 increased, some difficulties became apparent – e.g. the user receiving many false hits or, conversely, not retrieving a record even if it was in the database. These problems lead to the introduction of Z39.50 Profiles. *The Bath Profile: An international Z39.50 specification for library applications and resource discovery* identifies those features of the Z39.50 standard that are required to support effective use of Z39.50 software for a range of library functions, such as basic searching and retrieval of bibliographic records for cataloguing, interlibrary loan, reference, and acquisitions.

has been to create a sister standard for metadata that also provides a mechanism for integrating multiple metadata schemes – this standard is called the **Resource Description Framework (RDF)**.

Example 1: RDF and Multiple Application Schemas

```
<? xml version="1.0" ?>
<RDF xmlns = "http://w3.org/TR/1999/PR-rdf-syntax-19990105#"
xmlns:DC = "http://purl.org/DC#"
xmlns:AGLS = "http://naa.gov.au/AGLS#" >

  <Description about = "http://dstc.com.au/report.html" >
    <DC:Title> The Future of Metadata </DC:Title>
    <DC:Creator> Jacky Crystal </DC:Creator>
    <DC:Date> 1998-01-01 </DC:Date>
    <DC:Subject> Metadata, RDF, Dublin Core </DC:Subject>
    <AGLS:Document> Instructional </AGLS:Document>
    <AGLS:Function> Information Management - Internet </AGLS:Function>
  </Description>
</RDF>
```

The first line of Example 1 simply indicates that this is an XML document. The next three lines indicate three namespaces – RDF as the default namespace, Dublin Core and the Australian Government Locator Service (AGLS) metadata schema.

The main section of Example 1 - between the <Description> tags - shows six Properties that describe the resource pointed to by the URL <http://dstc.com.au/report.html> in the *about* attribute in the <Description> tag. The first four properties come from the Dublin Core (DC) namespace (the Title, Creator, Date, and Subject) and the last two from AGLS (Document and Function).

RDF provides much more than this however. RDF gives meaning. RDF makes assertions in sets of triples. To take an example from the above RDF document – the web page <http://dstc.com.au/report.html> has property “Creator” with the value “Jacky Crystal”. This is a meaning that computers can “understand” and use.

oneFish is looking at both the Agricultural Dublin Core and IDML metadata sets to assess their use for fisheries and aquatic resources and possible implementation within the oneFish vortal. If oneFish uses multiple metadata sets in this way it will, of necessity, need to consider using RDF within its system design.

Pausing to take stock, where are we now – where have these undercurrents taken us so far?

We now have a set of resources and activities marked up so that they can be shared, transmitted, manipulated and displayed and we have metadata records (catalogue entries) for these resources. All of this is now interoperable between many global “hosts”.

What we still need are systems to allow us to display them in logical groups (shelf order etc) for browsing; or to assist when searching. We need these systems to be capable of being used by many cultures and many language groups. This leads us on to our Information Architect’s *Ontologies* and *Taxonomies*.

The Internet community applies this terminology in varied and confusing ways leading to a lot of misunderstanding and confusion. However, in general terms, the two concepts cover: Classification schemes, Glossaries, Thesauri and Authority files.

Taxonomies

In many ways, Taxonomies could be considered to be part of the wider concept of Ontologies. In essence, they are a means of organising data for web sites to assist both browsing and search retrieval – sometimes classification schemes, sometimes thesauri and sometimes both. Some sites use more than one classification scheme (or even more than one thesaurus).

For a vortal, displaying the resources in a systematic topical arrangement is essential. Systematic arrangements can be created ad hoc, based on the collection content at a point in time, and then revised as the collection grows. Alternatively, they can be drawn from an existing Classification Scheme.

Opportunities for librarians:

The unbounded growth of Internet resources has given new prominence to the role of library classifications in imposing order on chaos. Any individual or organisation seeking to organise a large body of Internet resources is likely to call for a “Taxonomist” in the realm of knowledge management.

Many Internet sites are now using library classification schemes to represent their site’s “taxonomy”. DDC, UDC and LCSH are all extensively used on Internet sites. Some specialist schemes are also used e.g. the American Mathematical Society Classification.

Others use thesauri as their grouping structure e.g the EEVL and EELS engineering web sites both use subject categories based on the Ei Thesaurus (Engineering Index Thesaurus).

Ontologies

Put in its simplest form, an ontology is a collection of terms, definitions of the terms and defined relationships between the terms for a particular domain or subject area. This data set can then amalgamate the advantages of glossaries, classification schemes, thesauri, authority files (including biological taxonomy authority files) and gazetteers.

In other words, it can be thought of as an enhanced thesaurus—it provides all the basic relationships inherent in a thesaurus, plus it defines and enables the creation of more formal, more specific and more powerful relationships. An ontology captures and structures the knowledge in a domain (subject area), and by doing so captures the meaning of concepts that are specific to that domain. This meaning is then extended to end-users through the use of tools (e.g., indexing, retrieval and browsing tools) that apply the ontologies.

An ontology can be multi-lingual and, if several ontologies are properly constructed for different subject domains, they can assist *cross-site* and *cross-subject* searching and retrieval.

The following is a hypothetical example of what a simple ontology might produce for the term "Fish":

Fish as Noun [Verb variations not included]

Synonyms

Sense 1

fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills)

=> aquatic vertebrate -- (animal living wholly or chiefly in or on water)

Sense 2

fish -- (the flesh of fish used as food)

=> foodstuff, food product -- (a substance that can be used or prepared for use as food)

Sense 3

fish, chump, fool, gull, mark, patsy, fall guy, sucker, schlemiel, shlemiel, soft touch, mug -- (a person who is gullible and easy to take advantage of)

=> victim, dupe -- (a person who is tricked or swindled)

Sense 4

fish, go fish -- (a game for two players who try to assemble books of cards by asking the opponent for particular cards)

card game, cards -- (a game played with playing cards)

Hypernyms (Broader Terms)

4 senses of fish (only one displayed)

Sense 1

fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills)

=> aquatic vertebrate -- (animal living wholly or chiefly in or on water)

=> vertebrate, craniate -- (animals having a bony or cartilaginous skeleton with a segmented spinal column and a large brain enclosed in a skull or cranium)

=> chordate -- (any animal of the phylum Chordata having a notochord or spinal column)

=> animal, animate being, beast, brute, creature, fauna -- (a living organism characterized by voluntary movement)

Etc.

Hyponyms (Narrower Terms)

2 of 4 senses of fish (only part of one displayed)

Sense 1

fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills)

=> cartilaginous fish, chondrichthian -- (fishes in which the skeleton may be calcified but not ossified)

=> holocephalan -- (fish with high compressed head and a body tapering off into a long tail)

=> chimaera -- (smooth-skinned deep-sea fish with a tapering body and long threadlike tail)

=> rabbitfish, *Chimaera monstrosa* -- (large European chimaera)

Etc

Holonyms (is part of; is a member of)

1 of 4 senses of fish (only part of 1 displayed)

Sense 1

fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills)

MEMBER OF: school, shoal -- (a large group of fish; "a school of small glittering fish swam by")

MEMBER OF: Pisces -- (a group of vertebrates comprising both cartilaginous and bony fishes and sometimes including the jawless vertebrates; not used technically)

MEMBER OF: Vertebrata, subphylum Vertebrata, Craniata, subphylum Craniata
-- (fishes; amphibians; reptiles; birds; mammals)

Etc.

Merionums (has part)

1 of 4 senses of fish (only part of 1 displayed)

Sense 1

fish -- (any of various mostly cold-blooded aquatic vertebrates usually having scales and breathing through gills)

HAS PART: fish scale -- (scale of the kind that covers the bodies of fish)

HAS PART: roe -- (eggs of female fish)

HAS PART: milt -- (seminal fluid produced by male fish)

HAS PART: lateral line, lateral line organ -- (sense organs of fish and amphibians; believed to detect pressure changes in the water)

Etc.

Example 2 - possible Ontology output [source: WordNet [3]]

This example shows the terms (or vocabulary); the definitions (or glossary); and some possible relationships given as a printed output.

We should note that sections 4 and 5 in this example are just two specific applications of the thesaurus concept "Related Term" – there are potentially many more such relationships.

We should also note that the example is only monolingual.

This type of printout from a hypothetical Ontology is only meant to give you some idea of the information that may be within the Ontology. As pointed out earlier, a Vortal would be designed to incorporate the Ontology tools within its system [usually in "background" mode] such that they assist the users with browsing, indexing and searching the Vortal's resources and tailoring them to their individual needs.

Terms (vocabulary) express concepts. Concept relationships are expressed in classification schemes. Classification schemes, therefore, also come under the umbrella of "ontologies".

At the present time there are many initiatives attempting to produce “cross-walks between different classification schemes.

Dewey, UDC, LC and Bliss are working together.

The IAMS LIC Coordinating Committee on Subject Analysis has been mapping ASFA descriptors against LC Subject Headings.

The Renardus Project [an EU project to establish a collaborative framework for European subject gateways [4]] is encouraging and enabling cross-classification mapping. Using DDC as its core system, Renardus is inviting participants to map DDC terms to their own “taxonomy”. This includes DDC to UDC, Mathematics Subject Classification and Nederlandse Basisclassificatie.

The development of ontologies has progressed in several fields and particularly important work has been done for the medical knowledge sources. The US National Library of Medicine has been particularly active in this field with its Unified Medical Language System (UMLS [8]).

In the field of Agriculture and Fisheries, the UN Food and Agriculture Organization is leading an initiative for a proposed Agricultural Ontology Server project (AOS).

Although the AOS would use the AGROVOC thesaurus as a platform, it will need to build associations with community partners for its development. For instance, in the fisheries area, the AOS could partner with oneFish, ASFA and FIGIS (the FAO Fisheries Global Information System) among others. In the biological taxonomy areas, partners could include the Integrated Taxonomic Information System (ITIS [5]), the National Biological Information Infrastructure (NBII [6]), and the Federal Geographic Data Committee (FGDC [7]), again, among others.

Opportunities for Librarians:

- Involvement with thesaurus term development – both mono- and multi-lingual
- Involvement with the definition of more relationships between terms
- Involvement with the classification cross-walk projects
- Evaluation of the effectiveness of new software tools such as Topic Map software

The AOS is also looking at software tools to enable build, integration and maintenance of such an ontology. One software presently being evaluated for this purpose is Topic Map Software based on the 1999 ISO 13250 Standard for Topic Maps.

The Future

The rapid development of these technological undercurrents is showing no sign of slackening off. The phrase “Web Services” has gained visibility in the last few months –

particularly from the big industry players such as IBM, Microsoft and Sun. So, what is this all about and should we, as librarians, be involved?

Web services are interoperable building blocks for constructing web service applications. As an example, we can imagine a distributed library infrastructure built on web services providing functionality such as distributed search, authentication, inter-library loan requests, document delivery, document translation and payment for services – all tailored to particular user communities.

The industry giants have been working to develop a set of XML based open standards that enable the web service architecture to be implemented. There are 3 main components involved – WSDL, SOAP and UDDI.

The Web Service Description Language (WSDL) is a standard way of capturing service descriptions.

The Simple Object Access Protocol (SOAP) is a standard for XML based information exchange between distributed applications and hence communicates the service requested from the services described in the WSDL.

The Universal Discovery, Description and Integration (UDDI) is a specification for distributed registries of web services so that we know what web services are currently available.

These could be the XML building blocks that replace and enhance the Z39.50 standard we, as librarians, are presently using. Gardner [9] has given a useful introduction to this interesting development.

In the longer term, Machine Automated Indexing (MAI) and Natural Language Processing (NLP) will play a useful role in automated indexing and subject assignment. Visual Representation of Information Spaces will become more common for enhancing web browsing.

Conclusions

Global Information Circulation is becoming a reality and the Technological Undercurrents are essential components of the systems

This paper has attempted to explain some of these Technological Undercurrents driving the Internet information services in librarianship terms.

By trying to remove some of the techno-babble smoke-screen, I have over-simplified many of these developments – but I hope that I have at least shown that these are not impenetrable topics and that we, by our training and background in librarianship, have all the necessary skills to play valuable roles in progressing these developments.

At some future date, developments in Machine Aided Indexing, Natural Language Processing and Visual Representation of Information Spaces may displace the need for

some of the librarianship skills – those that John Akeroyd, in his keynote paper, talked about abandoning anyway - but not just yet.

For the foreseeable future, other librarianship skills will be in demand for Internet information services – particularly in the areas of Markup Language standards, Taxonomies and Ontologies. Maybe it is possible for the title Information Architect to be considered as at least a partial synonym for Internet Librarian?

I would like to conclude then by paraphrasing another of John's keynote points –

“We have the skills, we have the adaptability, we have the high ground and, therefore, we have the possibility of being higher paid.”

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IS THERE A NEED FOR A MEDITERRANEAN INTEREST GROUP?

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For following reasons:

The main living aquatic resources of the majority of North African countries are those of the Mediterranean Sea. When they look at fisheries - the North African countries don't look South to the desert and sub-Saharan Africa, they look North;

Regional fisheries / aquatic sciences bodies e.g., COPEMED, GFCM, CIESM, etc. involve several Mediterranean countries so there are ties between the scientists and institutions of these countries - it makes sense that the libraries should also collaborate.

Maybe we should think more of ecosystems than geopolitical borders, and the Mediterranean is an important ecosystem.

UNEP Mediterranean Action Plan <www.unepmap.org/>

The Mediterranean Action Plan (MAP) strives to protect the environment and to foster development in the Mediterranean Basin. It was adopted in Barcelona, Spain in 1975 by 16 Mediterranean States and the EC, under the auspices of the United Nations Environment Programme (UNEP). Its legal framework comprises the Barcelona Convention adopted in 1976 and revised in 1995, and six Protocols covering specific aspects of environmental protection.

Since its adoption by all Mediterranean states and the EC, the Action Plan has served as the basis for the development of a comprehensive, environment and development programme in the region involving the Mediterranean coastal states, specialized organizations of the United Nations system, Intergovernmental and Non-governmental Programmes and Organizations. MAP covers coastal zone management, pollution assessment and control, protection of ecosystems and preservation of bio-diversity. In 1995, it was revised to become more action-oriented and an instrument for sustainable development in the region.

The Member States of CIESM <www.ciesm.org/>

CIESM (Commission Internationale pour l'Exploration Scientifique de la mer Méditerranée)

Launched in 1910, CIESM (International Commission for the Scientific Exploration of the Mediterranean Sea) is one of the oldest and most enduring scientific intergovernmental organisations in the world. The Commission is currently funded by 22

Member States which support the work of a large scientific network - some 500 institutes and over 2500 researchers - united by a commitment to promote marine science for the lasting protection of the Mediterranean Sea and for the well-being of its coastal populations.

Illustrated CIESM Guide of Marine Research Institutes : discover 79 stations in 21 countries around the Mediterranean and Black seas.

<www.ciesm.org/resources/marin.html>

COPEMED <www.ua.es/copemed/en/index.htm>

The objectives of FAO **COPEMED** Project are the advice, technical support and establishment of cooperation networks to facilitate coordination to support fisheries management in the Mediterranean

COPEMED area covers the Western and Central sub-regions of the Mediterranean. Morocco, Algeria, Tunisia, Libya, Malta, Italy, France and Spain have adhered to the Project

La zone d'intervention de **COPEMED** couvre les sous-régions Occidentale et Centrale de la Méditerranée. Le Maroc, l'Algérie, la Tunisie, la Libye, Malte, l'Italie, la France et l'Espagne y ont adhéré.

General Fisheries Commission for the Mediterranean (GFCM)

<www.fao.org/fi/body/rfb/GFCM/gfcm_home.htm>

Established: 1949 - International agreement under aegis of FAO (Article XIV of FAO Constitution), amended in 1997

Headquarters: Rome (Italy)

Membership: Albania, Algeria, Bulgaria, Croatia, Cyprus, Egypt, European Community, France, Greece, Israel, Italy, Japan, Lebanon, Libya, Malta, Monaco, Morocco, Romania, Spain, Syria, Tunisia, Turkey, Yugoslavia

Area of competence: Mediterranean, Black Sea and connecting waters

Main functions: To promote the development, conservation and management of living marine resources; to formulate and recommend conservation measures; to encourage training cooperative projects.

Commission générale des pêches pour la Méditerranée (CGPM) (anciennement Conseil général des pêches pour la Méditerranée)

Création: 1949 - Accord international sous l'égide de la FAO (article XIV de l'Acte constitutif de la FAO), modifié en 1997

Siège: Rome (Italie)

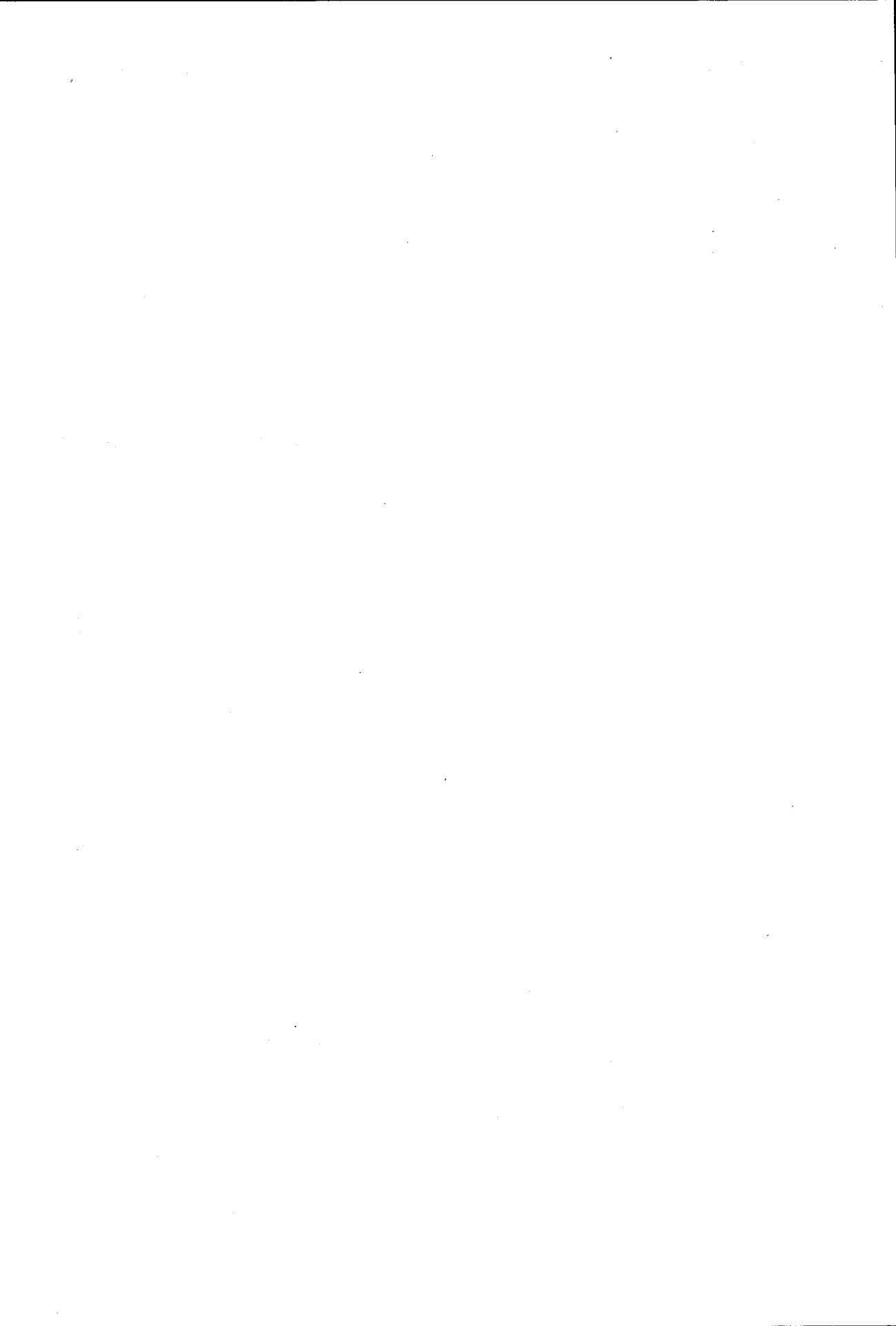
Composition: Albanie, Algérie, Bulgarie, Croatie, Chypre, Égypte, Espagne, Communauté européenne, France, Grèce, Israël, Italie, Japon (depuis avril 1997), Liban, Libye, Malte, Monaco, Maroc, Roumanie, Syrie, Tunisie, Turquie, Yougoslavie

Zone de compétence: Méditerranée, mer Noire et eaux les reliant

Fonctions principales: Favoriser le développement, la conservation et la gestion des ressources marines vivantes; formuler et recommander des mesures de conservation; favoriser les projets coopératifs de formation.

Note:

The planned Mediterranean Special Interest Group Discussion Session did not take place due to attendance and logistical problems, but during the course of the Conference the Discussion Chair, Jean Collins, did have informal discussions with various participants from Mediterranean and other North African countries, who generally showed enthusiasm for taking the concept forward. Discussions will therefore continue via email during the coming months. Background information relating to this initiative can be obtained from Jean Collins: jean.collins@fao.org.



EASTERN EUROPEAN REGIONAL REVIEW DISCUSSION SESSION

Chair: Maria Kalenchits (Estonia)

Participants: Olga Akimova (Ukraine), Snejina Bacheva (Bulgaria), Iracli Goradze (Georgia), Anastassia Ivanova (Russia), Valentina Khazova (Russia), Peter Pissierssens (France, IOC), Jadranka Stojanovski (Croatia), Jadviga Zdanowska (Poland).

According to the Provisional Agenda the topics covering various aspects of revision of the Eastern European Regional Review (prepared by Ian Pettman in 1996, at the request of the Intergovernmental Oceanographic Commission ¹) were intended to be discussed during the Session.

In order to more clearly identify the group of countries it was suggested by the participants that the definition "European Countries in Economic Transition (ECET)" should preferably be used instead of "Eastern European Countries". At the start of the discussion, the participants indicated the need for up-to-date information on the aquatic libraries and information centres in the region. A questionnaire was proposed as one of the possible tools of obtaining the necessary information. In order to improve the collaboration between the aquatic libraries in the region and recruit new EURASLIC members, some participants volunteered to identify and contact the aquatic libraries in their own and/or neighbouring countries (Anastassia Ivanova for Russia, Iracli Goradze for Georgia, Armenia, Azerbaijan; Maria Kalenchits for Latvia, Lithuania).

In the course of discussion the group agreed with the suggestion by Peter Pissierssens to concentrate efforts on identifying the needs and preparing specific project proposals rather than to produce an updated regional review. It was indicated that the projects proposed should take into account both the interests of concrete libraries and also to benefit to all EURASLIC members. Among the projects the preservation and digitisation of unique special collections, document delivery and regional training courses were suggested. The participants agreed to join into a temporary ECET Electronic Discussion Group to discuss the draft project proposals, which should be written by the end of the year. It was also agreed that for the discussion and assessment of the proposals they should be forwarded to EURASLIC Board. The participants would also expect that the EURASLIC Board advise them of possible sources of financing of concrete actual projects. Maria Kalenchits has volunteered to coordinate this activity.

¹ A summary of the state of information provision for the aquatic sciences in Eastern Europe: including recommendations for future actions in order to assure closer collaboration between Eastern and Western European aquatic sciences libraries and information centres and ensure mutual access/exchange of documents and information / Comp. by I. Pettman.- 1996



COUNTRY REPORT BELGIUM

MAPPING MARINE SCIENCE IN BELGIUM: RECENT DEVELOPMENTS IN MARINE INFORMATION ACCESS AND INTEGRATION

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INTRODUCTION

A concise directory of Belgian libraries and information centres – containing marine related information in their collections – is given. This shows a rather diverse and scattered picture, and for many years access to these collections was indeed not always easy. Universities, governmental institutions and private partners have always worked, and are still working 'at sea' but 'cooperation and coordination' have never been an important issue until recently. One of the consequences was of course that publication of, and access to marine scientific information was a battle in itself. The marine scientist or experienced researcher who already knew what he was looking for, could rely on personal communication, university libraries, and local information points to find his references and data, but all other parties (students, authorities, private partners, general public) have long been left out of this 'closed' circuit. A second aspect of poor information dissemination was the lack of references and data on local situations and publications in the local languages, Dutch and French. These publications were produced, but were often buried in private collections, administrations, archives, or even worse... in the dust bin.

However, this is a too negative picture of the situation. The scientific community has taken some excellent initiatives to provide information access for researchers, teachers and students. Two of the major tools developed in the past decade were a collective catalogue of serial publications, a collective catalogue of books, and a system to streamline interlibrary lending.

