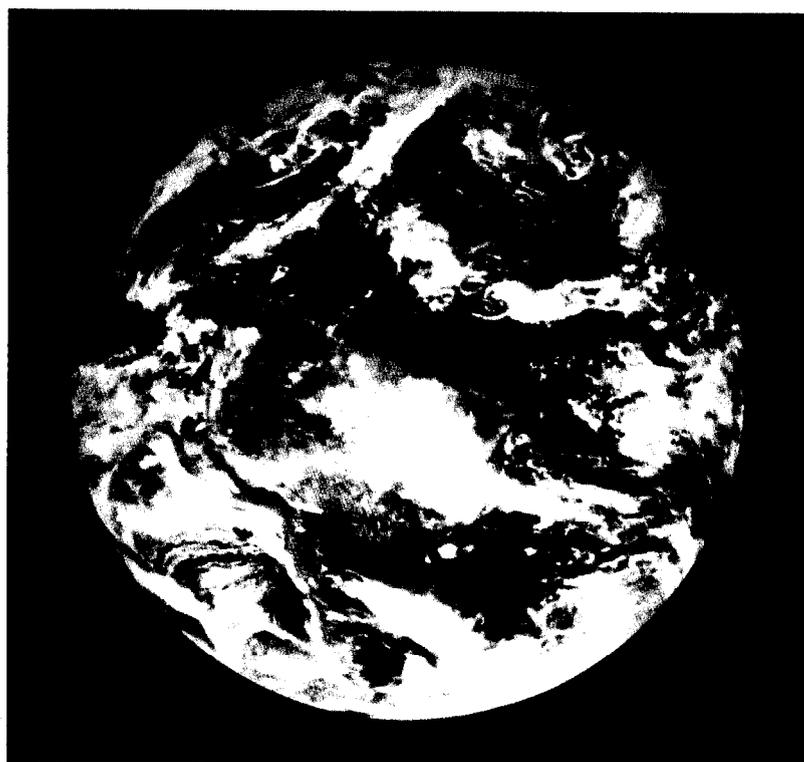


Intergovernmental Oceanographic Commission

ASFA

The First Twenty Years



An Outline History of
Aquatic Sciences and
Fisheries Abstracts
1971-1990

UNESCO

**Intergovernmental Oceanographic Commission
(of UNESCO)**

**ASFA: The First Twenty Years. An Outline History of
Aquatic Sciences and Fisheries Abstracts, 1971-1990**

Prepared for the ASFA Advisory Board by Allen Varley

ASFA is jointly sponsored by

**United Nations Division of Ocean Affairs and the Law of the Sea (UNDOALOS)
Food and Agriculture Organization of the United Nations (FAO)
Intergovernmental Oceanographic Commission (of UNESCO) (IOC)
United Nations Environment Programme (UNEP)**

INTRODUCTION

In 1993 I suggested to the members of the ASFA Advisory Board that since most of the people closely concerned with the development of ASFA had retired or moved to other fields, efforts should be made, before it became too late, to record ASFA's history, and to document its evolution, growth, policy, philosophy and technical development. I informed them that I would be willing to undertake the work.

The resulting record would be a useful reference document of value not only to the members of the Advisory Board and their colleagues, but also to present and future staff of the Secretariat, the international organisations, the input centres and the publisher, as well as to new and potential partners and funding bodies. In addition, an account of international cooperation could well prove to be of interest to a wider audience.

The Board approved my proposal and as well as providing encouragement, a number of past and present members have actively cooperated by supplying information and copies of documents, and by reviewing the draft.

Historical accounts resemble icebergs, in that much remains concealed beneath the surface; this is no exception. I have avoided the strong temptation to include anecdotes and observations about the personalities involved, and am conscious that the account inevitably reflects my own perspective as an Advisory Board member representing a national partner. Different interpretations would result if written as seen through the eyes of a member of the Secretariat, one of the international organisations, or the publisher, and it would indeed be interesting to compare such versions.

Many of the staff of the various organisations and institutions associated with ASFA are not mentioned by name in this account. From the start they have worked together with a sense of purpose, unity and camaraderie, and with a firm belief in the value of their collective effort; without them there would be no ASFA. At a time when experts would have us accept that networks and systems are the products and functions of electronic technology, I hope that this narrative will remind readers that key ingredients for success are human effort and human interaction.

Allen Varley
Plymouth
January 1995

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CHAPTER ONE

THE ORIGINS

Aquatic Sciences and Fisheries Abstracts (ASFA) first appeared as a monthly abstract journal in July 1971. Conceived as a new product, it also replaced the Current Bibliography for Aquatic Sciences and Fisheries, issued by the Food and Agriculture Organisation of the United Nations (FAO) and Aquatic Biology Abstracts, published by Information Retrieval Limited (IRL), London.

FAO's mandate to collect, analyse, interpret and disseminate information dates from the first FAO Conference, held in Quebec, Canada in 1945, and the Fisheries Division developed a publications programme and gradually introduced what became known in the 1950's as "information" or "intelligence" services. ASFA's lineage derives from two bibliographic services launched by FAO during this decade, one emphasising the fishing industry and the post-harvest processing of fish and fish products, and the other fishery science with the emphasis on biology.

From January 1950 the Technological Branch of the Fisheries Division (later the Fishery Industry Division of the Department of Fisheries) produced World Fisheries Abstracts, a bimonthly (quarterly from 1962) "review of technical literature on fisheries and related industries". Published in English, French and Spanish, the records were printed on sheets which could be cut into cards for filing.

A meeting of FAO consultants at the Centre d'études et de recherches scientifiques, Biarritz in February 1956 considered that a complete abstracting service would be costly though of incalculable value, but recognised the limitations of the Fishery Division. They recommended that "for the present emphasis be given to development of the services of listing and annotating fishery literature".⁽¹⁾ Bibliographic punched cards were demonstrated by the two FAO representatives, G.L. Kesteven, Chief of the Fisheries Biology Branch, and his colleague S.J. Holt.

A service aiming to include fisheries biology, aquaculture and fisheries oceanography, and produced by the Biology Branch of the Fisheries Division was first offered to outside users in the form of a monthly mimeographed bulletin entitled Current Bibliography for Fisheries Science. Volume 1 Number 1 appeared in April 1958 and copies were sent to