COLLECTIVE CATALOGUE OF SERIAL PUBLICATIONS

ANTILOPE is the Belgian union catalogue of periodicals held by the Royal (National) Library and other university, research and special libraries in Belgium. The number of

participating libraries increased from 4 in the first edition in 1973, to 31 in 1981 with the first national edition, and to 170 at the end of 1998. The number of titles increased from 6,000 in 1973 up to about 175,000 in 1998. The number of locations increased even more: from 7,700 in the first edition, 40,000 in 1981 up to 390,000 in 1998. A number of foreign library collections were included to streamline interlibrary lending; these collections include:

- TUD - Technische Universiteit Delft (NL) with 7,792 titles
- KNAW - Koninklijke Nederlandse Akademie voor Wetenschappen (Amsterdam - NL) with 24,433 titles
- BLUW - the library of the Landbouwniversiteit Wageningen (NL) with ca. 45,000 titles
- INIST - Institut national pour l'information scientifique et technique - FR with 25,527 titles
- BLDSC - British Library Document Supply Centre (UK) with 26,507 titles

COLLECTIVE CATALOGUE OF BOOKS

The CCB (Collectieve Catalogus van België / Catalogue Collectif de Belgique) contains almost 4.4 million bibliographic descriptions of monographs held by the most important Belgian academic or scientific libraries. The CCB is part of the *Union Catalogue of Belgian Research Libraries*, an initiative of the National Conference of University Chief Librarians and the continuation of a project initiated in 1989. The project management was given to the libraries of Universiteit Gent and Katholieke Universiteit Leuven. This catalogue contains two sections, the already mentioned ANTILOPE and the CCB. Both ANTILOPE and CCB are available on CD-ROM or via www.¹

Every library supplying its collection to these catalogues is automatically a supplying library for IMPALA, an automated ILL-tool, linked to the ANTILOPE/CCB- catalogue and accessible through the same web pages.²

ACCESS TO DATABASES

A more recent initiative to provide cheaper access to databases is called ELEKTRON. This project was submitted by the Council of Flemish Research Libraries (VOWB) to the Flemish Government (AWI = Flemish Administration of Science and Innovation), and aimed to set up a Flemish network for digital information. The feasibility of this project was investigated during a study, test and starting phase (1996-1998). During this demo-period it was shown that in Flanders there is a large audience for digital information and that an interactive information environment for a large group of users can be realised. In 1999 it was decided to purchase access to the following bibliographic databases:

¹ source of information: <http://www.libis.kuleuven.ac.be/ccb/>

² Description of ANTILOPE on the webpage: <http://lib.ua.ac.be/ANTILOPE/intro.html>

Web of Science ® Citation Databases 1972+
Current Contents Search ® 7 editions 1999 - 2000
Journal Citation Reports ® (JCR Web) 1999 - 2000
Econlit 1969+
ABI/Inform 1985+
Sociological Abstracts 1963+

The cost was about € 2,000,000. Since May 2000 these databases can be used effectively by the institutions (universities, high schools and scientific institutions) for which access is provided³.

INFORMATION FOR MARINE SCIENCE IN BELGIUM

The tools mentioned above are mainly suitable for large institutions and communities, such as universities or colleges, catering a broad spectrum of subjects to large groups of researchers and students. However, the (mainly Flemish) community of marine researchers needed more specific information (native language publications, grey literature, publications on local subjects, specialized databases such as ASFA, etc.), and also more metadata concerning the local marine situation. Only two small institutions were dedicated to work in this area, namely IZWO (marine research, ceased activities in 1999) and EAS (European Aquaculture Society⁴). Due to lack of substantial funding (in the case of IZWO), and the mainly international audience and very specific subjects (in the case of EAS), these two organisations were unable to fulfill the demands of the Belgian marine scientists.

To meet the special needs of the marine scientific community, the Flemish Government decided in 1999 to create the Flanders Marine Institute (Vlaams Instituut voor de Zee, VLIZ). A set of priority actions to be taken by VLIZ were determined. Two of these priorities are fundamental for access to marine information:

- Building the Flanders Marine Data and Information Centre (VMDC). The Centre assembles different types of data and information, implements international standards, and (re)distributes data nationally and internationally.
- Building an information and co-ordination centre for marine research in Flanders. VLIZ functions as co-ordination platform for policy, for the federal and institutional collaboration and for logistic support of the scientific research.

For the country as a whole, and the Flanders region in particular, this is the first time such priorities are actually worked out.

The objectives of the Flanders Marine Data and Information Centre are:

³ source of information:

<http://www.libis.kuleuven.ac.be/vowb/pubverslag/ELektrondescripEngX.htm>

⁴ <http://www.easonline.org/home/en/default.asp>

- To provide researchers, the government and those interested, with data and information, in a suitable and prompt way.
- To stimulate the network through means of centralisation to a maximum extent of the available data of research groups and governmental authorities, also on an international scale.
- To detect needs and to create series of data for interdisciplinary research, taking into account the accepted international standards.
- To integrate different types of data, including control of consistency and quality.

To accomplish these objectives, data exchange agreements have to be reached with relevant partners, in first instance with researchers in Flemish universities and federal institutes with similar objectives.

The speed and efficiency with which users can identify, locate, exchange and use marine data and information is an important factor for judging the quality of the services of the Data centre. If possible, the information will be disseminated through the World Wide Web. For specific target groups and datasets, CD-ROMs and DVDs can be provided.

In a first phase, a network of contacts is formed with authorities of the government, research and the private sector that manage data and information and/or dispose of marine scientific expertise, nationally and internationally. This information, together with meta-information about the datasets managed by these authorities, and the project in which they are involved, will be disseminated through the World Wide Web.

In addition, provision of services is also part of the agenda: the expertise of the VLIZ in data and information management can be made available to research groups, to create and disseminate products together. Also data management within the scope of interuniversity research projects and education are being considered.

International activities are undertaken through close collaboration with the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The Data Centre is the National Oceanographic Data Centre (NODC) for Flanders, and it is actively involved in several initiatives of the IOC Committee on International Oceanographic Data and Information Exchange (IODE).

One of the main databases created by VMDC is called **IMIS (Integrated Marine Information System)**. The objective of this database is to provide information on all topics relevant to marine sciences - be it people with their expertise, institutions and their mandate, publications, etc. Multiple gateways to this database (e.g. personal data, institutional information, published references, datasets, projects, conferences, infrastructure, etc.) provide completely integrated search and retrieval facilities. The ultimate purpose of this initiative is to draw a complete survey of the Belgian marine scientific landscape, as well as serving this same community in all its information needs and integrating the multiple marine scientific resources (i.e. information, data, expertise, infrastructure, etc.). Detailed information on IMIS is provided at the

IAMSLIC/EURASLIC Conference in Brest, 2001, and will be published in the Proceedings from this Conference.

International activities related to information for marine science

In recent years an International Training Course is organised at postgraduate university level, that can lead to an official GGS degree named Master in Ecological Marine Management. This is organised by co-operating universities. In this program a lot of attention is spent to information retrieval, management, and presentation.

Flanders also supports a project that is managed by UNESCO-IOC and that aims to establish a data and information network for marine science in Africa. This is named ODINAFRICA. Several experts from Flanders are involved as contributing experts.

CONCLUSION

After a long period of uncoordinated marine scientific activity, the country can finally coordinate all its marine scientific activities by means of the Flanders Marine Institute. In the domain of access to and availability of (marine) information, enormous progress has been made since 1980 (for broad scientific areas) and since 1999 (more specifically for marine related information) with the creation of VLIZ. Extensive information on the Belgian marine scientific community, its current realisations, projects, publications, will be accessible through one central access-point: www.vliz.be.

**CONCISE DIRECTORY OF BELGIAN LIBRARIES AND DOCUMENTATION
CENTERS PROVIDING MARINE SCIENTIFIC INFORMATION**

(entries marked with * manage a collection with a strong emphasis on marine subjects;
entries marked ** have a 100% marine-related collection)

Last revised 28 November, 2001

1. DWTI - DIENST VOOR WETENSCHAPPELIJKE EN TECHNISCHE
INFORMATIE
SIST - SERVICE D'INFORMATION SCIENTIFIQUE ET TECHNIQUE
Keizerslaan 4
B-1000 Brussel
Tel 02 519.56.40
Fax 02 519.56.45
E-mail mariette.beirnaert@stis.fgov.be
WWW <http://www.stis.fgov.be/>
Contact person(s): **Mariette Beirnaert; Bertha De Poorter**

2. EUROPEAN AQUACULTURE SOCIETY *
Slijkensesteenweg 4
B-8400 Oostende
Tel 059 32 38 59
Fax 0 59 32 10 05
E-mail eas@aquaculture.cc
WWW <http://www.easonline.org>
Contact person(s): **Hilde Joncheere**

3. FACULTÉ DES SCIENCES AGRONOMIQUES DE GEMBOUX
Bibliothèque centrale
Passage des Déportés 2
B-5030 Gembloux
Tel 081 62.21.03
Fax 081 61.45.44
E-mail bibliotheque@fsagx.ac.be
Contact person(s): **E. Bauduin**

4. **FACULTÉS UNIVERSITAIRES NOTRE DAME DE LA PAIX**
Bibliothèque universitaire Moretus Plantin
rue Grandgagnage 19
B-5000 Namur
Tel 081 72.46.26
Fax 081 72.46.28
E-mail peb@fundp.ac.be
WWW <http://www.fundp.ac.be/institution/autser/biblio/bump.html>
Contact person(s): **A.-M. Bogaert-Damin**

5. **GEMEENTELIJK HAVENBEDRIJF ANTWERPEN BIBLIOTHEEK ***
Entrepotkaai 1
B-2000 Antwerpen
Tel 03 205.21.92
Fax 03 205.20.21
E-mail jan.lochten@haven.Antwerpen.be
WWW <http://www.portofantwerp.be/>
Contact person(s): **Jan Lochten**

6. **INSTITUUT VOOR NATUURBEHOUD**
Bibliotheek
Kliniekstraat 25
B-1070 Brussel
Tel 02 558.18.11
Fax 02 558.18.05
E-mail bib@instnat.be
WWW <http://www.vito.be/emis/felnet>
Contact person(s): **Lieve Gossye**

7. **INSTITUUT VOOR TROPISCHE GENEESKUNDE**
Bibliotheek
Nationalestraat 155
B-2000 Antwerpen
Tel 03 247.62.41
Fax 03 248.11.33
E-mail sbuys@itg.be
WWW <http://lib.itg.be/>
Contact person(s): **Sarah Buys**

8. KATHOLIEKE UNIVERSITEIT BRUSSEL
Bibliotheek
Vrijheidslaan 17
B-1081 Brussel
Tel 02 412.43.12
Fax 02 412.43.46
E-mail stefan.mertens@kubrussel.ac.be
WWW <http://www.kubrussel.ac.be/>
Contact person(s): **Stefan Mertens**

9. KATHOLIEKE UNIVERSITEIT LEUVEN
Campusbibliotheek Exacte Wetenschappen
Celestijnenlaan 300 A
B-3001 Leuven
Tel 016 32.24.94
Fax 016 32.29.88
E-mail monique.kumps@wet.kuleuven.ac.be
Contact person(s): **Monique Kumps**

10. KATHOLIEKE UNIVERSITEIT LEUVEN
Centrale Bibliotheek
Mgr. Ladeuzeplein 21
B-3000 Leuven
Tel 016 32.46.06
Fax 016 32.46.91
E-mail ibl.leeszaal@bib.kuleuven.ac.be
WWW <http://www.bib.kuleuven.ac.be/bib/>
Contact person(s): **Jozef Peeters**

11. KONINKLIJK BELGISCH INSTITUUT VOOR
NATUURWETENSCHAPPEN
Bibliotheek
Vautierstraat 29
B-1040 Brussel
Tel 02 648.42.11
Fax 02 646.44.33
E-mail bib@kbinirsnb.be
WWW <http://www.natuurwetenschappen.be/science/library>
Contact person(s): **Laurent Meese**

12. KONINKLIJK BELGISCH INSTITUUT VOOR
NATUURWETENSCHAPPEN; BEHEERSEENHEID MATHEMATISCH
MODEL NOORDZEE EN SCHELDE-ESTUARUM *
Gulledelle 100
B-1200 Brussel
Tel 02 773 21 11
Fax 02 770 69 72
E-mail info@mumm.ac.be
WWW www.mumm.ac.be
13. KONINKLIJK MUSEUM VOOR MIDDEN AFRIKA
Leuvensesteenweg 13
B-3080 Tervuren
Tel 02 769 52 11
Fax 0 2 769 56 38
E-mail biblit2@africamuseum.be
WWW <http://www.africamuseum.be/Nl/Docdienst/docum.html>
Contact person(s): **Lucienne Di Mauro**
14. KONINKLIJKE BIBLIOTHEEK ALBERT I
BIBLIOTHÈQUE ROYAL ALBERT I
Keizerslaan 4
B-1000 Brussel
Tel 02 519.54.68
02 519.55.40
Fax 02 519.54.54
E-mail loanserv@kbr.be
WWW <http://www.kbr.be/>
Contact person(s): **F. Van Wijnsberghe**
15. LUC/RECOSCIX
Universiteitsbibliotheek
Universitaire Campus, Gebouw D
B-3590 Diepenbeek
Tel 011 26.81.29
Fax 011 26.81.26
E-mail annie.kuppens@luc.ac.be
Contact person(s): **Annie Kuppens**

16. SEA FISHERIES DEPARTMENT - DEPARTEMENT VOOR ZEEVISSERIJ *

Ankerstraat 1
B-8400 Oostende
Belgium
Tel 059-34 22 50
Fax 059-33 06 29
E-mail info@dvz.be
WWW <http://www.dvz.be/>
Contact person(s): **Frank Redant**

17. UNIVERSITÉ CATHOLIQUE DE LOUVAIN

Fac. des sciences exactes. Bibliothèque
Place des Sciences 3
B-1348 Louvain-la-Neuve
Tel +32-10-47 22 47
Fax +32-10-47 21 64
E-mail vancaster@bse.ucl.ac.be
WWW <http://www.sc.ucl.ac.be/BSE>
Contact person(s): **Francoise Pensis-Vancaster**

18. UNIVERSITÉ DE LIÈGE

Place Cockerill 1, bât. A3
B-4000 Liège
Tel 04 366.52.10
04 366.52.33
Fax 04 366.57.02
E-mail pret.interbib@ulg.ac.be
WWW <http://www.ulg.ac.be/libnet/pretint.htm>
Contact person(s): **M.-Th. Paques-Ledent**

19. UNIVERSITÉ DE MONS-HAINAUT

Bibliothèque Sciences - Médecine
Avenue du Champ de Mars 6,
B-7000 Mons
Tel 065 37.36.47
Fax 065 37.36.45
E-mail bibliotheque.fsfmp@umh.ac.be
WWW <http://www.umh.ac.be/Bibli/biblio.html>
Contact person(s): **Jean Pierre Petitjean**

20. UNIVERSITÉ LIBRE DE BRUXELLES
Bibliothèque
Campus du Solbosch Bât. D
50, av. F. Roosevelt CP 174
B-1050 Bruxelles
Tel 02 650.20.54
E-mail pib@ulb.ac.be
WWW <http://www.bib.ulb.ac.be/BST/>
Contact person(s): **Hervé Gilson**
21. UNIVERSITEIT ANTWERPEN
Universitaire Instelling Antwerpen
Bibliotheek
PB 13
B-2610 Antwerpen (Wilrijk)
Tel 03 820.21.52
Fax 03 820.22.48
E-mail michele.vandeneinde@ua.ac.be
WWW <http://lib.ua.ac.be/>
Contact person(s): **Michèle Van den Eynde**
22. UNIVERSITEIT GENT
Centrale Bibliotheek
Rozier 9
B-9000 Gent
Tel 09 264.38.57
Fax 09 264.41.96
E-mail libservice@ac.rug.be
WWW <http://sfxserv.rug.ac.be/>
Contact person(s): **Sylvia Van Peteghem**
23. VLAAMS INSTITUUT VOOR DE ZEE **
Victorialaan 3
B-8400 Oostende
Tel 059 34.21.30
Fax 059 34.21.31
E-mail janh@vliz.be
WWW <http://www.vliz.be/>
Contact person(s): **Jan Haspeslagh**

24. VLAAMSE MILIEUMAATSCHAPPIJ

Documentatiecentrum

A. Van de Maelestraat 96

B-9320 Erembodegem

Tel 053 72.64.42

Fax 053 71.10.78

E-mail n.luypaert@vmm.be ; d.notebaert@vmm.be

WWW <http://www.vmm.be/> ; <http://www.felnet.org/>

Contact person(s): **Nicole Luypaert, Dina Notebaert**

25. VRIJE UNIVERSITEIT BRUSSEL

Centrale Bibliotheek

Pleinlaan 2

B-1050 Brussel

Tel 02 629.25.03

Fax 02 629.39.72

E-mail pnieuwen@vub.ac.be

WWW <http://www.vub.ac.be/BIBLIO/>

Contact person(s): **Paul Nieuwenhuysen**

BULGARIAN COUNTRY REPORT

Snejina Bacheva
Institute of Oceanology
Varna, Bulgaria

Institutional changes and developments during the preceding twelve months that have impacted on library and information services include:

- An international project: *Centre for Sustainable Development and Management of the Black Sea Region (CESUM-BS)-2000-2003 (Contract ICAI-CT-2000-70031), 5FP*
This project was launched at the end of 2000 and aims at restructuring the research and expert activities targeted to long-range sustainable development of the Black Sea region through increasing regional and international co-operation and networking, providing user-friendly information media, improving quality of marine environment and quality of life for harmonization with the EC standards and environmental policy. Improvement of library and information services is also envisaged in order to meet the requirements of the team participating in the project and the Institute's staff as a whole. The first benefits for the library were: partial repairs of the library premises, an e-mail connection and partial funding for attending the IAMSLIC/EURASLIC Conference in Brest.
- Programme for Global Ocean Observing System (GOOS): *Complex Monitoring of the Bulgarian Part of the Black Sea.*
The Programme's goals and objectives are: to set up co-ordinated and scientifically based systems for the complex monitoring and prediction of the Black Sea variables in regional and national scale; to ensure long-term and regular observations on the physical, chemical and biological parameters and states of the marine environment and biota, to provide relevant information to governmental institutions for making decisions relating to protection and recovery activities for the sustainable development of the Black Sea as an unique water basin. According to the implementation for the programme, a new computer and Internet connection should be provided for the library.
- *Black Sea - NOAH Project. Joint Project with the USA Institute for Marine Research, 2001 -2003.* A project designed to look for evidence in support of the "Noah's Flood" theory of William Ryan and Walter Pitman. It will require provision of information and data in different fields of knowledge and it is expected to have some funds allocated to these needs.

Changes and developments in the library and information services during the preceding twelve months (e.g. staff; services; equipment; systems) include:

Partial repairs of the library premises.

E-mail connection.

Travel expenses for attending IAMSLIC/EURASLIC Conference in Brest

Subscription of some journals for 2002.

Library and Information Publications:

- Leaflets of newly acquired periodicals and other library acquisitions.
- A brochure of CESUM - BS (Centres of Excellence - 5th FP - EC) - presenting the goals and objectives of the Project, priority problems and expected results, illustrated with underwater photos from the Black Sea (in English).

Additional relevant information:

The Library of Institute of Oceanology as a part of the network of Central Library of the Bulgarian Academy of Sciences

CENTRAL LIBRARY of the BULGARIAN ACADEMY OF SCIENCES and ITS NETWORK

The Academic library network consists of the Central Library and the special libraries of the permanent academic units. It comprises 48 libraries with the Central Library at the head which supply information to the Bulgarian Academy of Sciences - the national research centre of Bulgaria. The library network contributes to a great extent to the creation of the national library collection.

The reforms carried out at the BAS in the last few years have caused changes in the management, structure and modernisation of the library activities. The library system of the Academy is a democratic institution, open and accessible for all citizens who want to use literature from its collections with direct or remote access. The Central Library is connected to world information resources through the Internet.

The special libraries are organised and directed methodologically by the Central Library according to the governing and technological requirements for the library and bibliographical processes, but they are administrative parts of the respective permanent units of the Academy.

According to the structure of the Academy the libraries are classified in nine groups: mathematical, physical, chemical, biological sciences, earth sciences. technical sciences, humanities, social sciences and special units.

At present the Research Group of Library Science and Bibliography and the New Library Technologies Department are developing an automated system (PERLIB/BOOKLIB - for periodicals and books) for cataloguing and management of the book stocks in the Central Library and the academic library network. Unfortunately, there is still a considerable lack of contemporary computer facilities which will be needed to build up the communication network.

LIBRARY OF INSTITUTE OF FISHERIES AND AQUACULTURE (IFA) - Varna

A governmental research institute established in 1932. Presently belonging to the National Centre of Agrarian Sciences.

The main scientific achievements of the Institute are published in 43 volumes of *Proceedings of the Institute of Fishing Resources* (the ex-name of the Institute), eight monographs and more than 200 scientific papers abroad.

Within its long-term history the Institute of Fisheries and Aquaculture has successfully participated in many national and international research projects and scientific expeditions carried out in different regions of the Black, Azov, Aegean Seas and the Atlantic Ocean.

IFA consists of three laboratories: Laboratory of Ichthyology, Laboratory of Marine Biology and Ecology, Laboratory of Hydrology and Hydrochemistry. Its basic activities include:

Multi-disciplinary studies of coastal and open-sea ecosystems based on routine monitoring of the Bulgarian Black Sea waters.

Development of knowledge and research methods in marine science.

Education and training of students and post-graduates in marine biology, chemistry, genetics and ecology.

Sustaining of public aquarium - lectures.

Development of public awareness, information service, support of NGOs activities.

Additional activities:

Consultation on the living resources of the World Ocean and the Black Sea, recommendations on optimal and sustainable use of the Black Sea living resources with respect to the marketing.

Environmental impact assessment.

Development of mariculture.

Support to the Bulgarian fishery and aquaculture sector.

The Institute houses an aquarium built between 1906 and 1912 according to the plans of the Bulgarian architect Dabkov with the help of the Italian professor A. Dohrn who supplied the plans and photos of the Naples Zoological Station. The official opening of the Aquarium was in 1932 and from that day on it has been a centre of promotion of the Black Sea flora and fauna. It consists of two parts living exposition (fish, turtles, mollusca, crustaceans, coelenterata, algae) and two halls with exhibits of stuffed animals, herbariums, shells, fossils, pictures.

PARTNERS

Membership in International Society for Study of Harmful Algal Blooms (ISSHA), American Fisheries Society, Association Francaise d'Halieumetrie, Foundation for European Ecological Education (FEEE), European Organisation for Study of Marine Mammals, CIESM - France, World Association of Copepologist (WAC), Bulgarian Union of Scientists, Bulgarian Botanical Society, etc.

LIBRARY:

It has more than 30 000 volumes of scientific books, reference books, periodicals in the field of marine biology, hydrochemistry, oceanography, ichthyology, fishery and fish industry, mariculture, aquarium matters. The library keeps unique old books and maps published in the 19th century. Presently it maintains interlibrary exchange with similar organisations from Europe, America and Asia, which is the basic source for provision of new publications. It has a computer where the new acquisitions are registered, but lacks electronic communications.

Due to administrative reasons the library is only open for four hours daily.

LIBRARY OF THE NAVAL SCHOOL 'NIKOLA YONKOV VAPTSAROV' - Varna

It was created when the School was opened in 1881. In 1948 a basic inventory of the library stocks was done and all old publications were given to the Naval Museum in Varna.

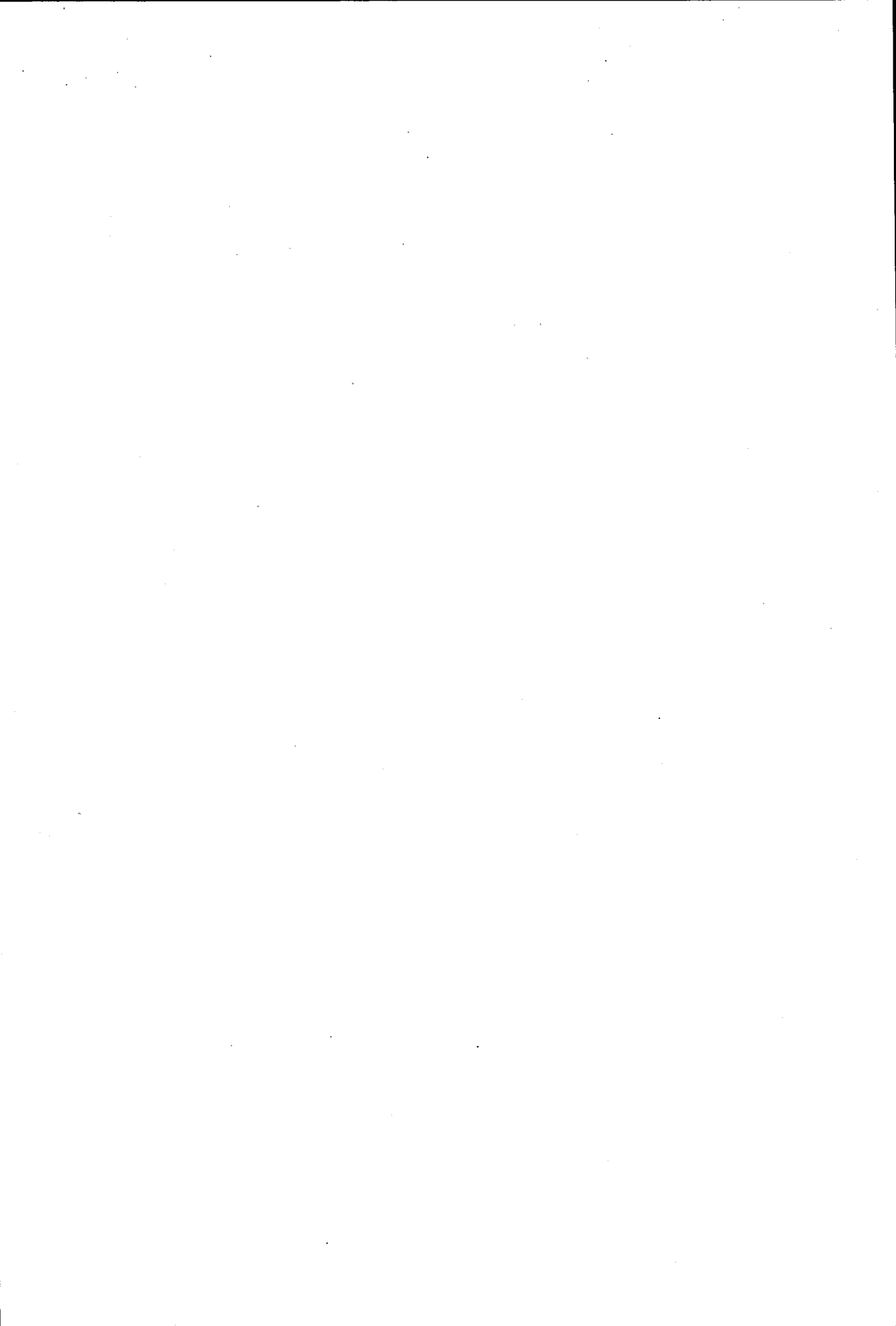
Library collections comprise about 112 000 volumes, one third of which are students textbooks. The rest include books, reference books, journals and special collections of governmental issues concerning rules and regulations of the Bulgarian Navy. There is also a special collection of 400 audiocassettes. The library has two computers and Internet access. It has developed its own automated system for library and information services. It has well organised loan service, comfortable reading room and offers services to about 2000 readers annually.

As the Navy School is the only one of the kind in the country its library collections are, to a great extent, unique for the country, too. Subjects covered include: warfare, military strategy and equipment, naval history, navigation, ship structure, ship guiding, exploitation of water transport, military psychology, foreign languages training, cybernetics and programming, communication systems, meteorology, oceanology, ecology, etc.

The Naval School has its own publishing centre which is the biggest publisher of specialised marine scientific and technical literature in Bulgaria. The centre publishes the best textbooks for our military education system and the library is the only one in the country which fully supplies the Naval School students with the necessary text books during their five-year course of training. The ambitious publishing programme includes fundamental books, reference books, dictionaries, series and issues of all professional spheres of the marine education. Special publications are *Collection of Scientific Publications of the Naval School* and *Marine Scientific Forum* (in four thematically compiled volumes), published biennially.

The library is open during the whole year six days a week for the Navy staff, military officers and the students of the School. It is run by a staff of four People.

Finally I would like to say that the idea for establishing a country association of the aquatic libraries and information centres was accepted by the librarians mentioned in this presentation and I hope to unite our efforts to make it reality.



CROATIA – COUNTRY REPORT

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There are six aquatic libraries in the country. Recent changes and developments in the country that have impacted on aquatic information provision include: network improvement; libraries collaboration; - ILL improvement; and several LIS projects.

Aquatic library and information networks within the country include:

Faculty of Science – Department of Geophysics Library, Institute of Oceanography and Fisheries Library and the Ruđer Bošković Institute Library are included in the project

Croatian Scientific Information System – Natural Sciences (<http://prirodo.irb.hr>), building together with another 23 libraries a comprehensive virtual library for the field of natural sciences.

The project Centre for online databases (<http://baze.irb.hr>) provides access to the commercial and non-commercial bibliographic and full-text databases for the academic and research community in Croatia.

The project Croatian Scientific Bibliography (CROSBIB) (<http://bib.irb.hr>) has the main goal to collect the data about scientific papers and current research projects financed by the Ministry of Science and Technology of the Republic of Croatia.

INFORMATION SUPPORT TO AQUATIC SCIENCES IN ESTONIA: A BRIEF OVERVIEW

Maria Kalenchits
Information Specialist
Estonian Marine Institute

There are about 10 libraries and information centres in Estonia related to the aquatic sciences to a different extent. Among them there is one aquatic special library (the library of the Estonian Marine Institute) and 2 universal public research libraries (Estonian Academic Library and the Library of the University of Tartu). The rest of the libraries are special libraries of research institutions, educational organizations and of a shipping company (the library of the Ministry of the Environment of Estonia, the library of the Estonian Maritime Academy, the library of the Institute of Botany and Hydrobiology of the University of Tartu, the library of the Institute of Zoology and Botany, the library of the Institute of Meteorology and Hydrology, the Technical library of the Geological Survey of Estonia, the Information Centre of the Estonian Shipping Company). In all of the above-mentioned libraries, except in the library of the Estonian Marine Institute, aquatic sciences is just one in the range of the subjects covered. Two of the Estonian libraries are members of EURASLIC and four of the libraries are members of the Section of Special Libraries of the Estonian Libraries Association (registered in 1999, to promote professional development, cooperation, and information exchange between libraries). Talking about the latest period in aquatic information provision in Estonia one may notice a certain progress in this sphere. The full text of several electronic aquatic journals became available to Estonian users as a result of agreements concluded by the Estonian Academic Library and the Library of the University of Tartu with Elsevier and EBSCO. In 2001 a licence allowing on-line access to the databases, maintained by the Institute of Scientific Information (ISI), was purchased by the Library of the University of Tartu. One of the most important sources of aquatic information in Estonia is the ASFA database. The Estonian ASFA Centre, acting as an input centre for aquatic information published in Estonia since 1996, provides multiple on-line access to the database from the library of the Estonian Marine Institute as well as at scientists' personal computers. On-line access to the database is also available from the library of the University of Tartu as a part of Cambridge Scientific Abstracts package purchased by the library.

In January 2001 the Estonian Marine Institute joined the University of Tartu (it was affiliated to the Ministry of the Environment before). A principal agreement has been achieved to get a free on-line access from the library of the Estonian Marine Institute to electronic journals and databases subscribed to by the Library of the University of Tartu, however some technical problems are not yet resolved.

The State Environmental Monitoring homepage, accessible since 2000, has helped the provision of aquatic information to the public and scientific community. Unfortunately, the Estonian Marine Institute homepage does not yet provide comprehensive information about the institute's activities.

Turning back to the aquatic libraries one could mention that all libraries related to the aquatic sciences and shipping are equipped with computers and maintain digital databases using either CDS-ISIS or ProCite software. The digital catalogue of the collections of the universal public research libraries is accessible *via* Internet. Finally, a few words about the bibliometric analysis of publications by the scientists of the Estonian Marine Institute, that has been carried out in the Library of the Estonian Marine Institute in 2000-2001. The bibliometrical methods used in research are productivity analysis and citation analysis. The research undertaken is probably one of the first attempts to evaluate the scientific productivity of one specific scientific institution in Estonia by means of the analysis of scientific publications. The productivity analysis was based on the bibliographical index including 378 records of the monographs and articles published by the scientists of the institute during the period 1993-1999. Data on the type, language, place of publication, number of co-authors and their geographic location, number of publications reflected in the ISI databases "Current Contents" and "Science Citation Index" were investigated. The citation analysis based on the data from the "Science Citation Index" was aimed at collecting information and drawing conclusions on the sphere of influence and the interest to the results of the Estonian marine research. The justification of self-citation as well as the relation between co-authorship and the citation trends were also investigated. 177 articles published by the EMI scientists in foreign and leading Estonian journals were selected for the citation analysis. All together 133 citations to the 50 articles were identified. It has been confirmed that publications written in international co-authorship are more intensively cited than publications authored by only Estonian scientists. Recommendations to the scientists and administration of the institute, concerning the improvement of productivity and citedness have been made.

COUNTRY REPORT OF THE LIBRARY AND INFORMATION SERVICE OF THE FINNISH ENVIRONMENT INSTITUTE (SYKE)

The Finnish Environment Institute (SYKE) is the national environmental research and development centre of the environmental administration. Research and development in SYKE deals with changes in the environment, cause and effect relationships, means of resolving environmental problems and effects of policy measures. SYKE is the national environmental information centre and provides expert services and takes care of certain national and international statutory tasks. There are 600 persons working in SYKE and 2 000 persons working in the whole environmental administration of Finland.

The library and information service of SYKE is a scientifically specialized library on environmental issues open to everyone and also for outside customers. The library works in close co-operation with the experts of the environmental administration and with other specialized libraries, too. There are 10 people working in the library. We also have a library in the Ministry of Environment. Finland is divided into 13 regional environmental centres and there is a library in each of them.

A new project for SYKE has been as a partner of European environmental research centres.

The other partners are Green World Research Centre in Netherlands, Centre for Ecology and Hydrology in United Kingdom, National Environmental Research Institute in Denmark and Centre for Environmental Research in Germany. Last August the research centres had a meeting at the Finnish Environment Institute. This alliance should, for example, develop and promote common strategies at the institutional level and develop a formal agreement to work together in selective areas.

In the Finnish Environmental Centre we are also experiencing "the sea of change" and those changes impact on the library. At the moment our institute is divided into 13 divisions and the library is situated in the Information and Education Division. From the 1st of January 2002 we will only have four divisions and the library will belong to the Information centre together with technical ADP, electronic publications and network services. I think this change will be very a suitable solution for the library. Other changes in SYKE will include renewing of our Internet web pages and Intranet system as well as our logo and the whole graphic, visual images will be changed. We will also get a new text editing system. A big change will be of course the new currency, Euro. Last year was a very successful period for the library and information service. We have received a new task and the library is now the information portal of the data registers of SYKE. This means that we have to take care of information services of the data registers concerning, for example, water quality and hydrology. Also, if outside users want to get a user licence for the registers, the library takes care of the agreements. We also maintain the network of information providers of the registers. On the whole, our activities have developed together with other network information and knowledge

management tasks in the environment administration. Especially I am very happy about the progress in the libraries of regional environmental centres. At the moment we have a working group whose task is to develop a new strategy for the library and information activities of the environment administration. In the area of electronic journals we have made progress with Elsevier journals. The Finnish Electronic Library, FinELib, is at the moment negotiating an agreement with Elsevier. It seems that from the 1st of January 2002 there will be a new consortium in Finland and we have 1 200 Elsevier journals in our collections. Currently we already have those journals in use because we have a test period in progress.

The environment administration has made an agreement about publishing every fourth year a product concerning the state of the Finnish environment. Thus there has been published a new CD-ROM multimedia called *The Finnish Nature : State of the Environment* in our division. That product has been published in Finnish and in Swedish and it's the result of a project that lasted for four years. The product has been very popular, for example, in schools.

One setback we also have is our library ADP system. We have a common system in the whole environment administration and it's now nearly ten years old. We have fought to get a new tool but have not succeeded. Now it seems that we will get a new system the 1st of January 2003. Fortunately anyway, some years ago we got a new application to the old system and it made it possible to create the search forms of our databases on the Internet.

What about our national matters? The university libraries have started to use a new library ADP system called *Voyager*. The old system, *VTLS*, was in use for ten years. The role of FinELib, the National Electronic Library, has continually become stronger. Its aim is to support research and teaching in Finland. FinELib acquires Finnish and foreign electronic material for Finland, such as scientific journals and databases for specialist fields. FinELib manages the complicated licence negotiations with the information producers. After that the libraries can form a consortium and buy those information products.

The Finnish Virtual Library Project has been developing all the time. It is a subject gateway service, which offers descriptions of Internet resources by subject field. It has been constructed to serve the Finnish science community from students to researchers: the material included complies with strict selection criteria.

This era is also a period of strategies as everything is changing all the time. National strategies concerning libraries and information services called higher education policy in Finland, Education, training and research in the information society and political program of Finnish libraries have been developed.

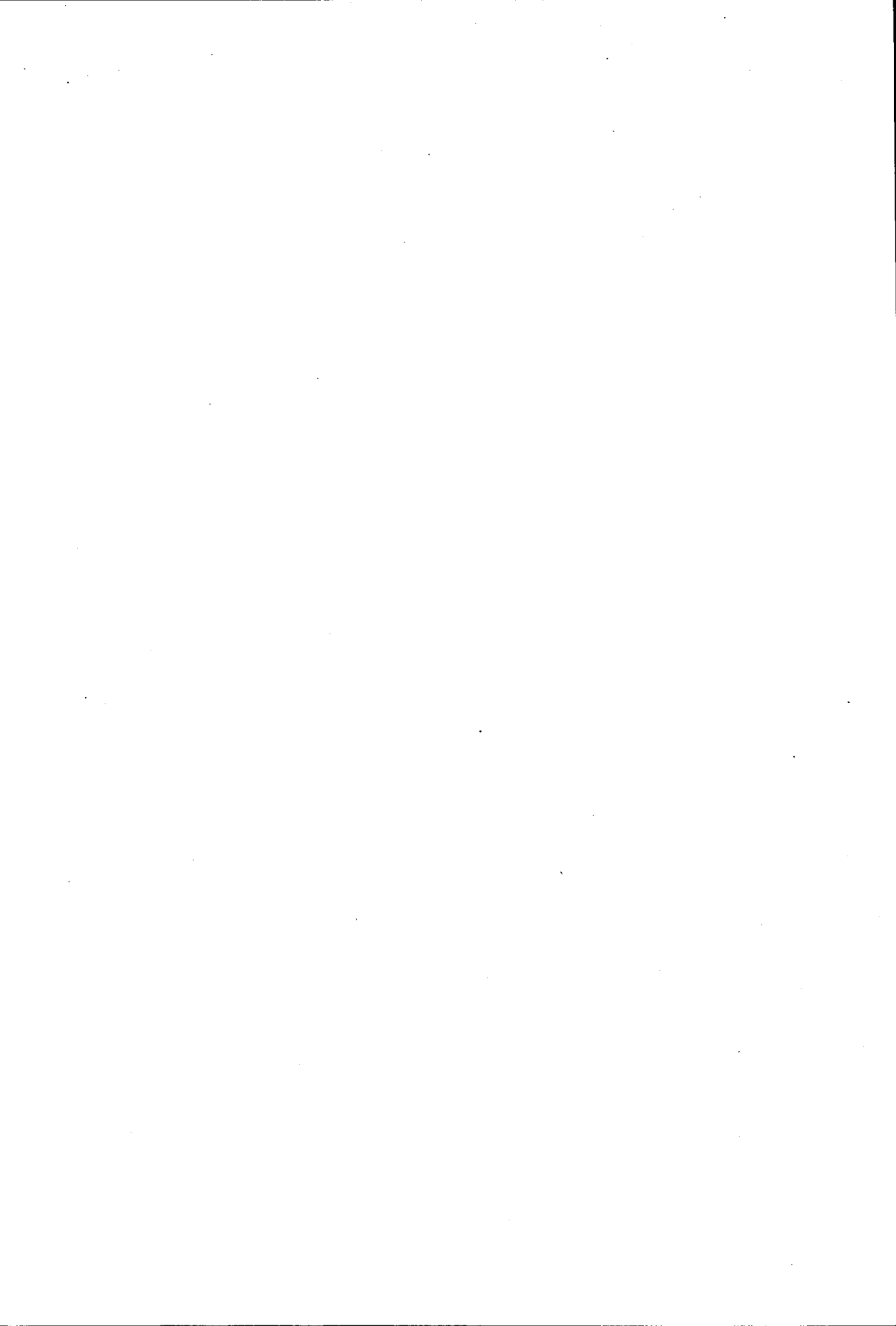
In Finland we have also discussed the new competencies of our professions a lot. Our work has changed so dramatically that the old professional standards are no more valid. Electronic publishing is in a very good condition and an everyday routine in Finland. The new concern now is how to guarantee the availability of those electronic products even after 50 or 100 years, when the ADP programs and hardware have changed. The University of Helsinki - the National Library of Finland now has a working group to clarify the difficult problem of archiving system.

The situation of special libraries has become better and better all the time. Now a lot of improvements have happened. We have a working group of special libraries inside The Finnish Research Library Association. We have arranged seminars and excursions, provided information about tasks, role and importance of special libraries and developed a position of special libraries in the national strategies. I think our work has been very important and succesful.

Our concern up until now has been the Finnish library policy for university and public libraries, yet not a policy for special libraries. From the national point of view it is a big setback that the Ministry of Education is not to be responsible for the whole national information policy. Unfortunately it only takes care of the role of university and public libraries.

The new trend is to establish large university campus libraries and connect separate special libraries of research centres with them. Perhaps those operations save money but, at the same time it has resulted in a loss of valuable special collections and skilled staff. In the long run the level of national library services is likely to get worse at the expense of efficiency and economy.

Anyway, it is very fascinating to work with environmental information, with the new challenges, in the sea of change.



FRANCE - COUNTRY REPORT

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OMER : the French Group

To encourage a larger participation in IAMS LIC-EURASLIC's conference in Brest the French group (almost 60 libraries and information centres) has not met in 2001, but the network is busy. Personal relations established over a long time ensure that problems are resolved and projects can be achieved

During the 18th annual meeting of the "Groupe Bibliothécaires et Documentalistes des Sciences de la Mer et des Eaux " (Marseilles, Station marine d'Endoume, March 30, 2000, about thirty attendees) it was decided to create, via a discussion list on the Internet, an exchange of information. The rapidly organized OMER list, (in charge: our colleagues of the Association Villes et Ports, Le Havre) allows fruitful exchanges of information.

Among the subjects evoked during the meeting, one can quote aspects of documentary data processing, practical applications for our libraries, access update of electronic publications in the libraries of our group and the COUPERIN consortium (grouping of French libraries for access to electronic reviews).

Naturally, the massive arrival of electronic periodicals, coupled with budgetary cuts, puts collections in great danger. The solutions are only collective and national: the consortium of libraries for the acquisitions of electronic periodicals (COUPERIN). Cambridge Scientific Abstracts has also made an interesting proposition to our group considering us as an entity and so within the framework of a consortium, a certain number of OMER libraries signed up for internet access (multiposts) to Cambridge Scientific Abstracts Internet Data Base Service for ASFA - Aquatic Sciences and Fisheries Abstracts, and Oceanic abstracts - in 2001.

The group, although of different administrative origins, is always keen to unite its forces regarding a documentary shared policy (even for subscription cancellations): namely regional title preservation and shared acquisition facilitated by the installation of the "Système Universitaire de Documentation" (SU-Catalogue) and the constitution of COLLECTIVE CATALOGUE OF FRANCE, piloted by the National Library of France (BNF).

OMER's next meeting is envisaged in 2002 in Cherbourg where a large participation is hoped for.

(OMER = EauxMer)

GEORGIA - COUNTRY REPORT

Irakli Goradze

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Georgia

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Fax: + 995 222 74642(43)

Email: mefri@batumi.net

Web/Internet: <http://mefri.iatp.org.ge>

The library of the Georgian Marine Ecology and Fisheries Research Institute is the only specific library in the fields of marine biology, ichthyology and eco-toxicology in the country (see the Institution report). There are other libraries containing inter alia aquatic studies related information such as: Library of Institute of Zoology of Academy of Sciences of Georgia; Mikeladze Scientific Technical Library; Tbilisi State University; Batumi State University; Scientific technical Information Research Institute - "Techinformi" (accommodates FAO depository library)

During the last decade the country has faced socio-economic and political crises after the break-up of the USSR. Georgia's participation in the Bucharest Convention (Protection of the Black Sea against pollution) and involvement in a number of projects within the Black Sea Environmental Programme (BSEP) have been the major factors contributing to the production of aquatic information in the region. Under the BSEP the series of publications called Black Sea Environmental Series (over 10 volumes), were published by BSEP/UN Publications. A number of projects aimed at the provision of scientific-technical (survey and monitoring) aquatic information were undertaken in the country within BSEP and other regional programmes.

One such regional (Trans-Caucasian) programme that has been initiated recently is called Water Management in Southern Caucasus, funded by the USAID funds and covering the catchments of R.Kura and Arax. One of the outputs of this project will be the establishment of three National and one Regional Information centres focusing on collection/storage, analysis and dissemination of (mainly water qualitative and quantitative) information.

Another major source of the provision of aquatic information in the country will be the World Bank/GEF funded Georgian Integrated Coastal Zone Management (GICZM) project, implementation of which is currently underway. One of the five components of the programme will be about the establishment of a Coastal Environmental Quality Monitoring and Information System (CEQMIS). This system will build on and

strengthen Georgia's existing monitoring capacity, and provide essential environmental quality data for decision-makers, the general population and environmental institutions in the Black Sea region.

A number of economic development schemes along the Georgian Black Sea Coast, such as construction of oil terminals and reconstruction of ports include Environmental Impact assessment and associated routine environmental monitoring activities, will surely contribute towards generating aquatic information.

With respect to the information network on the Black Sea regional level it should be noted that, under the Black Sea Environmental Programme, thematic Activity Centres were established in all the littoral countries, and to facilitate the regional work of the activity centres, each country has hosted relevant focal points. In Georgia the Biodiversity Activity Centre was established at the Georgian Marine Ecology and Fisheries Institute, which co-ordinates work of the Black Sea Regional Advisory Group on the Conservation of Biological Diversity. The Istanbul Commission Secretariat co-ordinates the work of the centres. At the same time the Commission Secretariat co-ordinates activity of the advisory group on information and data exchange.

Addresses and contacts of libraries:

1. Georgian Marine Ecology and Fisheries Research Institute;
Black Sea Regional Activity Centre for Biodiversity Conservation
51, Rustaveli Str. P.O. Box 58
384500, Batumi, Georgia
Director. Dr. Akaki Komakhidze
Tel: (+995 222) 74640
Fax: 74642(43)
email: mefri@batumi.net

2. Institute of Zoology of Academy of Sciences of Georgia
31 Chavchavadze Str.
380079, Tbilisi, Georgia.
Dr. Irakli Eliava,
Tel: (+995 32) 220164, 223353

3. Mikeladze Scientific Technical Library
47 M. Kostava Str. 380079
Tbilisi Georgia.
Director: Mr. Nugzar Goxadze
Tel: (+995 32) 98 95 36(37)

4. Tbilisi State University
1, Chavchavadze Ave.
380028, Tbilisi Georgia
Contact: Erekle Astakhishvili
Department of Internal Relations
Tel: (+ 995 32) 225679, 220241,
Fax: 221103.

5. Batumi State University
35 St. Ninoshvili, Batumi
384500, Georgia
Rector: N. Verd zadze
Tel: (+995 222) 71780,
Fax: (+995 222) 71787,
email: univer@batumi.net

6. "Techinformi" - Scientific Technical Information Research Institute
FAO depository library
47 Kostava Str. 380079
Tbilisi Georgia
Contact: Tsitso Dosmishvili
Tel: (+995 32) 334032
Fax: 987618
email: agro@tech.org.ge

**GEORGIAN MARINE ECOLOGY AND FISHERIES RESEARCH INSTITUTE -
LIBRARY/INSTITUTION REPORT**

Irakli Goradze

Georgian Marine Ecology and Fisheries Research Institute
Black Sea Regional Activity Centre for Biodiversity Conservation,
51, Rustaveli Str. P.O. Box 58,
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Contact details of Librarian:

Name: Svetlana Baibulatova

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Email: mefri@batumi.net

Web/Internet: <http://mefri.iatp.org.gr>

The major changes started 12 years ago, since the break-up of the USSR.

The Institute was established in 1931 as a marine biological station. Until the late 80s it was the Georgian branch of Soviet Scientific Research institute of Fisheries and Oceanology (VNIRO) under Soviet Ministry of Fisheries. After the break-up of Soviet Union since 1991 the institute comes under the Ministry of Environment of Georgia as the Georgian Marine Ecology and Fisheries Institute. In 1994 at the institute, under the UNDP GEF funded Black Sea Environmental Programme (BSEP) the Black Sea Regional Activity Centre for Biodiversity Conservation was established.

Until 1990 during the Soviet time the Institute library, as the part of VNIRO, had direct connections with all other similar libraries and the exchange of information and Cupertino took place. The library used to be supplied with the annual "exchange fund directory" with all the references that could have been exchanged among the scientific-technical libraries according to the different fields. The priority aquatic areas for the institute/library were:

- Fisheries and aquaculture
- Hydrobiology
- Marine mammals
- Ecology-toxicology
- Seafood technology.

Since 1991 all the existing links have been broken, and the library has become somewhat isolated. The situation was worsened by the continuous economic difficulties in the country and under-financing of the institute from the government. During 1991-2000 the library did not significantly increase its book collections.

Some improvements in aquatic information provision occurred after the institute became involved in the Black Sea Environmental Programme. Under different phases of this programme, the institute has compiled and produced several publications, e.g. *The Black Sea Biodiversity Georgian National Report*, published in 1998 under the Black Sea Environmental Series by UN environmental publications; *The Biology and Status of the Black Sea Salmon (Salmo trutta labrax)*; *Black Sea Salmon Conservation Strategy*, produced in 2000 under the EU TACIS Black Sea Salmon Project, etc.

During 1999-2000 under the EU TACIS BSEP project Support to the Black Sea Regional Activity Centre for Biodiversity Conservation, the institute/library has received a limited amount (20 books) of various modern literature related to aquatic science and biodiversity, mostly identification guides. No technical maintenance support was provided.

Under the same EU TACIS programme the Institute had the opportunity to perform the seasonal marine and wetlands biodiversity surveys along the Georgian Black Sea coast, which has enabled the institute to collect up-to-date information for the last 10 years. Currently institute research staff are working on producing the biodiversity report, and the institute is seeking means to publish it.

The bibliography of Georgian Black Sea Biology publications (years 1929-1995; 452 items) was prepared in 1995 for inclusion into the 2nd volume of the Black Sea Bibliography, as a part of the Black Sea Environmental Series under BSEP. Eventually it was not published. The bibliography is now used internally in the Institute.

Under the EU TACIS the Institute has received small-scale publishing equipment (copying machines, thermo-binder etc.). Some publications have already been produced within the institute using this equipment.

We have recently applied to EURASLIC for associate membership.

The institute/library is the only one of this kind in the country. Being a scientific-technical one, the library is relatively small sized. There are 7214 books, not including journals and articles. The library is served by one staff-librarian. The library also has an archive of all the scientific articles and reports produced within the institute since 1956. The earlier materials (1931-1856) are kept in the central archive of the town.

The resources of the library are used not only by the institute personnel, but the Batumi State University (Biology, Water Bio-resources Department) and Tbilisi State University (Hydrobiology and Water Eco-toxicology department).

Current Needs

1. Supply of up-to-date professional-aquatic information, as well as modern methodology and instructions regarding library management.
2. Equipment and means for establishment of an electronic cataloguing system.
3. Membership in professional bodies.

RECENT DEVELOPMENTS RELEVANT TO THE AQUATIC SCIENCE LIBRARIES, GERMANY

Barbara Schmidt
Institute of Marine Research
Kiel

Over the last two years the AmB (Arbeitsgemeinschaft meereskundlicher Bibliotheken = Organisation of marine science libraries in Germany) has finished to putting their joint journals catalogue on the web and it can be used now from all over the world. You are all, of course, welcome to have a look at it and use it for interlibrary loan.
(URL: [https://gwdu64.gwdg.de/pls/amb/BSUCHEN\\$ZS1.Startup](https://gwdu64.gwdg.de/pls/amb/BSUCHEN$ZS1.Startup))

At the beginning of this year the AmB formed a consortia to buy ASFA-online from CSA. Up to then most of the German libraries used the Silverplatter single user licence and we are happy that we can now deliver the online edition. It is almost the same price and much more effective.

At the end of 1999 the Biologische Anstalt Helgoland was dissolved for good and the collections were incorporated into the library of the Alfred-Wegener-Institute in Bremerhaven. Most of the books and journals are now, together with the collection of the Alfred-Wegener-Institute, part of the Common Library Network of seven Northern German Federal States, as well as the collections of the German Maritime Museum in Bremerhaven and the Baltic Sea Research Institute in Warnemünde. You can search within their catalogues using the following Web-address:
<http://www.gbv.de/en/>

At the beginning of July 2001, the German Research Foundation granted funds to the University of Bremen to set up a new marine research center. In the coming years, climate development and sedimentation processes, the biogeochemistry of the sea floor as well as, among other things, the effects of the construction of ports in coastal regions will be investigated in the new "Research Center Ocean Margins"
(URL: <http://www.oceanmargins.de/>)

A cooperation contract was signed between my Institute of Marine Research and GEOMAR – both Institutes are going to form a new and larger Institute of Marine Research in the near future. Another cooperation contract is due in 2003 between the Max-Planck-Institute for Meteorology, the Institute of Hydrobiology, the Institute of Oceanography, the Meteorological Institute, the Institute of Geophysics and the Institute of Biogeochemistry in Hamburg. Together they will form the new Center for Marine and Atmospheric Sciences with one central library. (More information:
<http://www.mpimet.mpg.de/>)

Our library software BISLOK was updated to Aleph, Ex Libris.

Our annual report will not be printed any longer, but published bi-annually on the website.

You can get more information about the German Group of marine science libraries at the following URL: <http://www.terramare.de/amb/>

**IMBC LIBRARY REPORT
FOR THE 27th ANNUAL IAMSLIC CONFERENCE & 9th
EURASLIC CONFERENCE (Brest 14-18 October 2001)**

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Heraklion, Crete, Greece

BACKGROUND

The IMBC Library was created in 1989 when the newly established Institute moved to the present harbor site in the port of Heraklion City in the Island of Crete and constitutes the second library in Greece on the aquatic sciences.

Provision was made for its collection of marine science literature to be housed in a very small library. It was not an easy time to set up a library as soaring costs for books and journals forced the rationalization of library resources on a worldwide scale. However, some small-scale funding for the collection had been forthcoming from the NATO Science for Stability program FISHECO and so a start was made.

LIBRARY RESOURCES

In Greece, aquatic libraries are attached to research institutions and generally are rather small. New establishments concentrate on collections of journals specific to scientific user needs.

The IMBC hard copy collection remains very small, roughly 800 books, more than 8000 reprints and 18 journals. The major areas covered are:

- aquaculture
- environmental impact assessment
- environmental studies
- fisheries biology and management
- fisheries technology
- marine biology
- marine chemistry
- marine ecology
- marine geology
- marine mammals
- marine microbiology
- marine pollution
- oceanography

It also contains two CD-ROM databases

- World Biodiversity
- Aquatic Sciences and Fisheries Abstracts (ASFA)

No computerization development was possible until 1993 when IMBC was linked to the University of Crete library database, transforming the situation overnight. The outpost down in Heraklion harbor at last had the opportunity to join the ARIADNE Network of Greek academic and research centers and ARIADNET, which links Greece to the rest of the world.

IMBC COLLECTED REPRINTS

Two volumes of Collected Reprints (1987-1991, 1993-1994) have already been compiled, with a third Volume (1995-96) almost ready for distribution. These have been widely distributed throughout Europe. The IMBC is seeking to establish links in collaboration in the exchange of journals and publications with other libraries, which specialize in marine sciences. Towards this end, in a new initiative for the Greek research libraries the IMBC has made the abstracts of these volumes available on-line and provided easy facilities for ordering reprints.

ONLINE BIBLIOGRAPHIC SERVICES

Within two months of the construction of the IMBC World Wide Web site (November 1995), a decision was made to provide free online access to abstracts from Workshops, seminars, and symposia hosted by IMBC. To date, the extended abstracts from the MAST MTP workshop (Feb 1996), the 28th EMB Symposium and MEDCOAST 95 have been available in this way, enabling hundreds of users throughout the world to have direct access to these materials.

From 1997 the IMBC library has been also linked up with HERMES information system, created by the Greek National Documentation Center. This system contains the Union Catalogue of Scientific Periodicals in Greek Libraries. This database can be used online to locate details of journals held in more than 250 scientific libraries in Greece. The library of IMBC as a member of the Greek Research Libraries Consortium has access in 3500 E-Journals full text from the above publishers:

ACADEMIC PRESS
ELSEVIER SCIENCE
KLUWER
SPRINGER VERLAG

LIBRARY PROJECT

Since October 1996 the IMBC Library has participated in the EPET Program run by the General Secretariat for Research, Industry and Technology. The aim is to extend and upgrade the existing infrastructure, mainly in the state-of-the-art electronic equipment nowadays essential to cover future needs for participating in national and international networks in the 21st century. In the framework of the above mentioned program the library has purchased:

- New building 60 m²
- Library furniture from BTJ
- Library software Geac Advance V6.7, Z3950 server Geopac
- Optical scanner: Fujitsu 3097 E with ADF
- Rank Xerox 5334 copier
- 1 laser printer HP 5si MX
- 1 Epson stylus color 800
- 1 dot matrix printer Star LC24-10
- 1 bar-code scanner

The library has installed:

- Server (Sun Ultra-1 @167MHZ)
- Software for the server
- RAID system 8GB to the server (RAID = system of hard disk with security level without loosing the data even if destroyed one hard disk)
- CD-ROM server 7 units to share CD-ROMs with LAN
- Web server

LIBRARY TOOLS

The library uses the following tools:

- Anglo-American Cataloguing Rules, 2nd Edition 1998 Revisions&1993 Amendments Electronic Version 1.0/ CD-ROM Format
- DEWEY for Windows CD-ROM Version and DDC -21 print version
- CDMARK Bibliographic
- CDMARK Subjects
- CDMARK Names

FUTURE PLANS

At the end of 2001 it is anticipated that the IMBC library will move to the new premises comprising 300m² within the new IMBC buildings. The new library will be fully equipped for the 21st century and will have the latest version of library automation system

Geac Advance as well as new hardware. It is hoped that by the end of 2002 the library will have a new Web page and the new OPAC fully searchable via the WWW.

In spring 2001 a major event concerning the future of marine science in Greece took place: Our Institute, the IMBC, was unified to the National Center for Marine Research (NCMR) in Athens to form the Hellenic Center for Marine Research (HCMR). It will comprise 5 Institutes, three located in Athens and two in Crete. The joint forces within the new library will have to face the challenges for marine research in the new century.

POLAND: COUNTRY REPORT FROM FISHERIES INSTITUTES

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In Poland there are two fisheries institutes, Sea Fisheries Institute (SFI) in Gdynia and Inland Fisheries Institute (IFI) in Olsztyn.. The former is studying marine and coastal environments, marine biology, ecology and oceanography, the latter – the fisheries and biology of freshwater environments. The IFI fulfils function of documentation centre for Polish fisheries literature, which is elaborated also to international information systems. The SFI co-ordinates documentation of Polish fisheries journals for ASFIS.

In 2001 the SFI celebrated its 80th anniversary, and IFI its 50th anniversary of activity. The jubilee celebration was an opportunity to demonstrate their scientific teams, studies, collaboration with different institutes and dissemination of new technologies – in short – it was the occasion for many summaries. The SFI celebrated its jubilee in June, the IFI in October 2001.

Besides two fisheries institutes, in Poland there are some other scientific centres, for example Institute of Meteorology and Water Management in Warsaw, Maritime Academy in Gdynia, Institute of Oceanology in Sopot, where water environments are studied. Many Polish scientific centres possess computerized library collections using ISIS or ALEPH software and almost all have access to the Internet. In the near future we hope that integration and co-operation with scientific institutes of the European Union will be possible on a partner basis.



ST. PETERSBURG'S HYDROLOGICAL LIBRARIES

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It would not be an exaggeration to say that St. Petersburg is one of the largest "library cities" of the world. By the beginning of the 90s there were more than 3,000 library and non-library book depositories in the city. The joint stock of St. Petersburg's libraries contains about 250 million volumes. There are large general-purpose libraries in St. Petersburg, such as the Russian National Library and the Library of the Russian Academy of Sciences. There are also small specialized libraries.

Many of the libraries are united in library systems or networks. For example, the Russian National Library has a lot of branches in different parts of the city and at the same time it is a center for all the public libraries of St. Petersburg and the northwest region of Russia. The Library of the Russian Academy of Sciences has a network of libraries in academic research institutes. This network consists of 32 institute libraries; their collections and reference resources form a single collection together with the collections and catalogues of the main library. The libraries affiliated with different state institutions, as a rule, exist independently, though in recent years one can see a tendency to integrate the academy and university libraries. This is embodied in the development of joint projects aimed at informational support of scientific research within the framework of specific financing. As for the specialized libraries (including hydrological libraries belonging to various state departments), interlibrary loans are the sole form of co-operation among them.

Intended by the Peter the Great to be a "window to Europe," today's St. Petersburg is a major scientific and educational center of Russia, the largest port of the northwest of the country, and the main naval base in the Baltic Sea. Each of these aspects brings into being related library services. The services can be subdivided into five categories: libraries of research institutes, libraries of planning institutes, libraries of universities, libraries of companies and expeditions, and naval libraries. Apart from general purpose libraries, there are 45 specialized libraries in St. Petersburg which possess literature on hydrology. The joint collection of these libraries has almost 7 million volumes of books and periodicals.

The libraries of research institutes located in the city. There are 12 libraries of research institutes specializing in the analysis of marine and fresh water. Their joint collection has more than 1.5 million volumes. Among these libraries are the libraries of the Institute of Oceanology, the Institute of Limnology, the Hydrological Institute, and the Arctic and Antarctic Research Institute. The Zoological Institute of the RAS and the National Research Institute of Lake and River Fish Economy are engaged in research on marine and freshwater hydrobionts. They have their own libraries.

The libraries of universities. The library of the Marine Technical University and libraries of educational institutions preparing civil specialists in marine and fluvial navigation belong to this category, which consists of six libraries in total. Their joint holdings amounts to 2.3 million volumes, including domestic and foreign literature on hydrology, meteorology, navigation, ecology, etc.

The libraries of planning institutes own literature on applied hydrodynamics, fluid mechanics, hydrological engineering surveys, hydrotechnic building, shipbuilding, ecology, etc. In total there are eight libraries of this kind in St. Petersburg with joint holdings of 703,000 volumes.

The libraries of companies and expeditions possess literature on shipbuilding, geological oceanography, hydrometeorology and monitoring of the environment, hydrography, and system design of water facilities. There are ten such libraries in the city, their joint holdings consist of 340,400 volumes.

The naval libraries possess both literature on military topics and literature on natural sciences and engineering. Personal collections which belonged to many outstanding figures of the Russian Navy are gathered here. A considerable portion of the holdings consists of books and periodicals on geography as well as geographic maps. As a rule, these are large libraries. In total there are nine of them in St. Petersburg; their joint holdings total over 2 million volumes.

Detailed information on libraries of St. Petersburg can be found in a reference book published in 1993. Publishing this book was an important event in that it combined the efforts of different library structures to optimize library information services in the northwest region of Russia. The reference book allows you to find libraries which have literature on a particular subject, and contact them directly. In the last ten years, citizens of Russia acquired the right to access information about environmental pollution. Formerly, this information was considered classified, access to it was limited, and that prevented the free exchange of information among libraries. Now these limitations are reduced, but the libraries have confronted new problems. Lack of financing and, as a result, low-grade technical equipment hinder libraries' efforts to share information in similar fields of knowledge.

**THE POLAR RESEARCH INSTITUTE OF MARINE FISHERIES AND
OCEANOGRAPHY (PINRO) AND ITS SCIENTIFIC LIBRARY**

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The oldest fisheries institute in Murmansk celebrated its 80th anniversary in March this year. The Institute's library was founded as early as 1899 when the Northern Marine Biological Station was established on the Kola Peninsula coast. Important fundamental research in the field of marine biology developed there.

The Institute has a tradition in studying fish biology and ecology, fisheries oceanography and fishery of the World Ocean as well as biological resources of the inland waters of Russia. Since the early days the principal aim of the library is collecting publications, every book and paper published about problems of the Barents and White Seas; another aspect is complementing the stock with publications related to ichthyology, hydrobiology, and oceanography of the world oceans.

Now the library has a collection of about 50,000 volumes of books and scientific journals, and more than 50 journal titles from abroad. The collection includes a number of valuable and unique Russian and foreign publications covering problems of the World fishery and related matters. The archive contains reports and "grey" literature sources related to this region since 1937. The bibliographic index of papers by PINRO scientists has been compiled and published from 1936 until 2000. The subject catalogue embraces all well-known sciences. Also, a list of the new acquisitions has been prepared every month. The Institute is involved in international research projects and programmes related to investigations of the Barents Sea ecosystem.

PINRO maintains close contacts with organizations from 25 countries of the world; such relations are especially close and long-standing with Norway, Canada, Iceland, Germany, Finland etc.

The results of scientific research in the field of fisheries and aquatic problems are represented in numerous articles, reviews, proceedings of fishery international organizations such as ICES, NAFO, FAO, NEAFC.

The library offers its facilities and services to researchers from every concerned Institute, university students, schoolchildren, non-governmental ecological organizations, to libraries of Murmansk Marine Biological Institute and of the Hydrometeorological Agency and private individuals from all over the country.

We have been in a difficult situation for the last ten years. Despite the internal economic and political problems the library of PINRO, as the other libraries in Russia, have continued to work in the traditional manner and style, having no access to on-line bibliographical search services, the use of CD-ROM, or information retrieval systems.

The situation was one of anarchy and duplication of effort. The number of serial publications in the field of marine biology and fisheries is constantly increasing, mainly these can be only obtained by subscription, not by exchange. Subscription rates tend to rise much faster than the budgets allotted to the libraries. We are still feeling the results of policies of the past when the funds allocated for research and development in biological fisheries and sciences were quite insufficient.

There is also a great need for training of our library staff in new techniques related to computerization of information services, as well as in foreign languages; the language problem is a great barrier to cooperation with foreign countries.

One of the most controversial is the problem of salaries of Russian librarians. The level of these salaries is relatively too low. For example, average monthly salaries range from 40 to 100 U.S. dollars.

Since 1995 our institute has been a member of EURASLIC. The first participation of librarian V. Khazova in meeting of EURASLIC Conference was in Poland, in 1994, thanks to Brit Skotheim, Head librarian of Institute of Marine Research (IMR, Norway, Bergen). The first steps of communication with our colleagues from abroad was encouraging and stimulating.

In 1995 according to the programme of close cooperation between PINRO (Russia) and IMR (Norway) our library was provided with the computer program Micro CDS/ISIS. After installation of CDS/ISIS we began to prepare the list of scientific publications of the PINRO's scientists.

Practical experience in studying CDS/ISIS was gained by the librarian Khazova through a training course taken at the library of the Institute of Biology of the Southern Seas (Sevastopol) in 1996-1998 thanks to Olga Akimova. It was easier than taking a training course in another country.

The Institute had the possibility to subscribe to the ASFA database on CD-ROM for 1978-1999. The users of the database find it very useful because ASFA allows quick access to the international aquatic literature.

After a long period of repairing of our library (1999-2000) we have a new computer with printer and scanner. It was again due to help from the Norwegian government "to strengthen PINRO".

Since the middle of 2000 our library has access to the Internet. The computers have a connection to the local network of the Institute. After installation of the program ProCITE all recent acquisitions of periodicals and books of the library are entered into the database. The next step is to create an electronic catalogue of the library in the nearest future.

Access to the Internet system highlighted some problems - lack of experience and the need of certain training to get used to the new type of work, and restricted possibility to pay a subscription at a high fee for access to a Website. We hope that we will be able to manage in future.

In the area of interlibrary cooperation a number of new exchange agreements have been set up with other aquatic libraries. Close interaction between PINRO and the IMR, PINRO and the IBSS (Sevastopol), as well as with the Estonian Marine Institute (Tallinn) made it possible visit these libraries to exchange their experiences and discuss future cooperation and relations. We are trying to be optimistic and it helps a lot.

In conclusion I want to express my sincere gratitude to those who have been giving us help and understanding in recent years. They were generous in sharing their knowledge and experience with us and sent papers we requested and donated journals and books.

My personal thanks are to David Moulder, Brit Skotheim, Barbara Schmidt, Olga Akimova, and Maria Kalenchits.



**SPAIN: MARINE SCIENCES INFORMATION ACTIVITY REPORT FOR SPAIN
1999/2000**

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Introduction

Interest of the scientific community in marine sciences-related research has been growing in 1999 and 2000. Many solutions to sea-related problems have been interesting in the context of marine biology and chemistry, big science areas like oceanology, aquaculture, fishery and ecology. A number of studies have been conducted in 1999, 2000. The Spanish aquaculture directory (1999), the report from the Ministry of Education "Marine science research in Spain (1981-1998)" (1999), the report from the Ministry of Agriculture "Evaluation of the activities of research and technological development in aquaculture on the (1982/1997)" (1999), the "White book on Aquaculture in Spain" (1999) outside of the follow-up surveys contrasting topics shown to be of concern to marine sciences in Spain. During the 1999 Congress of the Spanish society for the history of science and technics, a study was presented on "The Cádiz laboratory of the Spanish council for scientific research fisheries research institute, between 1957 and 1966, a research "arena"" (1999).

Several congresses and conferences have been held in Spain. The Spanish leadership in view of the European program Aquaflow, has been purposely added to this paper (Flos 1999). An additional bibliographical tool is, the latest report from the Iberoamerican Scientific and Technological Development Program (CYTED), relevant to aquaculture through its Subprogram II (Programa iberoamericano de ciencia y tecnología para el desarrollo (CYTED) 1998-99). Also discussed here is the Coastwatch Europe network 1999 report recently produced by the government of Andalusia (*Cuidemos la costa, informe resultados de la campaña 2001*). The report is finalized with a discussion on the most widely recognised electronic journal and forum of marine science in Spain.

As the result of the follow-up survey for foregoing issues of the ASFA database between 1999 and 2000, 838 articles were identified as published in Spain. The bibliometric analysis of these publications has been found useful to enlighten the peculiarities of the Spanish research system in this academic territory. It includes the communication

channels used by the scientists, the authorship background and the unbalanced distribution of the research throughout the country.

The intended goal of the marine sciences information activity report for Spain 1999/2000 is to fuse all the informative perspectives of the cited documentation into one overall mental map, wherein each source is by its common focus, the marine sciences.

1. The Spanish aquaculture directory (ed. 1999). (Spanish only)

Produced by the Scientific Documentation and Information Center, Spanish Council for Scientific Research (CSIC, Madrid). Its last edition was published in 1999. The directory is divided into two sections: Research Centers and Firms.

The research centers section shows those research institutions, founded by the government, the University; the Ministries; the Regional and local authorities; the International organism working in Spain. Information available from each entry includes: address, phone, fax, e-mail; main person at charge; subjects and/or species focused; and the courses related with aquaculture.

The section dedicated to business is listed alphabetically and by subject. Each entry in the alphabetical list supplies the consultant with the name and acronym of the firm; the address, phone, and fax of the central headquarters; the name of the person responsible; the animals cultured, techniques employed and annual estimated production; the products marketed; the I&D activities developed. The subject-oriented section lists firms under the headings: the cultured species alphabetically ordered; the pharmaceutical and chemical products elaborated; food for aquatic species; aquaculture equipment; engineering and installation design; aquatic health, quality control and analytical chemistry; consultancy; life animals transport; reintroduction of populations; production and marketing of food; production and marketing of drugs; finance, assurance; contamination and environmental studies; association of producers.

Two printouts are available from the Spanish Aquaculture directory: 1. A comprehensive list of the scientific names (and their common equivalences) of the species cultured alphabetically ordered, 2. a list of the common names (and their Latin equivalents).

The publication closes with six indexes. The indexes are listed under: 1. the regional center authority in charge; 2. the research centers listed alphabetically; 3. the courses they teach; 4. index of courses offered; 5. researchers working at the centers; and 6. final list of the business by regions. All the entries are indexed in the Directory by page number where the complete data are available.

107 research centers, 728 researchers, 179 businesses are the sources available for the future of marine science in Spain. A new directory, with updated data including many

more resources, will be available soon from the Spanish Council for Scientific Research (CSIC) Publication Service.

2. The report from the Ministry of Education "Research in marine science in Spain (1981-1998)" (ed. 1999). (Spanish only)

The report from the Ministry of Education "Research in marine science in Spain (1981-1998)" was recently published (1999). The contributors to this report are among the most prolific Spanish authors of the scientific literature, and among the unique publishing in the journal *Nature*, contributors were also from the delegation to the V EU Framework Program.

This government-sponsored report was edited reflecting the Spanish effort to the EU IVth Framework Program, and the Spanish national interests on EU Vth Framework Program related topics. It is also a result of the Spain's IIIrd National Plan of R&D, a government effort for a rapid progress in Science & Industry.

Five crucial trends are surveyed.

The European funds related to the marine R&D. Spain (with Ireland) is ranked in 10th position, of the 14 EU countries regarding R&D funding available for marine science research. Also the analysis indicates that the Spanish governmental financial effort related to R&D in marine sciences is considered to be 30 times than the real impact on the Spanish economy of all the sea-related Spanish activities.

The survey of the development of the National Program in R&D in Marine Science and Technology (P.N.CYTMAR). The analysis includes an estimation of the Spanish population of scientists working on marine sciences-related topics. It reflects the competitive effort of a small community. Some 135,600 Euros funded the three Spanish P.N. CYTMAR programs, between 1988 and 1997.

The examination of the Spanish partnership into the EU MAST III program, lists the shortage of scientific resources including scientists. The need to promote a greater number of research groups in Galicia, Murcia and the Basque Country. A better policy would need more viable projects and "market analysis." A reduction of the bureaucratic policy-associated duties required of the Spanish leaders in R&D proposals must be undertaken. The R&D inside the business sector must be more frequently added to the R&D Spanish national plan (only 10% of the Spanish MAST proposals were from the private sector). The expansion of the technical staff must be promoted. The design of a R&D National Plan in Marine Science and Technology is readily accepted. In conclusion, data are offered that show the Spanish rate of funding amounts to 1/3 of the total, as opposed to 2/3 coming from Europe; the improvement of the Spanish contribution is advised.

An examination of the Spanish scientific production in marine science and technology R&D, clearly states the leadership of the university. The Spanish Council for Scientific Research's (CSIC) contribution were the most prolific in aquaculture and marine ecology. The Spanish Oceanographic Institute (IEO) provided a wider information channel to the fisheries-oriented subjects. Between 1981 and 1995, 4,604 documents were produced (75% journal articles, and 25% books and book chapters). Only one out of three documents was published in Spanish, 65% of the total production was published in English. The data from researchers working in Antarctica are not reflected in 99/2000.

The Oceanography Research Cruiser "Hespérides." Launched in 1991, built with a budget of 54 MEuro, has two expeditions annually to the Spanish research mission in Antarctica. Between 1991 and 1998 the ship has been involved in 50 oceanographic cruises, and 41 research projects have been accomplished. The users of this scientific resource have come mainly from Spanish Council for Scientific Research (CSIC) (52%), the University (27%); the Spanish Oceanographic Institute (11%); the Naval Forces staff (10%). The bibliographic production from the Antarctic expeditions amount to 53.7% of the total, and the articles on Mediterranean topics amount to 37.1% of the total, although the ship works there only 14% of its operative time. Two web sites are designed for those interested in "*Hespérides*": <http://www.cicyt.es/hesperides/> and <http://www.ugbo.icm.csic.es>.

3. The report from the Ministry of Agriculture "Evaluation of the activities of research and technological development in aquaculture into the 1982/1997 period" (1999). (Spanish only)

The report from the Ministry of Agriculture "Evaluation of the activities of research and technological development in aquaculture into the 1982/1997 period" extends the chapter on R&D in the "White Book on Aquaculture in Spain" (Borrador del libro blanco de la acuicultura en España 1999) published in 1999. The authors come from the Social Advanced Studies Institute IESA (Spanish Council for Scientific Research, Madrid), and from the Galician University-Firm Foundation (FEUGA). The period studied is 1982-1997. Two volumes are available: the first one with the evaluation, and the second with the directory of the publications of the Spanish researchers in aquaculture. The data have been edited with the cooperation of the financing institutions in aquaculture in Spain: Interministerial Commission for Science and Technology (CICYT), Center for the Industrial Technological Development (CDTI), General Secretary for the Maritime Fishery, Regional Authorities, European Union, and Spanish Oceanographic Institute.

Crucially important conclusions raised in the domain of information seem to be that:

The Regional Authorities spend so many funds on R&D in aquaculture that an in-depth revision of their whole policy is necessary, to equate it to the real needs of industry in their territory;

Databases from financial organisms must be uniformly refined and even in some cases created. CICYT and CDTI databases seem to be able to be interpreted as the models;

The development of standards attracting economic-funding for researchers optimization of the experimental plants;

Sinergies for improving the degree of transfer and exploitation of research results must be put in work (17 national and two international recognised patents, have been produced in the period);

Permanent evaluation programmes of the activities performed inside the research centers must be conducted;

The bibliographic production is oriented to the production of personal resumes (curriculum vitae). A reorientation of the recognition of the scientist-work towards the topics related with consultancy must be the factor;

The international ranking of the Spanish bibliographical production in aquaculture is around 10th. But marine biology topics like genetics, biochemistry and molecular pathology of marine organisms need to be promoted.

Because of their size and absence of technical staff the results from the researchers inside private firms are weak on innovation; firms are only able to perform the work themselves in 20% of the cases. The areas need an 80% of collaboration (from the universities or other high research institutions).

4. White book on Aquaculture in Spain (ed. 1999) from the Ministry of Agriculture. (Spanish only)

The report was undertaken by the general secretary of maritime fisheries, and is available through the Internet. Its main conclusions on R&D are published and analysed in the above commented report.

In the White Book we find an introduction to aquaculture and a structural analysis of this industry. The introduction uses historical criteria to present an initial view on the situation of the sector in Spain. The structural analysis affords the administrative and technological framework, environmental management, the markets of aquaculture, and a set of proposals for determining the immediate priorities.

5. Marine sciences Congresses and conferences in Spain : 1999-2000.

The number of congresses and conferences in marine science for 1999/2000 in Spain, has been derived from RedIRIS (the Spanish academic Internet network).

In 1999:

1999 Canigo Project Conference. The subjects of the conference were the marine systems of the Canary Islands-Azores-Gibraltar region. It was organised by the University of Las Palmas de Gran Canaria, and held between September 12-14, 1999, at Las Palmas de Gran Canaria. Its electronic address is:

<http://www.cccb.ulpgc.es/canigofc>.

In 2000:

The following list is a RedIRIS network printout of all the congresses and conferences offered in 2000 (http://tierra.rediris.es/marinet/marinet_english.html).

III Workshop on the Sea. Galician Professional Association of MD in Sea Sciences. Vigo. Internet address: <http://www.uvigo.es>.

10th Iberian Seminary on Marine Chemistry. Cádiz, June 1-3, 2000. Internet address: <http://www.uca.es/grup-invest/ole>.

Second International Conference on Maritime Research and Innovation. Cádiz, November 9-11, 2000. Internet address: <http://www3.uca.es/facultad/nauticas/english/default.htm>.

2nd Workshop on variable analysis and numeric simulation caused by the exchange of water masses through the Gibraltar strait. Cádiz, June 28-30, 2000. Internet address: <http://www3.uca.es/otros/anasim-gibraltar/>.

International Congress "Authenticity of species in meat and seafood products." Vigo, September 18-20, 2000. Internet address: <http://www.iim.csic.es/~qpmtsi/noflash.html>.

Workshop on spatial objective analysis for diagnostic studies in meteorology and oceanography. Menorca, 18-22 September 2000. Internet address: <http://campanilla.uib.es/workshop>

6th International Congress of Medmaravis, "Fisheries, marine productivity, and conservation of marine birds of the Mediterranean". Benidorm (Alicante), October 2000. Internet address: <http://www.seo.org.es/es/todoaves/medmaravises.html>.

3rd International Conference Coastal Environment 2000. Las Palmas de Gran Canarias. September 2000. Internet address:
<http://www.wessex.ac.uk/conferences/2000/coastal2000>.

2nd International Conference Oil Spill 2000. (Oil & Hydrocarbon Spills, modelling analysis and control). Las Palmas de Gran Canarias, September 2000. Internet address:
<http://www.wessex.ac.uk/conferences/2000/oil2000/>.

6. European program AquafLOW: Spanish initiative.

A development project supported by the European Commission DG12 was presented by Miss Rosa Flos, a Spanish Council for Scientific Research officer, at the 98 MAST conference Lisbon (proceedings published in 1999), and the project is presently implemented. The research results from the EU funded projects are being transferred to the end users (SMEs) as technical leaflets, by Internet and e-mail. Sixteen countries were initially involved, and the web content management brings together providers from the European Aquaculture Society (EAS), the Federation of European Aquaculture Producers and AquaTT.

7. The memo of the Iberoamerican Scientific and Technological Development Program (CYTED). Subprogram II Aquaculture. (Spanish only)

The Memo published in 2000 in Spanish, illustrates through the subprogram II the thematic network in Iberoamerica on aquaculture activities. With a total budget of US \$130,869 the subprogram has 18 (7.28%) Spanish research groups. It is the third largest number of research groups by country (only surpassed by Mexico and Brasil). Out of seven research projects concluded in 1999, the two directed by Spanish scientists, on *Artemia* and mussels received the largest founding \$35,000 and \$40,000, respectively. The *Artemia* project resulted in six dissertations, two books, 25 papers and six invitations to congresses.

No outstanding results were achieved, but the scientific and technological information transfer is notable, together with the research groups promotion between the participants, and the possibilities related with the transference of the results obtained by the project to industrial areas of productivity.

The mussel project resulted in one dissertation thesis, 19 scientific papers, and ten invitations to congresses. Its results are highly regarded concerning the exchange of information and technical and methodological capabilities of the participant groups.

The CYTED Conference on Coordination of the Programs was held in Santiago de Compostela, Spain, 3-13 November 1999.

8. The Andalusian government recently produced Coastwatch Europe network 1999 report. (Spanish only)

This report shows the results of the campaign Coastwatch 99 (an initial design based in the European Commission General Directorate XI) in Andalusia. The data, obtained from 399 inspections performed in November 25, 1999, amount to 24% of the Andalusian coastal littoral. Granada is the best studied littoral (50%), and Huelva the least (13%).

Professors from the Faculty of Sea Sciences of the University of Cadiz, conducted the inquiry and analysis of data from the Coastwatch campaign 99.

Aquaculture is said to be the least environmentally risky activity (3.95%) for the Andalusian coastal littoral. Dead worms (32.46%) and live marine birds (35.34%) were the animals most frequently detected in the coastline. Local explosions of algal growth were detected in 26% of the occurrences. Wild areas, such as dunes, are dominant in Huelva (76%). Cádiz is the dirtiest coastline in Andalusia, Málaga has the cleanest beaches. Erosion was considered the greatest risk to the coastal areas (24%), and coastal construction as second (16%).

9. A final note on the most known electronic journal and forum.

The university of Zaragoza supports Spain's best known aquaculture electronic journal: <http://aquatic.unizar.es>. The journal is of value to those with interest in the area of Spanish aquaculture. It is essential to reference the electronic journal for the sake of the aquaculture investigator.

The RedIRIS (the Spanish academic Internet network) resource in marine sciences, the Marinet Forum (http://tierra.rediris.es/marinet/marinet_english.html), offers the best information for those concerned with events in the area. It is structured into these sections: International programs; Guides and directories; Oceanographic research centers (all Iberoamerican countries, from Argentina to Venezuela); Research projects; Ships, harbours, and oceanographic expeditions; International organizations; Publications; Oceanographic data; Firms; Software; News; and Disclosure. A consistent addressing scheme is employed to distribute the resources. The massive production of online contents can be reused and adapted to fit the requirements of all interested parties thanks to the use of metadata facilities.

10. The follow-up survey of the ASFA database between 1999 and 2000.

The survey of ASFA 1 (Biological sciences & living resources), Cambridge Scientific Abstracts, detected 838 articles published in Spain, between 1999 and 2000. It is pertinent to make use of this kind of data, if not to answer the questions, then at least to forecast the difficulties with communication channels used by scientists, and the methodology of cataloging the authorship behaviour and the unequal distribution of the

research effort within Spain. This section investigates a panorama of the difficulties of making use of bibliometric methods in assessment, during the period of study (Sylvain 1993).

10.1. Relation of quantities of keywords assigned to journal articles to the number of authors. (Yitzhaki 1994)

Introduction.

The importance of the informative nature of an item inside a database could be detected by reporting the number of keywords used to index it. The assumption would be that to warrant the informativeness of a series of keywords is to assure that they fit their functions more closely. Are the quantity of keywords and the quantity of authors related or not? The present report tried to evaluate the hypothesis according to which an article with a great number of authors also contains a greater number of keywords.

Material & Methods.

One permanent standard bibliographic printout, such as is found on ASFA computerized information systems, can be taken directly in order to screen the two bibliometric traits (authors, and keywords) required to test the hypothesis. The data readily fell into an opposing pair for the bibliometric categories: authors vs. keywords.

The complete collection of 838 papers, published from 1999 through 2000, present in the Cambridge Scientific Abstracts database ASFA, was examined. Total duration of follow-up was defined as the interval between the last Aberdeen Euraslic Conference (1999) and the most recent material available from the utility at the campus in Puerto Real.

Results.

The curve for which meaningful results can be observed differed greatly from that expected. Thus, a remote relationship has been identified between the number of keywords employed to index an item and the number of its authors. Ultimately, some massively authored articles (17 authors) have demonstrated a single actuarial relevance after the number of keywords used (33 keywords). But the fact is fortuitous. Rather, the most common outcome is that it does not demonstrate the hypothesis.

Approximately 86% of the authors vs. keywords relations detected have been depicted between the cumulative incidences estimated between one and five authors. As far as the number of keywords employed is concerned, they present a mean of 12 words. This situation must be added to a concentration of 90% of the articles between one and 20 keywords.

Discussion.

The information available on the significance of the database keywords and their relationship with the number of authors presents an effective link. But at the time of diagnosis the incidence of the hypothesis tested seems to be inconsistent.

The curve presents a peak at three authors vs. 12 keywords. It becomes apparent that the hypothesis as such is unsound. But if our goal is to identify and treat with separate symmetries between these two bibliometric traits, some ideas on Spanish optimal size limited to authorship and indexing practices are attainable. Three authors is the best size for a Spanish unit of information production, and the three-author papers amount to 25% of the total. At the same time the total number of keywords assigned by paper peaks at seven keywords; it represents 10% of the complete set of publications analysed.

The unevenness of the distribution of authors vs. keywords is striking. Deviating from the hypothesis, the current status of information production in Spain on fishery and aquatic science presents patterns of absence of international funded research, assumed to correlate with multiple authorship (Heffner 1981). A model of team cooperativeness associated with such scarce behaviour of authorship is not available in Spain, and for this discipline. It is known that when research contribution is authored by two persons, the first is credited with 75% of the total work (Vinkler 1993).

The main finding of this study is that, if observed, collaboration eventually shows a reduced number of keywords, determining the qualitative measure linked to the indexing practice with multiple authorship. The assignment of author rank is a question not yet posed. In conclusion, no conjecture can be drawn, further study is required on the relationship associated with forecasting practices looking at novelty and international multiple authorship practices.

10.2. Distribution of scientific creativity among separate cities of Spain.

The next step of our investigation considered data at our disposal from ASFA to raise questions on scientific creativity in cities in Spain.

In comparing the data on the distribution of the scientific creativity of the different cities, the contribution by each of these cities to the volume of scientific data available in Spain, permits the examination of the way its scientific potential is distributed through its main cities. It is possible to point out those cities where it could be assumed that a considerable volume of the scientific search performed available would be different from that published through open publication (Price 1986).

Material & Methods

The database compiled after the ASFA resource, contains a field Notes ("nt"), where the scientists' addresses can be found. The software this author employed was unable to produce a list of addresses. The research scientist addresses have been found manually.

The data were processed as follows. The total number of contributions was determined for each city. Then the cities were ranked according to the number of contributions. To conduct a thorough comparative analysis of the availability of informational products in the scientific centers of Spain the choice was made to distribute the data according to the kind of organisational identity of the authorship. Then the observed data were distributed by the place where the scientific work was performed. Universities, the Spanish Council for Scientific Research, and the Spanish Institute of Oceanography were initially researched.

Results

First, it seems noteworthy that 60% of the data observed were from universities, 25% were from the Spanish Council for Scientific Research (CSIC), and 6% from the Spanish Institute of Oceanography.

It is interesting that Barcelona is the largest scientific city in the marine science with 16.5% of the data surveyed. At approximately the same level are Vigo (9.3%) and Madrid (10.7%). The Andalusian cities are far behind (Almeria 1.1%, Granada 1.8%, Málaga 3.3%, Cádiz 4.2%, Huelva 0.1%, Sevilla 4%).

In other words, the variety of scientific cities can be divided into separate subgroups. At first the number of contributions decreases quite rapidly; then there appears a small group at approximately the same level, and finally we again face a rapid decrease.

Discussion

The validity of the results obtained must be discussed. The mechanism controlling the decrease in the number of contributions can be seen by the analogy of an acute struggle for existence as a result of nutrient supply. When we analyze the way different scientific centers accord with total amounts of contributions assigned by city, the data present the view of science as a hierarchical self-organizing system. According to it, a model of information distribution is replicated in all the cities where the scientific centers exist. With the exception of Vigo where a slight optimability of the results from the Spanish Council for Scientific Research (CSIC), over those from the university, formalize to a certain degree a slow model of convergence to the general picture.

Scientists work under unequal conditions as far as information is concerned (Nalimov 1981). What this means is that different degrees of available information will have

essentially different scientific potentials. The stocking of the libraries with scientific journals, the distribution of foreign scientific journals among separate scientific centers, and the distribution of *Science Citation Index* inside Spain are manifestations of unevenness. It can also be seen, from the bibliometric point of view, the poor amount of contributions at the tail of the distribution nevertheless presents a constant quotient value between successive decreasing quantities. An intrinsic quality suggesting its adequacy for comparison (Ferreiro-Alález 1993).

10.3. Centers ranked by number of papers of authors and journals.

The underlying section is a result of the number of authors of Spanish publications inside the ASFA database and the number of journals where these items have been published. As the multiple authorship problem requires the distinction between authors and collaborators, and the disadvantages of the counting method employed are closely attached to the ranking produced. To keep the same type of frequency function for different weight assignment methods implies that a Lotka-type frequency function must be fitted by the data. To predict the author's productivity strata, and to further discuss on stratification of marine science in Spain, the priority is to confirm that the choice of author counting confirm a Lotka-type law. An analysis on the journal's productivity is also carried out.

A list of the indispensable first ten essential journals where Spanish authors are published is offered.

Material & Methods

The data for the study has been derived from the comprehensive 1999-00 Spanish-authored bibliography. Compiled by the author from the ASFA database. The total number of authors covered in the entire bibliography are 2,022 who have published into 264 journals. We have explored whether Lotka's law should fit in the data of authors. We have identified the most representative authors and journals suggested by the literature (Fuseler-McDowell 1989).

Results

Lotka's law states that the number of authors which contribute one paper will constitute the largest group, around 60% of the total authors. In this study, this group of authors constitutes 75% of the total authors, and with authors of two to six papers, equals to 99.1% of all authors. A list of authors contributing seven or more articles has been elaborated, and is discussed below.

We computed the distribution of the data arising from the number of journals and the number of articles. 838 articles on marine sciences papers publishing in serials during the

years 1999-2000. Disseminated in 264 journals. 50% of these articles were found in 37 journals. The most preferred journal published a total of 38 papers.

Discussion

The phenomenon observed in this study is of stratification in marine sciences in Spain. This points out to an extreme concentration of authorship and a decisive dispersion of the sources utilized.

At the time of diagnosis, 1999-00, the applicability of Lotka's law is not viable, although one paper authors are the majority, and the two paper authors are less than the one paper authors but more than the three paper authors. The latter result, with its dimension of strong interdisciplinarity implied, in that there are many more collaborators than authors (surpassing the forecastings of the Lotka's law). A significant association recommending further analysis of productivity strata in marine sciences in Spain. The most dynamic authors, for the period 1999-2000, were Mr. Duarte (CSIC, Palma de Mallorca, 14 contributions), Ms. Zanuy (CSIC, Castellón, 11 contributions), Mr. Carrillo (CSIC, Castellón, 10 contributions), Mr. Delgado de Molina (IEO, Tenerife, 10 contributions), and Mr. Freire (University, La Coruña, 9 contributions).

The problems of merging editorial traditions are reflected in the analysis concerning domestic and international journals used by researchers. Scientists preferred to publish much of their works in serials publications of other countries. Although the main Spanish journal "Scientia marina" is ranked as fourth among scientific journals, only 5% of the articles were published in domestic journals. Characteristics of the publishing infrastructure of peripheral countries is verified also in this case. In fact, most contributors choice journals like: *Marine Ecology Progress Series* (29 papers), *Journal of the Marine Biological Association of the United Kingdom* (23), *Archiv für Hydrobiologie* (22), *Scientia Marina* (CSIC, Barcelona) (19), and *Aquaculture* (17). Between the less information source available for Spanish scientists is, interestingly enough, *Marine Chemistry* (two only admitted manuscripts).

The Spanish journals included in the database were: *Archivos de Zootecnia* (Córdoba, one time), *Boletín Real Sociedad Española de Historia Natural* (*Bulletin of the Spanish Royal Society for the Natural History*) (Section biology, seven times, Section geology one time), *Iberus* (Oviedo, 3 times), *Technical Reports from the Canary Institute for Marine Sciences* (ICCM) (one time), *Miscellanea Zoologica* (Barcelona, two times), *Scientia Marina* (CSIC, Barcelona) (19 times), *Thalassas* (University, Vigo) (two times).

10.4. Data on documentary tipology and main research problems confronted after an analysis of key words employed in database records.

To estimate the short-term association between technical reports/conference communications and information reported through contributions to primary literature (journals), the quantities of each documentary tipology available was obtained.

Conclusions derived from the above analysis resulted in very few books (0.5% of the 838 total) available through the database. No technical report was admitted if not assimilable to a journal article. The only available report was from the Canarian Institute of Marine Sciences. The assumed value of the conference presentations and technical reports production was not able to be tested (Dizon 1985).

Some research questions are only able to be retrieved by using the keywords (Corcoran 1995) it can be accepted that those shown in Table 4 are substantial. Taxonomy (68), animal morphology (59), Biomass (53), Community composition (49), Feeding behavior (42), Fish culture (49) and Phytoplankton (42) present a better performance in estimating the maximum expected number of papers retrievable through keywords.

The effort of Spanish labs as seen through the ASFA database recovery priorities is in conformity with world standards of community compositions (see Table 4). Two Spanish papers concerning *Phytoplankton* were published in the journal *Nature* during the period 99/00. As in the average of the ASFA database *Community composition* is a result of a certain degree of relative effort of the Spanish labs; the aims *Fish culture*, *Taxonomy* (two bioinformatics devices from Spain, related with the taxonomy of fishes and algae have been accepted by CODATA (ICSU) (Wulff-Barreiro 1999; Wulff-Barreiro 2000), in 99/00) and *Biomass* are also a priority for all the countries. Spain's concern with *Animal morphology*, because of its geographical position, is not shared by people working abroad. Works dealing with *Fish behaviour* play a major role in Spain, a concentration which is not observed in the other countries.

The scarce number of information activity determined on *immunogenicity* (12 (1.43%) out of 838 contributions), *histology* (ten (1.19%) out of 838 contributions connected with this keyword) and *vaccines* (one (0.1%) out of 838 contributions) correspond to the global rank for the ASFA database 0.13%, 0.84%, 0.19% respectively. No information activity is available on *Endocrinology*; *Eggs* are only a research subject for 1.19%, contrasting with the world data on 3.32% articles.

As far as animals studied, the more prominent were: the Acipenser (ten papers), Brown trout (13), the *Dicentrarchus labrax* (22), the Gilthead seabream (67), *Mytilus galloprovincialis* (14), *Oncorhynchus mykiss* (16), Rainbow trout (13), *Salmo salar* (10), *Salmo trutta* (18), *Scophthalmus maximus* (13), Sea bass (22), Tuna (19) and Turbot (32).

11. Final note.

Documenting the state of the art information activity in the marine sciences of Spain 99/00, the best bibliographic resources have been compiled in evaluating books and in attempting to study research papers.

The electronic pursuit has given a portrait of research information available within Spain. From the least available electronic information on such subjects as vaccines to a flood of information on subjects as Spanish Antarctic research, the report is expected to provide an insight into Spanish 99/00 marine sciences-relevant activities.

*

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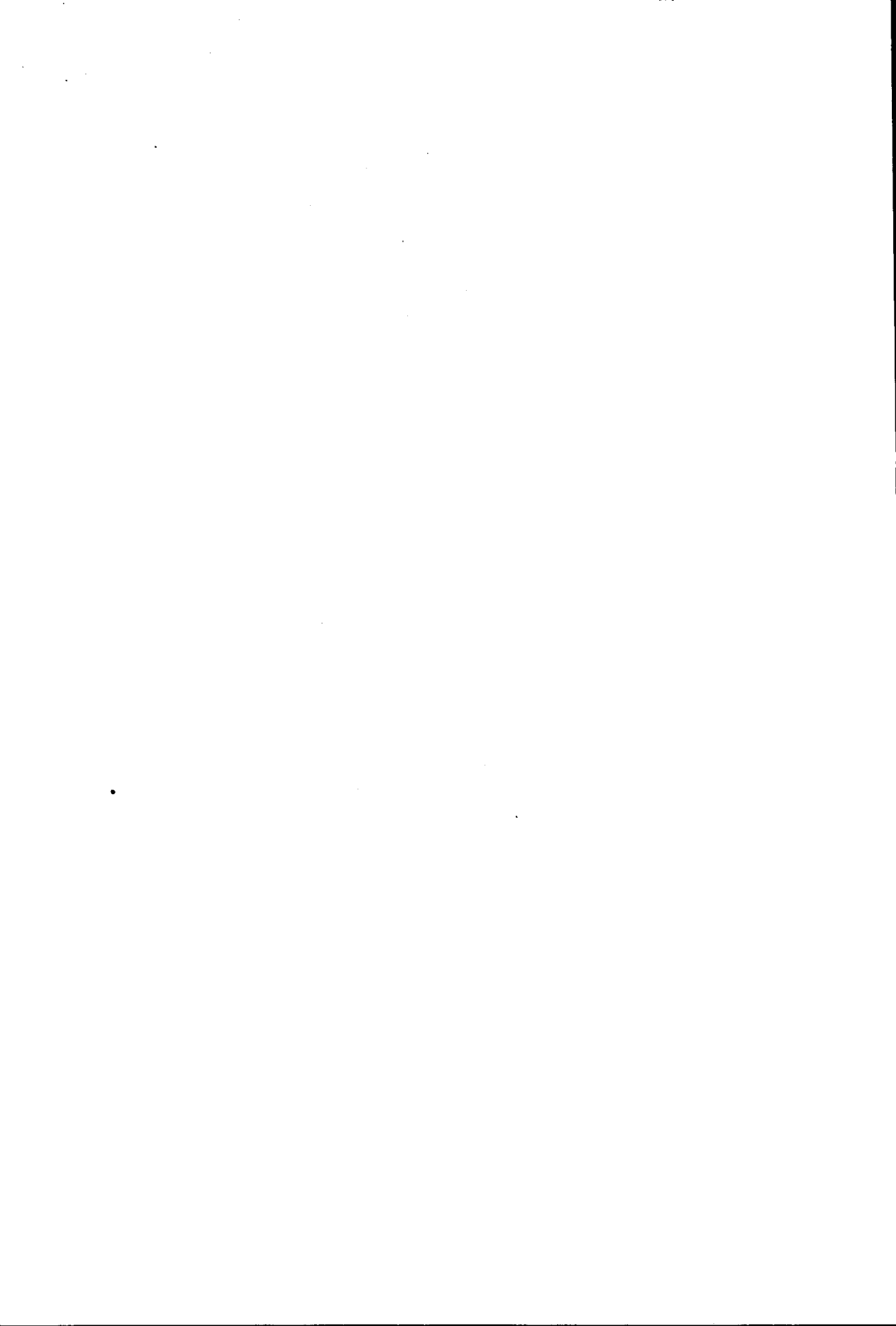
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UKRAINE – COUNTRY REPORT: WHERE ARE WE MARCHING TO?

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This report is a logical sequel of the report presented in Aberdeen. It describes the work done for the past year and activities to be undertaken further. It also gives a few ideas about the trends small Ukrainian libraries should follow and develop.

Last year an event of special significance was our active participation in the training organized by the British Council Foundation in cooperation with International Renaissance Foundation within the format of the project "*Management in the Library.*" The programme concentrates on giving training to trainers to disseminate knowledge at the regional level; providing information support for management through publication of the British Institute of Management books "*Management in a week*"; developing the virtual training centre "*Knowledge Centre*" and Internet Information portal. Thirty libraries from 14 Ukrainian regions became participants of the Programme, a representative from Scientific Library of IBSS NASU was among them.

It was stipulated by the Programme that training seminars for librarians should be organized and conducted at the regional level. Therefore, from January to May 4 sessions and consultations were held in the library of IBSS for librarians of scientific, marine and university libraries. The purpose of the training seminars was to inform participants about the current practices in library management. The training will be the last this year.

Our vision of the future

During the year covered we worked out the programme of further development of our scientific library and marine libraries of Ukraine. In doing this task we studied and analyzed the current trends of development of libraries in Russia and Ukraine.

Numerous facts given in periodicals point out that a trend has emerged towards transformation of libraries into information centres, activities of which would be based primarily on information analysis. Therefore the main task of the library would be data collection, processing, keeping and disseminating in electronic forms. The creation and availability of the digital databases (virtual libraries) would lessen the load on the libraries' book collections. The number of users will be growing with the advancement of technical progress, accessibility to Internet, enlargement of electronic publications services and efficiency (e.g. document search and delivery). Libraries would be losing readers, they would also run the risk of losing significance as a key unit in the world of

information in which basic information fluxes would assume an electronic form, but if the libraries incorporated digitization into their daily routine, it would guarantee them safe and even comfortable living.

The intended work divided into several assignments, which must be carried out concurrently:

1. offering readers the access to digital publications beyond the library. This can be done through providing access to Internet and offering expert advice about information search in cyberspace. Then the library would still be functioning as an information mediator;
2. presenting original information stored at the library as a service to Internet users. This should be implemented through creation of the libraries web servers with useful information including the libraries electronic catalogues and papers in digital form. The next step would be the development of efficient electronic delivery: chapters and sections of books, articles from periodicals might be dispatched to a remote reader that way. In other words, services to be provided by the real libraries through the electronic communication net must be demanded and able to compete with services provided by virtual information agencies.

European libraries have probably come close to the venture; for Ukraine this is a matter for the very distant future.

**RECENT DEVELOPMENTS RELATING TO THE AQUATIC SCIENCES IN
THE UNITED KINGDOM – MAY 2000 TO OCTOBER 2001**

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ABSTRACT: This report attempts to summarize developments both in UK science policy and in the library and information sector, with particular reference to the aquatic sciences. Issues relating to the government sector, the private sector and the academic sector are addressed. Developments in the aquatic research associations and librarians' groups are also covered, and some conclusions drawn.

Introduction

This report covers the principal developments in this area since the last EURASLIC meeting, and is intended to be a guide to the general course of events rather than a comprehensive review. I will start with the overall national picture for library and information services, and for science in general.

National level

Although some concern was voiced in the last report (McCulloch, 2001) the placing of the Office of Science and Technology within the Department of Trade and Industry has not affected science funding as adversely as feared. In July 2000, the Chancellor, Gordon Brown, announced a £1 billion investment in buildings, laboratories and equipment for science research as a result of a partnership with the Wellcome Trust. This was released in several tranches over the following year, while the 2000 Spending Review (Her Majesty's Treasury 2000) provided for an annual increase of 7% above inflation for Department of Trade and Industry funding of science and its exploitation. In September 2001, the UK signed up as a full voting member of the Global Biodiversity Information Facility (GBIF). The goal of this international science facility is to provide worldwide access, via the Internet, to geographical, ecological, genetic, and taxonomic information about the world's biological resources.

The introduction of the Freedom of Information Act 2000 gave a general right of access to all types of 'recorded' information held by public authorities (and those providing services for them) for the first time. The Act is implemented by the Information

Commissioner, a new post that includes the duties of the former Data Protection Registrar.

In the library sector, in July 2000 Lynne Brindley became the new Chief Executive of the British Library, the first professional librarian ever to hold that post. Since her appointment, there has been an increased emphasis on digitization and electronic access, and in August 2001 the Library's first Director of e-Strategy and Programmes was appointed. After wide consultation, the library has also decided to spearhead a move away from UKMARC, the UK version of the international standard for machine-readable cataloguing, and change to MARC21. MARC21 was formed in 1999 when the National Library of Canada's MARC format was fully integrated into USMARC. It is anticipated that UK libraries will still have some input into the running of MARC21.

On 31 March 2000 the Library and Information Commission merged with the Museums and Galleries Commission to become Resource: The Council for Museums, Archives and Libraries. Although the objectives set out in its Manifesto (The Council for Museums, Archives and Libraries n.d.) have been broadly welcomed, the Government's attempt to view libraries and museums as a single sector has not been seen so positively, and has in fact been roundly condemned by Aslib as "pure folly".

Full Disclosure, a project to identify nationally important card catalogues and convert them to digital form moved a step forwards in May 2001 when it was announced that a prioritization study would be carried out (Chapman et al. 1999). The study will assess priorities for the retrospective conversion of catalogue and documentation data and the retrospective cataloguing or documentation of non-current acquisitions in libraries, archives and museums in the UK. The Cultural Heritage Consortium will develop and refine criteria by which priorities for retrospective conversion and retrospective cataloguing can be established. These criteria will then be taken forward and used to produce concrete named priorities for retrospective conversion and retrospective cataloguing projects. Recommendations for implementing priorities will also be developed as part of the study. The UK Office for Library and Information Networking (UKOLN) is disseminating the reports that emerge from this project.

The two principal professional societies for library and information workers in the UK, the Institute of Information Scientists and the Library Association, continue to work towards a merger. The most popular (or rather, least disliked) choice for a new name so far is the Chartered Institute of Library and Information Professionals. The intention is that the new organization will come into existence on 1st April 2002.

Government sector

In June 2000 the Natural Environment Research Council (NERC) announced that the Centre for Coastal and Marine Science (CCMS) would be disbanded with effect from 1 April 2001. The three component laboratories of CCMS have each found different solutions to this enforced position. The management of Dunstaffnage Marine Laboratory

has been taken on by the Scottish Association for Marine Science, while Proudman Oceanographic Laboratory (POL) is in negotiation with the University of Liverpool regarding a possible move onto its campus. POL continues to be funded as an independent institute under the Natural Environment Research Council. Plymouth Marine Laboratory (PML) is to become a NERC Collaborative Centre rather than a NERC Institute and NERC Council has just made the decision to change the ownership model of PML to a Company Limited by Guarantee with charitable status with effect from 1 April 2002. The Marine Biological Association is likely to take over management of the National Marine Biology Library. This is under discussion with NERC. Southampton Oceanography Centre continues to function as a joint venture (Collaborative Centre) between NERC and Southampton University, and launched the new Laboratory for Satellite Oceanography on 2nd May 2001.

Also within NERC, the Centre for Ecology and Hydrology (CEH) appointed a new director in 2001. Significant changes to the organization are planned, to improve its delivery of high quality science, although precise details are not yet available. The Director's vision for the future of CEH will be presented to a full Council meeting of NERC in November, and the final version of the plan is expected to be agreed in Spring 2002.

Private sector organizations and water supply

The Water Industry Librarians' Group continues to meet annually, most recently in October 2001. Several of them are getting used to being part of foreign companies, but are unsure how that will alter their situation. One water company has recently ceased centrally funding its library, requiring instead a subscription from its users. First impressions are that this is not a success, and is likely to be a more costly approach in the long run. The other companies are experiencing very mixed fortunes, some with serious budget cuts, others not at all.

University and academic sector

The four UK higher education funding bodies, in collaboration with the British Library and the national libraries of Wales and Scotland, have established a new strategic advisory group on research support libraries, to be chaired by Sir Brian Follett. The Group, called the Research Support Libraries Group, will advise on the development of a national strategy to ensure that UK researchers in all disciplines have access to world-class information resources. Their time scale is to look forward over the next decade or so.

One of the issues continuing to vex academic librarians in the UK, as everywhere else, is the implementation of electronic journals. Having recently taken on that role within my own organization, I find that my frustrations are precisely duplicated for every other person I meet engaged in this task. Publishers continue to follow their own, unique policies for access, which they may change without warning. A recent meeting on the

subject, arranged by the Northern Branch of ASLIB, sold out in record time, and proved very fruitful, not least as an opportunity to let off steam amongst fellow sufferers. The National Electronic Site Licence Initiative (NESLI) established in 1999 for the UK higher education sector has been of some considerable help to university librarians, and negotiations are currently underway to include the Research Councils in this collaborative arrangement.

Research Associations

The Freshwater Biological Association (FBA), the Marine Biological Association (MBA) and the Scottish Association for Marine Science (SAMS) continue to support research in the aquatic sciences. The FBA shares its location with the Centre for Ecology and Hydrology's Windermere Laboratory, and is having to consider its future options with the likely move of CEH Windermere to the Lancaster University campus. SAMS has recently joined with the University of the Highlands and Islands (a distributed "virtual" university covering the sparsely populated areas of Scotland) to offer a degree course in Marine Science. In future years, modules of the course will be available "on-line" via the internet at learning centres across the Highlands and Islands.

BIASLIC

The Britain and Ireland Association of Aquatic Science Libraries and Information Centres (BIASLIC) has failed to meet since the last EURASLIC meeting. A planned meeting in Cork, in 2000, was rescheduled for 2001, then had to be called off because of the Foot and Mouth epidemic.

ASFIS

The National Marine Biology Library (NMBL) at PML continues as the UK National Input Centre for *Aquatic Sciences and Fisheries Abstracts*, co-ordinating the input of the other two organizations providing data, the Centre for the Economics and Management of Aquatic Resources (CEMARE) and the CEH Windermere Laboratory. NMBL have been active in training new abstracting and indexing staff over the last two years. It is anticipated that the Environment Agency, the regulatory body charged with the protection of the natural environment in England and Wales, will shortly be joining the UK network, adding their research reports to ASFA.

Conclusions

Both this report and the last one have noted some welcome stability in national science policy and in libraries. At the same time, the marine and freshwater research laboratories are going through periods of great change, a situation that is no doubt repeated in other national reports. Once again we are offered a welcome opportunity to share our experiences of these changes with our colleagues throughout Europe, and, in this collaborative conference, with colleagues from around the globe. By listening to the

changes and developments occurring elsewhere, we can make ourselves more ready to face them at home.

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Links

Aslib – <http://www.aslib.com>

BIASLIC – <http://www.ife.ac.uk/biaslic>

British Library – <http://www.bl.uk>

CEH Windermere – <http://www.ceh.ac.uk>

Centre for the Economics and Management of Aquatic Resources – <http://www.pbs.port.ac.uk/econ/cemare/>

Centre for Ecology and Hydrology – <http://www.ceh.ac.uk>

Dunstaffnage Marine Laboratory/Scottish Association for Marine Science – <http://www.sams.ac.uk/>

Environment Agency – <http://www.environment-agency.gov.uk/>

Freshwater Biological Association – <http://www.fba.org.uk>

Global Biodiversity Information Facility – <http://www.gbif.org>

Institute of Information Scientists – <http://www.iis.org.uk>

Library Association – <http://www.la-hq.org.uk>

Marine Biological Association – <http://www.mba.ac.uk/>

Natural Environment Research Council – <http://www.nerc.ac.uk>

NESLI – <http://www.nesli.ac.uk>

Office of Science and Technology – <http://www.dti.gov.uk/ost>
Plymouth Marine Laboratory – <http://www.pml.ac.uk>
Proudman Oceanographic Laboratory – <http://www.pol.ac.uk>
Research Support Libraries Group – <http://www.rslg.ac.uk>
Resource – <http://www.resource.gov.uk>
Southampton Oceanography Centre – <http://www.soc.soton.ac.uk>
UK Office for Library and Information Networking – <http://www.ukoln.ac.uk>
University of the Highlands and Islands – <http://www.uhi.ac.uk>
Water Industry Librarians' Group –
<http://groups.yahoo.com/group/waterindustrylibrariansgroup>

**SEAMEO BIOTROP:
ITS ROLE IN THE NATIONAL DEVELOPMENT IN INDONESIA**

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ABSTRACT: The BIOTROP - SEAMEO (Southeast Asian Ministers of Education Organization) Regional Center for Tropical Biology, a Center which is active in Training and Research on Tropical Biology, has been a partner of scientists in tropical biology. The Information Resource Unit, to which the library is attached, has played an important role in providing information on its subject interests both to BIOTROP staff and its other end users from Indonesia and Southeast Asian countries.

As Indonesia has just embarked into the third millennium, Indonesia's responses to the emerging knowledge economy, the massive information explosion and rapid knowledge obsolescence are to be that of a learning nation. It means that the entire population of Indonesia, regardless of their socio-economic backgrounds, are encouraged to learn and make productive use of knowledge all the time. The learning process requires good-quality services of the libraries. The libraries have crucial roles to play in supporting the entire spectrum of Indonesians in the lifelong process of acquiring new knowledge and skills - in science and technology. BIOTROP, with its innovations achieved in librarianship, must provide good library services. The programs and services being offered by BIOTROP library are discussed in this article.

I. INTRODUCTION

BIOTROP, the SEAMEO Regional Center for Tropical Biology was established on February 6, 1968, in Bogor, Indonesia. BIOTROP has been developed to provide the SEAMEO member countries with increased capability in biological science relevant to regional economic needs. Its enabling instrument mandates that the objectives of this organization are to identify and help solve critical biological problems, the solution of which will enhance economic development in the respective member countries and to that end, undertake research, publication and training programs and other related activities within and outside of Indonesia.

Bogor was considered appropriate for the location of BIOTROP, as this city is noted for its Tropical Biological Institutes, namely the Botanical Gardens, the Herbarium Bogorienses, the Treub Laboratories, and the Muzeum Zoologicum Bogorienses. Furthermore, Bogor is the center of scientific activities in agriculture of Indonesia, where the Forest Research Institute, the Central Research Institute for Agriculture, the Central Institute of Estate Crops, the Central Research Institute for Industrial Crops, the Animal Husbandry Research Institute, CIFOR, Asia Pacific Agroforestry Networks (APAN), and the Bogor Agricultural University (IPB) are located.

The goals and objectives of BIOTROP, as mandated by SEAMES (SEAMEO Secretariat at Bangkok) are:

1. To develop into a regional center of excellence of international stature in Tropical Biology
2. To strengthen BIOTROP's management capability and leadership needed in the pursuance of its vision and mission
3. To develop the organizational capability to initiate and manage change in development
4. To provide leadership in networks, partnership, and linkages through enhanced cooperation/collaboration among SEAMEO-member countries as well as other countries and relevant organizations
5. To ensure financial viability by exploring alternative sources of funding

After 32 years of dedicated service to the region through cooperation, BIOTROP has proven its viability and has gained international recognition for the impact of its professional and technical program activities and services in tropical biology. On the threshold of the next millennium, BIOTROP has just completed its process of restructuring with the end-in-view of revitalization in response to the changing needs and developmental conditions. BIOTROP's Governing Board, which is the policy-making body, has identified for the next five years the following program thrusts, namely:

1. Tropical Ecosystems and Environmental Impacts.
Priority Areas:
 - Tropical ecosystem structure and function
 - Tropical production systems
 - Environmental impacts assessment and modeling
2. Biodiversity Conservation and Sustainable Development
Priority Areas:
 - Biological resource utilization and conservation
 - Biodiversity exploration for conservation and sustainable development

3. Biotechnology and Pest Control

Priority Areas:

- Biological control of pests and diseases
- Biological control of pollution (bioremediation technology)
- Agricultural and forest biotechnology

II. BIOTROP OBJECTIVES AND ITS ACTIVITIES

BIOTROP's objective is to contribute to the economic development of the Southeast Asian region by identifying and solving critical biological problems, the solution of which will enhance regional development and help solve these problems through appropriately designed research and training programs (Seventh Governing Board Meeting, 1972).

In particular, BIOTROP concentrates on research programs, developing the tools and principles of research in its defined program areas, and on training professionals in the region in their efforts to stimulate further biological research in member countries, thus producing the maximum multiplier effect from BIOTROP programs. The dissemination of findings and results of experimentation is fundamentally important in helping BIOTROP attain its objectives.

To implement this, BIOTROP is supported by its Information Resources Unit (IRU). The library, under the supervision of the Head of the Information Resources Unit, and has the following functions: to lend out library materials; provision of interlibrary loan services, photocopying services, general reference services, and circulation of journals among BIOTROP staff; display of new library materials and the conduct of training courses.

BIOTROP research projects, handled by its scientists, are problem oriented and geared toward developing model solutions. Through research in tropical biology and agriculture, BIOTROP has developed technologies for accelerating agricultural development, concern about the Southeast Asia's rich forests, aquatic and agricultural resources, and its sustainable development.

III. DATA AND INFORMATION SYSTEM OF BIOTROP

Among the functional goals of BIOTROP are for its library to disseminate information on its programs and research findings to users of such information in Southeast Asia; to act as a clearinghouse for processing, storage, and exchange of tropical biological information within the region; and foster international cooperation communication and exchange of scientific information among scientists interested in tropical biology. The IRU has a regional responsibility and has the objective of creating and maintaining bibliographic databases in selected areas of tropical biology.

To allow easy access to information resources available at the SEAMEO BIOTROP, the IRU produced different kinds of databases for different purposes. Until recently, five databases have been established. After the WEEDOC (Weed documents), RESABS (abstracts of research), and HERBAR (herbarium data bank) were developed, the choice was made for developing a user-friendly software, INMAGIC. The five databases are:

- **WEEDOC**, database which contains bibliographical information on weeds of Southeast Asia. IRU is proud to have a database on Southeast Asian weeds that is larger than what a user can get at any one place;
- **LIA**, a database which contains an index of scientific articles from the journals available at the IRU library;
- **DOC**, a database which contains bibliographical data of published and unpublished and reports, and/or other articles/papers written by BIOTROP staff;
- **BIOTRO**, a database which contains bibliographical data on books acquired by the BIOTROP library; and
- **SERIAL**, a database which contains bibliographical data of the serials by title acquired regularly by the BIOTROP library.

Those databases were initially established with financial assistance from the International Development Research Center (IDRC), Canada. Under the Project, BIOTROP established the Southeast Asian Weed Information Center (SEAWIC) in 1985. It is a specialized information center about undesirable plants that grow in the region. SEAWIC has been created to select, screen, analyze, process, store, and disseminate information that can be gathered in Southeast Asia. In addition, SEAWIC was established to collect and disseminate information on weeds. With the databases it has created and the publications it distributes all over the world, the project has shown its merits in terms of providing information to weed scientists all over the world.

IV. BIOTROP ROLES IN THE HIGHER EDUCATION PROJECT (HEP)

There are a number of important roles for regional universities to fulfill in regional development which constitute the overall developmental mission of these universities. The regional universities have not always been able to fulfill the mission because of the limitation caused by their isolation, lack of adequate qualified staff, inadequate facilities such as information services, and lack of communication with regional authorities and communities.

Through the HEP, the Ministry of Education and Culture designated BIOTROP as a resource center for Indonesian universities to promote scholarly research via networking. Through this project also, BIOTROP has performed its function to share its experiences by providing training courses for junior staff members at the target universities, supervise

research projects proposed by them, and facilitate any activities related to those at BIOTROP.

In the last few years, under said project, the library of BIOTROP has been a partner of the University of Indonesia in organizing training courses on library management and library staffing for junior librarians of target university libraries funded by the HEP. Library management covering strategic planning, total quality management, information technology, human resource management, and marketing of information were selected topics given in the courses. More than two hundred librarians and information specialists from the target universities participated in the courses organized jointly between BIOTROP and the School of Library Science - University of Indonesia.

V. BIOTROP AND ITS RESEARCH PROGRAMS

SEAMEO-BIOTROP, the Southeast Asian Regional Center for Tropical Biology is one of the thirteen Regional Centers of SEAMEO⁵⁾, established in 1968. The objective of the Center is to assist the Member States to identify biological problems, the solution of which will enhance economic development in their respective countries and to that end, to undertake research, publications and training programs and other related activities within and outside Indonesia.

BIOTROP's Research Projects, conducted by its scientists, are problem-oriented and geared towards developing model solutions. The Tropical Aquatic Biology (TAB) Program of BIOTROP, since mid 1976 until mid 1996, had focused their research activities on inland water ecosystems with special emphasis on natural and man-made lakes of Java. The studies covered a broad range of topics including eutrophication, water quality monitoring, aquatic weeds, water pollution, fish population structure and dynamics, feasibility studies on the use of lakes for aquaculture and the formulation of the appropriate fisheries management concepts.

Since April 2000, three training courses have been offered at BIOTROP. The first was on "Eutrophication of lakes and reservoirs", held on 10-20 April 2000; the second occurred 16 - 26 January 2001 on the topic "planning and management of eutrophication in lakes and reservoirs", and the third course on "bioremediation on aquatic ecosystems with emphasis on aquaculture" was held on 6-15 June 2001. To underline the importance of eutrophication, the courses had attracted the support of international institutions such as MAB (Man - Biosphere) UNESCO for the courses, by providing the funds to conduct these.

VI. TRAINING COURSES

Training is the major activity of the BIOTROP and is handled by the respective scientific programs. The problem-oriented training courses emphasize the critical biological problems facing the SEAMEO member countries. The courses aim to develop experts

which could identify priorities, analyze, and suggest solutions or alternative approaches to critical biological problems in the region.

Training programs are included as a part of BIOTROP's annual programs. Training is one of the BIOTROP's outlets in dissemination of information. Experiences of the last decades of development have made it clear that human capital is ultimately the key factor behind all progress. Thus, from July 1968 up to present, 1268 junior scientists and scholars have participated in short-term and long-term training courses organized by BIOTROP.

BIOTROP's regular training courses are developed from the center's experience with its research and development programs. BIOTROP can serve as a catalyst to ensure that basic knowledge related to a specific problem is acquired when needed. This ensures that existing knowledge is interpreted and is translated into principles and guidelines for potential application, and that scientists in the region are properly trained both in the methodology of this transfer as well as the development of principles and guidelines.

VII. SCIENTIFIC MEETINGS

Information exchange is what BIOTROP does best and has done for the past 32 years through presentations at our scientific meetings and publication of research papers in BIOTROP's official publication source "BIOTROPIA". In addition to the information exchange, the scientific meetings were organized in response to the current needs and emerging regional, and global concerns that are congruent with BIOTROP's overall mission and objectives.

The scientific meetings offer an opportunity for scientists from the Southeast Asian countries to discuss and share what they have achieved, as well as to relate their practical research needs.

VIII. THE INFORMATION RESOURCE UNIT (IRU)

To provide current information for its staff, the IRU screens, digests, and organizes information from institutions, agencies and other sources.

To meet this goal, the IRU has as its objectives to:

1. Provide information and library services to the following target groups: (a) BIOTROP staff ; (b) Non-BIOTROP staff which includes scientists, students (both of undergraduate and graduate schools; and (c) other communities concerned with the tropical biology and BIOTROP subject areas.
2. Provide advice and training in the management of information to: (a) BIOTROP project-related jobs; (b) Local and international institutions concerned with

tropical biology as well as BIOTROP subject areas; (c) Institutions concerned with the training of information specialists.

3. Develop data-bases useful to scientists and researchers in the Southeast Asian region.
4. To promote BIOTROP programs and activities.
5. Increase networking and linkages.

VIII.1 THE LIBRARY AND DOCUMENTATION SERVICE

- The Library

The BIOTROP Library and Documentation Service is classified as a special library and is headed by a librarian who is directly under the supervision of the Head of the Information Resource Unit. The Library has seating capacity for forty readers. It provides up-to-date references and learning resources both in print and non-print media. Currently the library holdings consist of 15,500 volumes of books, more than 1,000 serial titles, voluminous pamphlets, and microfiches. They are acquired and collected from a large variety of sources within and outside the Southeast Asian region, with 80% of the books collected written in the English language. Due to budgetary constraints, the acquisition of books and other library materials has been reduced. However, with the higher activities programmed through the program thrusts, we hope that BIOTROP can exchange publications with local and international institutions that will contribute greatly to the growth of the library collection.

- The Documentation

The first step to build up the documentation of the institute's publications and, unpublished and published reports, is the systematic collection of this material. Further dissemination of BIOTROP's research results would not be possible if the materials could not be located or be made available for consultation. These materials are stored separately from the library and are catalogued using its own systematic classifications approach. As required by SEAMES, every year BIOTROP has to submit the list of published and un-published reports and papers, which will be accumulated along with those from the other Centers under SEAMEO. These publications are very important as it is the medium to promote as well as to disseminate "gray literature" (unpublished material) collections available at the Centers.

IX. CHALLENGES TO ACCESS INFORMATION

Other challenges in providing access to scientific and technical materials can also be encountered in Indonesia as institutions try to develop comprehensive access. These include:

1. There is concern about the accessibility of domestic or local information to the international arena. This raises the issue of relationship between open information flow, and information restricted to concerns of national interest. Examples are: cultural sovereignty issues, including values related to indigenous heritage, customs, language, and national security. This reminds us that, although information production and information industries are global, information policies are local.

Regardless of the reform era in Indonesia, access to public information is still limited mainly due to a bureaucratic culture where officials remain reluctant to disseminate information. Many people still find it difficult to obtain data or information from government institutions because the government still perceives information as its personal domain. Data are strictly for private use and confidential. For example, satellite data on forest fire hot-spots should be shared with the Environmental Impact Control Agency (Bapedal) which then should pass it on to the Ministry of Forestry. Data about the weather should be shared with the Meteorological and Geophysics Agency.

Of course, there is also information the disclosure of which would have serious prejudicial consequences, such as violating a person's right to presumption of innocence; disrupting or threatening the survival of a business; undermining the nation's defense and security; and threatening the lives of others.

2. Lack of technological sophistication, including compatibility of systems, unreliability of telecommunications, interrupted electrical supply, insufficient maintenance of equipment, and even shortage of supplies plagues efforts in many locations. In some areas, particularly outside Java, there are not enough telephone lines for institutions to develop basic online networks. Lacking in some instances is an infrastructure to ensure continuity of access. Traditional methods of information collection, processing, storage and dissemination are prevalent.

In addition, the library automation programs in Indonesia are heterogeneous. It always depends on the need and capability of each library. Some libraries implement existing standards that are internationally accepted, while others have been creating their databases using a very simple format. It is understandable that the libraries do not opt for future cooperation. The argument against implementing a uniform standard is that the time spent for document processing becomes longer.

3. Lack of organized access presents problems. This includes insufficient classification or retrieval systems with a need to develop and apply a common standard. Also there is a lack of depth in many collections. It is very important to keep in mind that library development is not a priority of the national budget.

Thus, very little money is available for acquisition of books, periodicals and other library materials. Furthermore, for university libraries this has caused a halt to the purchase of library materials the past several years.

Moreover, the depository act, imposed by the National Library for the national bibliographic control of all publications in Indonesia, is not well-implemented. As a result, needed information may be present but not available, since there is no place to look for it.

It is good news that many biomedical journals are available via the Internet. Developing country researchers and students will benefit from this, as they may access the information at no cost to themselves or their institutions. But how many of them have access to the Internet and at high bandwidth? It is essential to bear pressure upon governments in these countries, and others interested such as international funding agencies, to help spread high bandwidth Internet access development. Only then, can researchers take advantage of this offer by journal publishers.

4. In Indonesia there is a severe shortage of educated information professionals who can develop the services to store, process, analyze, package and deliver scientific and technical information. In a report published by UNESCO³⁾ it mentions that "effective management of information requires professionals who understand information, how it is created, organized, sought, and used by people in both their work lives and their professional lives. One of the most important activities in an information society is to maintain a cadre of qualified information professionals". In order to assist librarians in Indonesia to cope with the numerous pressures on current innovations, as well as adapt challenges of the new millennium, appropriate training courses should be provided for them.
5. Inconsistency and lack of control of the publishing regulations have caused publishers of some serials to change the "titles" very often - particularly in recent times with the flush of enthusiasm for "reformation". Pursuing missing issues of serial titles is one of the most difficult and time consuming tasks in Indonesia.
6. Newspapers, serials and books published in the provinces are very difficult to get, if not impossible to obtain in the other provinces. This necessitates librarians or other interested users to travel around to collect these.

IX. CONCLUSION

Notwithstanding internal and external obstacles, BIOTROP has become established as a well-recognized institute of tropical biology in the Southeast Asian region, particularly in Indonesia. Among the SEAMEO-BIOTROP professional programs that the Center contributes to are:

- (1) The Center has established its credibility as a prime source of information in response to the demand for biological subject matter. The experience SEAMEO BIOTROP has achieved, especially in the field of weed biology and management, as well as the pests of stored products, have indirectly contributed to programs related to food sufficiency .
- (2). Indirectly, the BIOTROP has made an impact in the development of the Indonesian' socio-economic development. Accordingly, SEAMEO BIOTROP has helped the country to alleviate the disparity among the regions to secure qualified manpower, and the capacity building of the universities in carrying out their research and development functions.
- (2) The results obtained by SEAMEO BIOTROP so far, though modest, have contributed significantly to the development of the nation and have become internationally recognized.

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REPORT OF THE REGIONAL FISHERIES DOCUMENTATION CENTRE

Ndahigeze Spès
LTFMP Documentation Centre
Lake Tanganyika Fisheries Monitoring Programme
Bujumbura, Burundi

INTRODUCTION

When the Lake Tanganyika Research (LTR) project "Fisheries on Lake Tanganyika" became operational in 1992, it was decided that a library would be an essential component of the research program. The priority users of the Library were initially the LTR project staff and their counterparts requiring information on fisheries research and management in order to carry out their current activities. The regional Library is based in Burundi and would provide services to the project staff based in institutions of all four countries around Lake Tanganyika (Burundi, Congo, Tanzania and Zambia). It was decided that the LTR Library would cover historical as well as current information related to Lake Tanganyika and its fishery resources. In addition, it would acquire relevant publications on other African lakes and their fisheries : the broad category for limnology has been expanded to provide a specific class number for African lakes and rivers. For example : literature for Lake Kossou, Lake Volta, Lake Niger, Lake Kainji, Basin du Chad, Lake Kivu, Lake Georges, Lake Edouard, Lake Victoria, Lake Mobutu etc.

BUILDING THE LIBRARY COLLECTION

I must recognize that the combined efforts of the Libraries of the Universities of Kuopio and of FAO were instrumental in building the collection of the historical publications related to Lake Tanganyika. A great deal of information has accumulated on limnology, biology and ecology, statistics, zoology, environment, trophic dynamics, fisheries etc. The library now includes almost 6000 documents dating to 1930. For example Beauchamp, R.S.A. *Int.Rev.Ges.Hydrobiol.Hydrogr.* ;1930 ; 39 : 316-353. Many of documents of the Center (on Lake Tanganyika) are not available through normal commercial channels and, in some cases, may have very few locations anywhere in the world. Bringing all of this material together into a comprehensive collection is very useful for present and future generations of researchers and managers of Lake Tanganyika.

CLASSIFICATION AND INDEXING SYSTEM

Each document is allocated subject index terms using the Aquatic Sciences and Fisheries Abstracts (ASFA) thesaurus. The Aquatic Sciences and Fisheries Information System (ASFIS) subject categories are used as the basis for classification of documents, with expansion of the categories to cater for local needs.

THE LIBRARY DATABASE

PROCITE is the software selected to create the LTR library and input to the database continues. The catalogue of publications is printed periodically. The recent one included a total of 10,918 references and 72 maps.

N.B. All of the LTR publications are supplied to the FAO Fisheries Library where they are made available to the staff of FAO and to the many visiting scientists and experts. For more information, you could explore the web (<http://www.fao.org/fi/ltr>) and on CD-ROM. A total of 20 Field Guides and manuals and 100 Technical documents have been published, all of which are available in full text as Adobe Acrobat Reader files (produced during 1992-1999). The copies of the CD-ROM containing all LTR publications may be ordered from: Mss Anja Nuutinen ; University of Kuopio- Finland. E-Mail: Anja.Nuutinen@uku.fi

USE BY EXTERNAL USERS (1992-2000)

category	numbers
Consultants	103
Students (University of Burundi)	38
Staff other projects	1254
Other library	12
Researchers of Subregions	419
Theses	

**GHANA: LIBRARY/INSTITUTION REPORT PROFORMA
JOINT IAMS LIC/EURAS LIC CONFERENCE**

<p>Name of person who is presenting or has prepared the report: Marian Akpene Jiagge (Mrs)</p>
<p>Name and address of institution/organisation: Water Research Institute (Council for Scientific and Industrial Research), P. O. Box M32, Accra, Ghana.</p>
<p>Name of library and address (if different from above): Water Research Library</p>
<p>Name and contact details of Librarian/Head of Library/Information Service: Name: Marian A. Jiagge (Mrs) Tel: (233-21) 770396, 771513-15 Fax: (233-21) 777170, 761031 Email: wri@ghana.com <mjiagge@yahoo.com> Web/Internet</p>
<p>Institutional changes and developments during the preceding twelve months that have impacted on library and information services:</p> <p>The Library has been placed under a newly created division called the Business Development and Information Division (BDID). The library has therefore adopted a more proactive way of reaching out to its target groups. Staff have been trained on how to market information products and services. The library is therefore expected to generate some funds to support the Institute's research activities.</p>
<p>Changes and developments in the library and information services during the preceding twelve months (e.g. staff; services; equipment; systems):</p> <p>Staff have attended various training courses during the past year. Knowledge derived from these courses is used in improving library services to both our internal and external users. The Library acquired a new computer. We have created our own database called "WATLIB" which is based on the CDS/ISIS format. We also have the "GHAGRI" database which holds information on agriculture and related disciplines.</p> <p>Some of the services we provide include Selective Dissemination of Information (SDI) to our target groups, Current Information Awareness Services – we issue Information Awareness Bulletins fortnightly. We provide Inter-library Lending and Document Delivery services. (This is an IFLA/DANIDA sponsored ILL/DD for Institutes of the Council for Scientific and Industrial Research.</p> <p>The BDID provides e-mail services/INTERNET services but the PC in the library is not linked to the INTERNET. The library is on the mailing list of reputable</p>

organisations like UNESCO, WMO, UNDP and the United States of Geological Survey (USGS). The library is also on the mailing list of International Program for Technology Research in Irrigation and Drainage) IPTRID of the ODA and receives their publication called GRID. The library is cited in the "World Guide to Libraries", published by K.G. Saur Verlag GmHH & Company of Germany.

Library and Information Publications:

1. Current Information Awareness Bulletin
2. A Survey of the Information needs of staff of the Water Research Institute
3. Bibliography of African Wetlands with special reference to English speaking Areas of Africa.
4. A National Bibliography of underground water resources
5. A Partially Annotated Bibliography for the Environmental and Ecological Management and utilization of Water Resources of Ghana.
6. Documentation of the 1988-90 Hydrometeorological Disasters in Ghana.

Membership and involvement in library and information Networks:

Ghana Library Association, IAMSLIC. The library was in 1989 designated the sectoral nodal point for the water resources sector under the auspices of the Ghana National Scientific and Technological Network (GHASTINET), a project of the Council for Scientific and Industrial Research.

The Library is also a member of the Ghana Agricultural Information Network System (GAINS) which is a project of the National Agricultural Research Project (NARP), (CSIR) and has linkages with International Agricultural Information centers such as the Technical Centre for Agriculture and Rural Co-operation (CTA), International Institute for Tropical Agriculture (IITA), the Royal Tropical Institute (RTI), Commonwealth Agriculture Bureau, International (CABI) and the Food and Agriculture Organisation (FAO, AGRIS).

**GHANA: COUNTRY/REGIONAL REPORT PROFORMA
JOINT IAMSILIC/EURASILIC CONFERENCE**

Number and range of aquatic libraries in the country or region:

Currently there are 13 well known water related national institutions in Ghana with Libraries.

Summary of recent changes and developments in the country or region that have impacted on aquatic information provision:

The library has achieved some success in the provision of aquatic information in Ghana. It is the depository of the Aquatic Science and Fisheries Abstract (ASFA) on CD-Rom in Ghana. It is also a depository of Food and Agriculture Organisation (FAO) publications. It has links with other libraries which provide marine and aquatic information.

The library subscribes to scientific journals such as "Aquaculture Research", "Aquaculture and Fisheries Management" and the "Cladistics", (just to mention a few) and these go a long way in supporting research scientists in their research efforts. The library is listed in the preliminary version of the Directory of Fisheries and Aquaculture Information Resources in Africa (FAO Fisheries) Circular No.960/2000.

Details of national or regional aquatic library and information networks within the country or region:

The goal of the Ghana National Scientific and Technological Information Network, is to establish a well co-ordinated and integrated national network within the framework of a national science and technology plan and based on collaborative efforts for the provision of scientific technological information to various user agencies, through the application of appropriate modern information technologies to assist in Ghana's socio-economic development.

The Water Research Library was designated the sectoral nodal point for the water resources sector within the framework of GHASTINET. It is therefore expected to establish and maintain links with water agencies and water related or water dependent institutions which include institutions such as:

- Water Research Institute (CSIR) under Ministry of Science and Technology
- Marine Fisheries Research Division of the Ministry of Food and Agriculture (MOFA), Fisheries Directorate (MOFA).
- Food Research Institute (CSIR)
- Kwame Nkrumah University of Science and Technology (Department of Chemistry), (Institute of Renewable Natural Resources) and Kumasi Institute of Tropical Agriculture (KITA, UST).
- Programme for the Integrated Development of Artisanal Fisheries in West Africa (IDAF) in Yeji (formerly part of the FAO regional project, IDAF, based in Benin).
- University of Ghana, Legon – Department of Zoology, Department of Oceanography and Fisheries Library
- Volta River Authority
- Environmental Protection Agency
- Irrigation Development Authority
- Volta Basin Research Project, University of Ghana, Legon
- Ministry of Works and Housing, Hydro-Division
- Ghana Water Company Limited
- University of Development Studies, Tamale.

Subjects covered include fisheries, marine environment, freshwater/inland resources, aquaculture, oceanography, zoology, lagoons, marine biology, planktonology, surface water and groundwater.

Additional relevant information:

Co-operation and Sharing of resources among Libraries of water agencies:

1. CD-ROM facility available at WRL for water agencies to make use of
2. Depository of FAO, UNESCO Publications etc.
3. Exchange of publications; Gifts – publications are sent as gifts to water agencies
4. Inter-library Lending and Document Delivery (IFLA/DANIDA) sponsored by ILL/DD for CSIR Institutes
5. Selective Dissemination of Information (SDI)
6. Current Awareness policy being implemented through the issues of subject bibliographies, Information Awareness Bulletins distributed to water agencies – we are therefore aware of what each agency has at a given time.

We tour libraries of these institutions from time to time to acquaint ourselves with new developments.

PROBLEMS

There is the need for the library to acquire 2 more computers. It is essential that it gets INTERNET connectivity. Our main problem has been with funding. We shall therefore appreciate it very much if some donor organizations could come to our aid. We use this opportunity to thank the Food and Agriculture Organisation (FAO) for donating ASFA on CD-Rom to our institute. We welcome such kind gestures from other organisations.



**GUINEA : REPORT OF ACTIVITIES (APRIL 2001)
OF THE INFORMATION AND VALORIZATION SERVICE (SIVA)**

Fodé Karim Kaba
Librarian Chief
E-mail : Kabalondon@yahoo.fr

Victor Totté Sandouno
Librarian Assistant

Information and Valorization Service
National Center of the Fisheries Sciences of Boussoura (CNSHB)
B.P. : 3738/39, Conakry (Guinea)
E-mail : cns hb@sotelgui.org.net

GENERAL INFORMATION :

- Year of opening of the service: 1991. (restructuration in 1995).
- Person to contact: KABA Fodé K. (Librarian); SANDOUNO Victor (Librarian assistant).
- Number of persons in the service: four (4) full-time.
- Hours of operation: 8h30 to 12h00 and 13h00 to 16h00 except Friday 8h30 to 13h00.
- Modes of access: Semi - direct
- Condition of access: Loan reserved for workers of the Center; Possible consultation for externals.
- Address : B.P. : 3738/39 , Conakry (Guinée). Fax : (224) 41 35 64 E-mail : cns hb@sotelgui.gn.org or kabalondon@yahoo.fr (for Kaba Fodé Karim) and vsandouno@caramail.com (for Sandouno Victor Totté).

AREAS OF INTEREST :

- Aquatic sciences and fisheries; littoral zone.

GEOGRAPHICAL COVER:

- Guinea Conakry, Africa and other geographical areas.

ADMINISTRATIVE SITUATION :

The Service of Information and Valorization (SIVA) is one of the technical support services of the Direction, charged with the collection, management and distribution of scientific information on research. It consists of a service of documentation, a committee of publishing and a reprography section. The charges of SIVA are :

- to organize and insure the functioning of documentation and publication services to the Center;
- to facilitate the circulation of the scientific information to the personnel of the Center;
- to support user of the Center in searching for scientific information;
- to prepare a periodic bulletin and other relevant publications to publicize the work and results of the Center;
- to insure the distribution of publications of the Center in Guinea and abroad;

To realize these missions, the service has following personnel and equipment :

1 - Personnel :

SIVA has three employees, two in the documentation section (F.K. Kaba and V. Sandouno) and one in the reprography section (A. Oulare). There are two researchers (K. Solie and F. Domain) in the Scientific Publications Committee of the Center.

2 - Computer Equipment:

Material	Brand	Quantity	Condition
PC 200 Mhz 6 Go	IBM Aptiva	1	Good
Barcode reader	Dataplus 8000	1	Good
PC multimédia	Transtec 1100	1	Good
Transformer	UPS	1	Good

3 - Reprographics Equipment :

Material	Brand	Quantity	Condition
Photocopier	RICOH	1	Good
Fax machine	TOSHAFAX MA-750	1	Good
Paper cutter	IDEAL 4700A	1	Bad
Duplicator	Rénéo GESTETNER 4110	1	Good
Binder	Planax L7 50 (25/8)	1	Good
Taseuse	Speal	1	Good
Stapler	Novus B533	1	Good
Shredder	Ellepi standard	1	Good

4 - Documents: (April 2001)

DOCUMENT	NOMBRE	Consultation	Prêt interne
CNSHB's collection.	191	oui	oui
Theses and memoirs	47	oui	oui
Books	418	oui	oui
Project Erosion Costal Fund	83	?	non
Discarded	515	oui	oui
Periodical titles	46	oui	oui
General Books	27	oui	oui
COPACE and DIPA collection.	141	oui	oui
FAO, UNESCO/COI collection.	361	oui	oui
Maps, plans**	62	oui	non
NBM (vidéo, CD-ROM, etc.)	7	oui	non
TOTAL DOCUMENTS	1883		
Total (document in 1999)	1842		
Total of documents acquired in 2000 is 41			
1 Documents (total number) :		2 -Périodicals : titres reçus	
-Acquisition 2001 : 57 whose credits CNSHB : 00 whose projects : 00.* whose exchanges and gifts : : 57		Suscription 2001 : 16. whose credits CNSHB : 00. whose credits projects : * whose exchanges and gifts : 18	
3- Other resources: - CD ROM : 9 whose 8 CD ROM ASFA and 00 Curent Contents			

* these acquisitions are paid directly by researchers from their budgets.

Documentary Data Base : H - CNSHB and BDD ProCite

The processing and the automation of databases continues; the table below, indicates the state of papers entered in the databases H - CNSHB and BDD ProCite.

Name documentary Data Base	BDD H-CNSHB	BDD ProCite
Total documents entered	423	--
Total documents entered in 1996	86	--
Total documents entered in 1997	306	--
Total documents entered in 1998	383	--
Total documents entered in 1999	414	---
Total documents entered in 2000	423	2205

6 - Services and database products:

Storage of databases in ProCite and TEXTODOS allows for retrieval of documents, but also requires adoption of new information technology software.

Currently, the Documentation Sector offers these services:

- Ready return of documents.
- Consultation on the spot of primary documents and periodicals.
- Research and primary document supply.
- Research and supply of secondary information (bibliographical references).
- Distribution of scientific publications by the Center.
- Basic searching on CD-ROM Horizon and CD-ROM ASFA.
- Basic searching on H - CNSHB and BDD ProCite.

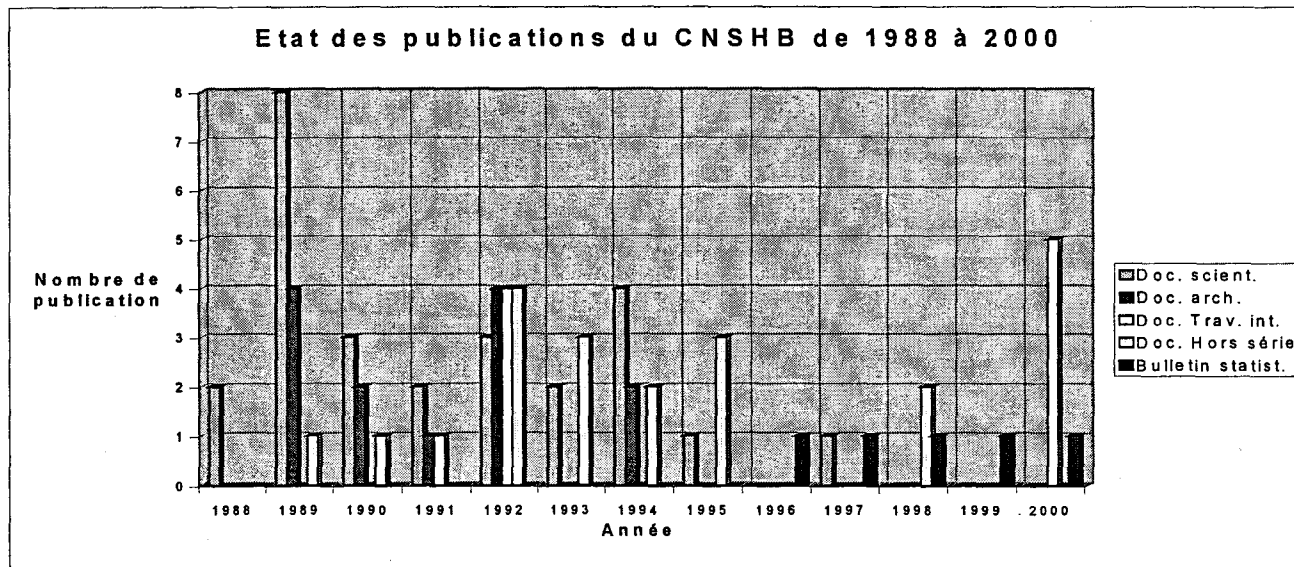
7 - Usage of the service:

According to loan statistics, the usage of the documentation service is eight (8) users per workday of whom five (5) are researchers and three (3) are external users, on average.

8 - Scientific publications of CNSHB from 1988 to April 2001:

Publications of the Center since 1988 by year and by series.

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total
Scientific documents	02	08	03	02	03	02	04	01	00	01	00	00	00	00	26
Archival documents	00	04	02	01	04	00	02	00	00	00	00	00	00	00	13
Internal working documents	00	00	00	01	04	00	00	00	00	00	00	00	05	00	10
Documents out of series	00	01	01	00	04	03	02	03	00	00	02	00	00	00	16
Statistical bulletins	00	00	00	00	00	00	00	00	01	01	01	01	01	00	05
Total	02	13	06	04	15	05	08	04	01	02	03	01	06	00	70



GENERAL PROGRESS

Prominent activities of SIVA have been:

1. The project FAO - FIDI - ASFA and RECOSCIX-CEA;
2. Actions of the information / valorization component of the Project FAC;
3. Actions of the communication component of the Project PEG (Ecological Fishing in Guinea); and

ASSOCIATED ACTIVITIES

In the framework of the documentary system and professional associations, the SIVA participates in:

Nationally : REDOCO (Documentary System of Conakry);

Regionally : ASIPA: Association of Specialists of the Information in Peach in Africa
RECOSCIX-CEA: (Regional Cooperation in scientific Information Exchange in the Central East Atlantic)

Internationally : IAMSLIC: International Association of Aquatic and Marine Science Libraries and Information Centers.

In fact, these associated activities are almost non-existent because of lack of dialogue and organization at the national and African level and difficulty of paying the contributions.

PERSPECTIVE 2001

In the year 2001 projects were planned:

1. To build a database covering all areas of interest to the Center ; to manage this database, publicize it, and make it accessible to all users.
2. To respond to documentary needs by searching bibliographic data (Horizon, ASFA and CCOD).
3. To improve services of reprographics and scientific publications.
4. To provide the best distribution of technical and scientific information to the personnel of the Center.
5. To exploit the internal database and search online to:
 - establish researcher profiles by searching the databases H-CNSHB; ProCite and ASFA;

- establish cooperation with the Center SYFED-REFER of the University of Conakry for searching French-language databases online and on CD-ROM;
6. To participate in Project FAC and Projetc PEG (Ecological Fishing in Guinea) through its components «Cell Scientific Information and Valorization »;
 7. To participate in systems and associations of documentation specialists centered on the local system REDOCO and the system under regional RECOSCIX-CEA and IAMSLIC;
 8. To initiate and participate in projects aimed at improvement of the documentary system of the CNSHB.



TANZANIA FISHERIES RESEARCH INSTITUTE: INFORMATION AVAILABILITY AND DOCUMENTATION AT TAFIRI

Samwel Katunzi Kamugisha

INTRODUCTION

Tanzania Fisheries Research Institute was established with the following main objectives; to promote, co-ordinate and implement fisheries research for the purpose of establishing, improving or developing better methods or techniques of fishing, fish processing and aquaculture development. It was also intended to improve and protect the fishing industry, investigations on fish diseases, their case and to develop ways of controlling or preventing their occurrence. All objectives led into information generation. The generated information needs to be accessible to the user.

Information available at our Institute can be grouped into various categories according to their source.

We have the institute's printout which includes all quarterly and annual reports, the Institute's bulletin, and other research reports produced by the Institute itself.

- Library-subscribed materials: include various journals, books annual reports and technical reports from various places.
- Programmes/projects reports: this covers all information generated as a result of projects' research results. They are mainly quarterly or annually and report on specified topics.
- CD-ROMs and other Internet oriented materials.
- Information from other collaborating Institutions, which include various journals, reports, and specific research papers.

INSTITUTE'S PRINTOUTS

The role of our Institute is to conduct research in various aspects of fisheries for the establishment, improvement of development of better methods or techniques of fishing, fish processing and aquaculture research and development. Thus from the research conducted reports are produced.

The reports are in the form of *TAFIRI Bulletin*, quarterly and annual research reports. All this information is kept on our Institute's documentation units and respective programme files. For those reports research projects funded by other Institutes are submitted to the funding agency and can be available upon request.

LIBRARIES

Libraries play a major role in the research institutions for promoting fisheries research. In the case of TAFIRI we have simple documentation units at our centers to cover library activities although there are plans for making Mwanza library the Institutes Documentation Centre/Database under Lake Victoria Environment Management Programme (LVEMP) project. Information in our library is not computerized although some of our centers have started to do so. Lack of some facilities such as scanners slows down the process.

Our library receives bulletins, newsletters, books and technical reports from FAO and UNESCO. Some of the journals received by our library as grants are as follows:

- *Naga The ICLARM Quarterly*
- *ICLARM Annual Reports*
- *Fishbyte*
- *Seafdec*
- *Asian Aquaculture Newsletter*
- *FAO's Freshwater and Aquaculture Content and Tables (FACT)*
- *Marine Sciences Contents and Table (MSCT)*
- *United Nation Environment Programme's Siren*
- *East African Biodiversity Newsletter*
- *CTA's Spore Bi-Monthly Newsletter, Agriculture and Rural Development and EC Fisheries Cooperation Bulletin*
- *Bulletin of Technical Centre for Agriculture and Rural Cooperation*
- *Aquafarm*
- *News Coral Action*
- *FAO and UNESCO Technical Reports*
- *Seychelles Fishing Authority Technology Report*
- *Tanzania Science and Technology News from COSTECH*
- *Tanzania Journal of Agricultural Science*
- *Tanzania Coastal Management Partnership (TCMP) Reports*
- *FAO Species Catalogue*
- *FAO Bulletin of Fisheries Statistics*
- *Lake Victoria Fisheries Research Project Report*
- *SWIOP Document*
- *Checklist of Freshwater Fishes of Africa (CLOFFA)*
- *The Zambezi an IMERCSA Newsletter together with CEP Factsheets from SARDC*
- *Fish Farmer*

COMPUTER AND INTERNET SERVICE

We have been receiving CD-ROMs from various sources. They have been installed on our computer and can be accessed using the appropriate programme. So far we have the following list of CD-ROMs and databases.

- *Fishbase 98*
- *RECOSCIX-WIO WIOBASE CD-ROM* on data and information. The CD contains information form of web pages which can also be accessible through the IOC/UNESCO web site <http://www.unesco.org/ioc> Other information includes web pages of ASFA, IMS, IOC/UNESCO, KMFRI and RECOSCIX – WIO. Oceanographic data, Literature information, ASFA thesaurus, directory of marine expertise (WIODir), extracts of Belgian ANTILOPE database of current periodicals and fish species codes developed and maintained by FAO (SPECCO)
- *Aquatic Sciences & Fisheries Abstracts (ASFA)* CD-ROMs. The CDs contain information on Aquatic Biology, Aquaculture and Fisheries Resources for 1971-1989, 1990-June 1999 and 1990-January 2000
- *FAO on the Internet* CD-ROMs which contains data from FAOWEB directory. The CD contains selected information available in the FAO world wide web site by the end of July 1998.
- *IMS META DATABASE*
- *TAFIRI DATABASE* (Still under process based on the mode of IMS Meta Database)

We have also linked to the Internet services thus we are able to exchange information via e-mail services and also access various database in their respective we site

PROGRAMMES

Currently there are ongoing programmes on the Great Lakes that promote availability of information relevant to lakes.

Lake Tanganyika Biodiversity Project

From this project, various reports and newsletters concerning the project are produced. Those reports include:

- LakeSide View Newsletter
- Lake Tanganyika Technical Documents

Lake Nyasa/Malawi Biodiversity Project

From this project various technical reports are produced about the Lake Victoria Environmental Management Programme.

In this project collection and availability of information is more advanced compared to the other projects. TAFIRI is working under the main components of Fisheries Biology and Biodiversity, Aquaculture, Socio-economics and Database. In each component various research report are produced and submitted to the Project's Secretariat and copies are retained at the Institute. The project Secretariat also produces Nyanza Review Newsletter and various brochure regarding project's activities, copies of their documents are available at our Institute.

Fish Biology and Biodiversity

In this sub-component after every quarterly field trip there is production of the report of research results on the main lake and another report on satellite lakes. It is also intended to produce two books from the research results.

Aquaculture

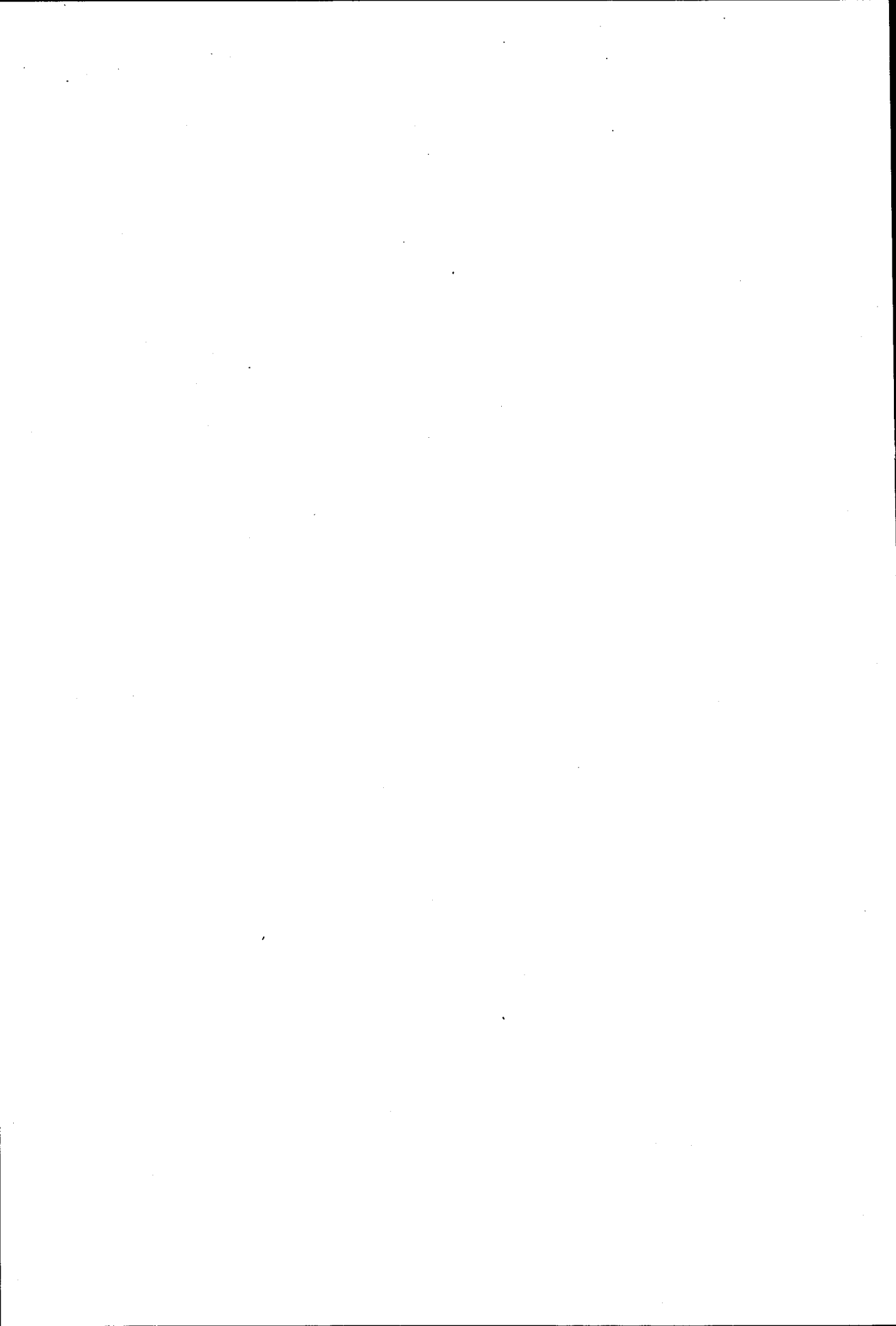
In this sub-component there are reports on survey of aquaculture potential in the Lake regions, quarterly reports and various report on aquaculture experiments. Collection of literature was also done and the information can be available at the institute and at the project secretariat office. Lists of collected literature are as follows:

1. Collected reprints on aquaculture development
2. Collected reprints on the Fishery of Lake Victoria
3. Collected reprints on the Species/Evolution of Species with reference to Lake Victoria
4. Tilapia Genetic resources for Aquaculture Proceeding of the workshop on Tilapia Genetic resources for Aquaculture 23 – 24 March, 1987 Bangkok Thailand
5. Collected reprints on the Biology of *Labeo Victorianus* and *Tilapia leucosticta* in Lake Victoria
6. Fishes of Uganda
7. The Fishes of Uganda – Vol. II, III and IV
8. The Cichlid Fishes of the Great Lakes of Africa their Biology and Evolution
9. The Cichlid Fishes of Lake Victoria ND Nabugabo, Uganda
10. Collected reprints on the fishes of Lake Victoria
11. The African Journal of Tropical Hydrobiology and Fisheries – Volume 4 – 1975
12. Collected reprints on the growth parameters of selected fishes
13. Fishery Biology the Schibeid Cat-Fish *Pangasius pangasius* (HAMILTON) and its utility and Propagation in culture ponds A. David – Indian Journal of Fisheries Vol X No. 2 – 1963 (Pg. 521 – 600)

14. Manual on seed Production of African Catfish (*Clarias gariepinus*)
Peteri, A.; Nandi, S.; and Choridhury – 1992
15. Food and Growth of *Clarias gariepinus*
16. Collected reprints on growth and survival of *Clarias* sp.
17. Collected reprints on growth, fecundity and genetics of *clarias* sp.
18. Collected reprints on the Limnology Lakes and Pond Management.
19. Collected reprints on aquaculture management
20. Collected on nutrition of *Tilapia* sp

Socio-economics

In this sub component, reports of research results are available and also reports on special case studies. A literature collection was also compiled on the socio-economic aspects of the fisheries sector. The final report covering the information available is in progress.



TUNISIA / INSTM REPORT

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Service Bibliothèque
Tunis, Tunisia

Created in 1924 according to the standard architectural model of that period with a laboratory for the research, a museum for the public, a library for the documentation, the Oceanographical Station of Salamambo (SOS) was the first and the greatest marine sciences institution created in Africa and in the Arabic World.

In 1996, the name SOS was changed into "National Institute of Sea Sciences and Technologies" (INSTM). It is composed of five research centers, a vessel "Hannibal," a seminar space, a library, and a museum with fresh and seawater aquaria.

Recently, the INSTM has increased personnel (70 reseachers, 15 technicians, 70 workers) and laboratory materials (Aquaculture, Biotechnologies, Aquatic environment, Marine resources...).

- INSTM leads national plan research (PNM) in marine sciences linked with development,
- It participates in the different regional and national networks in connection with the Mediterranean Sea,
- It helps in solving problems due to the urban and economic activity development on the coast and in territorial waters,
- It transfers knowledge and results of its experts to professional, scientific and technical groups that surround it.

The institute is composed currently of a scientific library with more than 40,000 documents some of them with electronic support. The subscription to the ASFA databases (Aquatic Sciences and Fisheries Abstracts) constitutes an important tool for researchers.

The INSTM provides a great deal of effort in the promotion of science and technology of the sea. It leads many national research plan (PNM), organises annual scientific meetings in the form of international and national seminars and insures the dissemination of its results by the publication of technical scientific documents, among them:

- Bulletin of INSTM
- Reports and documents of INSTM.



ONEFISH - ONE YEAR ON...

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The need to improve communication, information flows and networking in the field of fisheries and aquatic research and development has been widely recognised for some considerable time, and has been highlighted in all recent major international policy instruments related to fisheries development.

Donor organisations recognise that the problem is particularly acute in developing countries where access to information relevant to effective research planning is often poor, and where dissemination from research activities is weak.

The relatively recent advent of Internet technologies has offered a completely new opportunity for overcoming this problem...

OVERVIEW

oneFish - a thematic participatory Internet portal and knowledge management system developed by the Support unit for International Fisheries and Aquatic Research (SIFAR) in collaboration with the United Nations Food and Agriculture Organisation (UN FAO).

oneFish - addresses known constraints to knowledge generation and dissemination by allowing anyone to search and retrieve information, and by allowing registered users to contribute information to specific subject areas.

oneFish - donor organisations, research institutes and special interest groups can develop virtual offices within oneFish via which they can collect, organise and disseminate their research output.

oneFish - carefully selected subject specialist topic editors assist in the management of the system by reviewing, organising and ranking information submitted to them.

CHRONOLOGY

- February 2000 oneFish prototype goes online.
- May 2000 oneFish prototype presented and tested at the EURASLIC Conference in Aberdeen (Baron et al. 2001); (Bostock 2001); (McCulloch et al 2001).
- October 2000 oneFish prototype demonstrated at the IAMSLIC Conference in Victoria, BC (Baron et al. 2001).
- February 2001 oneFish 1.0 goes live on the Internet - first fully interactive version.
- October 2001 oneFish 1.0 exhibited at the Joint Iamslic/Euraslic Conference in Brest.
- October 2001 oneFish 1.2 - intensive testing of new enhanced version currently taking place.
- November 2001 oneFish 1.2 due for release...

ATTRIBUTES

- oneFish - a subject gateway providing access to a wide range of information on fisheries and aquatic research and development.
- oneFish - an online directory, a virtual library; an electronic repository; a means of communication; a community-building tool.
- oneFish - encourages immediate and effective online publishing of research results and outputs.
- oneFish - permits devolved management by individual specialists and permits institutes and networks to create virtual offices or institutional topics.
- oneFish - encourages the participatory approach to the collection, sharing and dissemination of information.

CONTENT

- oneFish - provides access to c. 10,000 items of knowledge linked to c.1700 topics, updated daily.

oneFish - knowledge types include: books; contacts; discussions; documents; events; multimedia items; news articles; polls; projects; and websites.

oneFish - knowledge includes in excess of 6,000 fisheries and aquatic project records dating from 1960 to 2001.

oneFish - access is freely available to anyone who can access the Internet and regular users may become registered members and contribute information.

oneFish - since February 2001 has attracted over 260 registered members and more that 50 subject specialist volunteer topic editors.

EDITORIAL STRUCTURE

oneFish Editorial Advisory Board – providing advice to the Senior Editorial Group and promoting the use and adoption of the system.

oneFish Senior Editorial Group - responsible for day to day management of the oneFish system and ongoing development.

oneFish Subject Specialist Topic Editors - managing and developing specific topic areas
- contributing information - searching and retrieving knowledge.

oneFish Registered Members - contributing information - searching and retrieving knowledge.

oneFish Browsers - searching and retrieving knowledge.

SUMMARY

oneFish - will provide the fisheries research community with the largest fully integrated global collection of information on fisheries and aquatic research and development.

oneFish - will be a tool for all and as a result it will grow and develop according to the needs and requirements of all stakeholders in the target community.

oneFish - a truly responsive approach to the information needs of the fisheries and aquatic research community in this new millennium.

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**DIRECTORY OF FISHERIES AND AQUACULTURE
INFORMATION RESOURCES IN AFRICA**

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FAO Fisheries Library
Bibliothèque des pêches de la FAO

Fodé Karim Kaba
Centre National des Sciences Halieutiques de Boussoura,
Guinea / Guinée

ABSTRACT: An overview of the fisheries and aquaculture information resources available or produced in Africa has been compiled using the CDS/ISIS software. The Directory includes details of the information resources and services of international organizations, regional bodies and networks; and national institutions and organizations in Africa. Fisheries and aquaculture periodicals and newsletters published in Africa are listed, as well as brief details of relevant Internet sites. The main purpose of the Directory is to facilitate more effective dissemination of fisheries and aquaculture information and to promote collaboration and information resource-sharing activities between fisheries institutions in Africa. The Directory will also be published on the FAO home page at <http://www.fao.org/fi/library/directry.htm>

The Poster presented an overview of the different information resources covered by the Directory:

- **ORGANIZATIONS.** Details of the information resources and services of 22 international organizations and of national institutions involved in fisheries or aquaculture in 53 African countries;
- **REGIONAL INFORMATION NETWORKS AND PROGRAMMES** including:
Data and Information Systems,
Associations and Societies,
Fisheries and Aquaculture Projects,
Regional Fishery Bodies.
- **INFORMATION RESOURCE SHARING ACTIVITIES**
- **CURRENT AFRICAN FISHERIES AND AQUACULTURE PERIODICALS.**
- **A DIRECTORY OF AFRICAN FISHERIES, AQUACULTURE AND RELATED INTERNET SITES.** <www.fao.org/fi/library/NATAF.HTM>

IAMSLIC WEBSITE REDESIGN CHECKLIST: HOW TO SURVIVE THE RFP/REDESIGN PROCESS

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DO's of the Web site redesign

Management issues:

- 1) Have 2 people as key contacts with the designer for support of continuous communication
- 2) Consider project management software

Request for Proposal (RFP) preparation:

- 1) Consult early with server technical staff for precise technical requirements including guidelines for accommodation of persons with disabilities
- 2) Include requirement for technical documentation and help files for the new web site
- 3) Clearly state required documents to be received or application will not be considered
- 4) Committee chair should draft initial document to provide consistent language, then clearly define sections to be reviewed by committee
- 5) If possible, include bid range to eliminate absurdly high bidders

Memorandum of Understanding (MOU):

- 1) Break up design into discrete smaller units to provide flexible timeline for comments after each new important component is added
- 2) Require the overall "design options" presentation to be midway in the process as this takes lots of time to pick and choose from
- 3) Establish review deadlines for the majority of reviewers well before the final review
- 4) Make Final review period for fine-tuning only

Redesign Testing Phase:

- 1) Have key contacts of the association closely monitor the progress with the designer by phone as well as by e-mail
- 2) Be prepared to learn much more from the designer than they will from you

DON'Ts of the Web site redesign

Management issues:

- 1) Don't assume the bid recipient will stick with you
- 2) Don't change several factors at the same time: server location, domain name, and redesign Break these out over time

Request for Proposal (RFP) preparation:

- 1) Don't forget to "pad" the deadlines as there will be all kinds of unanticipated delays
- 2) Don't leave the RFP up on the web site for more than a few weeks beyond the application deadline
- 3) Don't forget to get quotes for maintenance contracts from the redesign bidders in case the association decides to continue with the bid recipient after project completion

Memorandum of Understanding (MOU):

- 1) Don't forget to include all committee chairs in review deadlines and copy them on the final MOU so that they know of the time commitment
- 2) Don't leave out precise descriptions of who is responsible for coordinating comments versus who should be providing these

Redesign Testing Phase:

- 1) Don't forget to encourage committee members to send comments to all committee members – allows for building on each other's work and avoids duplication
- 2) Don't forget to get out-of-office schedules from all reviewers to enable tracking of when the comment period can be closed
- 3) Don't panic -- the end result is well worth the effort

Completion of Project:

- 1) Don't forget to acknowledge the designer in the web site

**E-Books for IAMSLIC?
Testing the waters in 2001**
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E-books are an exciting technology presenting libraries with opportunity -- and a host of new challenges. Are the marine and aquatic sciences currently covered by e-book vendors in such a way as to ensure benefit worth the necessary investment of time and resources? Libraries currently utilize a variety of electronic resources -- databases, e-journals, and computer files (some of which are called 'books'), which are LAN-mounted or accessed via the WWW and which allow multiple simultaneous users.

The E-books considered in this study are confined to those monographic electronic titles which are restricted to use by one patron at a time and that are somehow charged to that user for a given loan period.

E-book publishers aim their products at individual buyers, requiring the use of either e-book readers (purchased separately) or proprietary e-book reader software. Content is usually of the best-seller-list variety. For libraries, cataloging and circulation issues abound! A library alternative, the NetLibrary model, presents a package of e-book material geared to libraries and accessible via the WWW. While some circulation and cataloging issues remain, this model makes e-books much easier for libraries to assimilate. Records may be purchased for batch loading.

NetLibrary (www.netlibrary.com) provides libraries with a shared collection (available to all subscribing libraries) as well as an opportunity to custom create a 'private' collection of unique titles selected by each library.

- Access is via the WWW, but each title may be 'charged' to only one patron at a time.
- Loan periods vary from 15 minutes to several weeks, and are determined by the library.
- Material is not simply of the best-seller variety, although literature and the classics still predominate.

It seems generally true at present that the sciences are under-represented in the e-book marketplace. In an effort to determine whether or not libraries specializing in aquaculture and the marine sciences might want to venture *at this point* into the still but deep waters of e-books, a small cross-section of e-book vendors and NetLibrary were searched for relevant material.

Of the 20 e-book publishers surveyed by means of keyword search for marine science related material:

- 15 had no relevant marine science research material
- 4 had fewer than 5 titles for marine science researchers
- Only 1 (Ebookshoppe.com) scored greater than 10 titles that were relevant

NetLibrary was surveyed, based on the collection purchased by the University of Connecticut libraries (shared and private collections). Of 24 'hits', only 6 appear to be material relevant to research in aquatic and marine science. It should be noted, however, that this assessment is based on the collection purchased by the University of Connecticut. NetLibrary will run keyword searches on demand for libraries interested in obtaining further information on their available titles. While their holdings are not extensive in the sciences, some scientific material is available for selection by libraries for their private collections.

The E-book environment is changing rapidly, and the future may hold more promise for science and specialized libraries interested in e-books. Meanwhile, there are still some interesting options for specialized science libraries. Trends to watch:

Questia (www.questia.com) is an online library which provides full text resources to individuals (not to libraries) for a cost. The site is worth a visit for its content, searchability, and for the innovative approach. Questia invites librarians to use its catalog (which is freely searchable) for bibliographic information and as an emergency resource for patrons who are willing to pay for the privilege. Individual researchers with well-funded projects may want to take advantage of this option.

Columbia Earthscape (www.earthscape.org) presents a wide range of Earth resources online. Holdings include journals, databases, and e-books. While this is a full-text subscriber service (rather than an e-book vendor), the choice of material is encouraging. It may be a cost-effective resource for some libraries.

Online Books Page at the Univ. of Pennsylvania (onlinebooks.library.upenn.edu) presents a well-arranged listing of electronic books available full-text free of charge via the WWW, as well as some helpful tips on other resources available.

In conclusion, the e-book market for marine science related research is not robust at the present time, although emerging trends and innovative solutions are worth watching.

For details on this study and some simple title lists of resources found in the most promising sources searched, please contact Mary Heckman by email at Mary.Heckman@alum.conncoll.edu.

**THE MANAGEMENT OF INFORMATION ON FISHERIES IN GUINEA: FROM
SYSTEMIC APPROACH TO THE INTEGRATION OF INFORMATION
TECHNOLOGIES**

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ABSTRACT: A lot of projects on collection and dissemination of information have been undertaken recently in West Africa. To reach the objectives of these projects, the use of New Technologies of Information and Communication (NTIC) is necessary. In what context do documentary services integrate these new technologies? To solve what problems? These are the questions that this poster attempts to answer, through examples of plans proposed to the National Center of Fisheries Sciences of Boussoura (CNSHB) in Guinea – Conakry. After a schematic presentation of the fishery documentation system that has been devised, the poster points out difficulties related to the creation of a reference program in aquatic sciences and fisheries, and to access to secondary information, that hinders the internal work of an information service in Africa. The recommended solutions are presented as explanations of the documentary program submitted to the Project PEG (Ecological Fishing in Guinea), particularly in its proposal “Improvement of the Fishery Environment” to the CNSHB.

**RESEARCH ACTIVITY IN MARINE FISHERIES AND AQUACULTURE: A
BIBLIOMETRIC ANALYSIS**

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ABSTRACT: This is the analysis of the publications received in our library in the fields of marine fisheries and aquaculture. Our software MINISIS can produce statistics and we can study the relations between journals, journal articles, books, keywords, years. The main objective is to use bibliometric analysis to reveal some features of research.

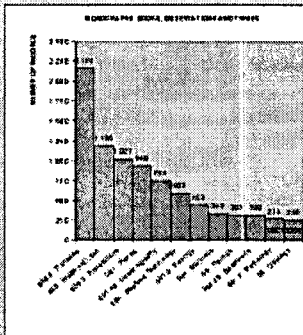
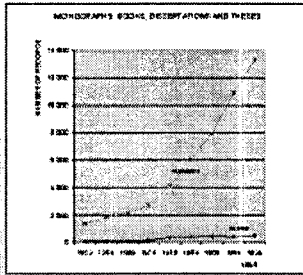
RESEARCH ACTIVITY IN MARINE FISHERIES AND AQUACULTURE : A BIBLIOMETRIC ANALYSIS

The Nantes Library's mission is to ensure the delivery of scientific information to users : IFREMER staff, other governmental institutes, industry and general public. The main resource for accomplishing this mission is a research collection with a comprehensive coverage of living marine resources, fisheries and aquaculture, marine environment and ecology, chemical pollutants, up-grading of marine products, seafood processing, seafood quality. The Nantes library holds 15,000 monographs, 950 current serials (2,500 serials), 22,000 pamphlets, 2,500 charts, 2,000 reports.

Two IFREMER's own databases have been created and managed with the software MINISIS :

- LIVREMER covers the monographs received in all IFREMER libraries, mainly Brest and Nantes.
- SESAMER covers the articles of 960 journals received in the Nantes library and related to marine fisheries and marine aquaculture

LIVREMER : 15,000 MONOGRAPHS



This analysis confirms the growth of the literature and the main covered fields

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Ifremer

SESAMER : 42,000 ARTICLES since 1980 about FISHERIES and AQUACULTURE

Field	Articles	Field	Articles
Antarctica	130	1. Oceanogr.	2,528
Arctic	130	2. Oceanogr.	2,515
Chad	130	3. Oceanogr.	1,204
Chad	130	4. Oceanogr.	1,721
Chad	130	5. Marine	1,913
Chad	130	6. Marine	4,282
Chad	130	7. Oceanogr.	4,402
Chad	130	8. Oceanogr.	1,462
Chad	130	9. Oceanogr.	1,121
Chad	130	10. Oceanogr.	918
Chad	130	11. Oceanogr.	728
Chad	130	12. Oceanogr.	531
Chad	130	13. Oceanogr.	504
Chad	130	14. Oceanogr.	507
Chad	130	15. Oceanogr.	513
Chad	130	16. Oceanogr.	548
Chad	130	17. Oceanogr.	548
Chad	130	18. Oceanogr.	548
Chad	130	19. Oceanogr.	548
Chad	130	20. Oceanogr.	548
Chad	130	21. Oceanogr.	548
Chad	130	22. Oceanogr.	548
Chad	130	23. Oceanogr.	548
Chad	130	24. Oceanogr.	548
Chad	130	25. Oceanogr.	548

These tables show that researchers now publish less articles on some species and more articles on others

In order to know everything about	SARDINE	SQUID
You should read the following journals	1. Can. J. Mar. Freshw. Res. 2. ICES J. Mar. Sci. 3. Int. J. Fisheries 4. J. Fish Biol. 5. Fish. Res.	1. J. Shellfish Res. 2. Aquaculture 3. Int. J. Fish. Biol. Econ. 4. J. Aquac. Mar. Biol. Econ. 5. Invertebr. Pathol.
And you will find	21% of the field	35% of the field

CONCLUSION
 Generally the bibliometric analysis shows how fields of research change with time

MANAGING RESOURCES IN A SEA OF CHANGE
27th Annual IAMSLIC Conference and the 9th EURASLIC Conference
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8/11/01

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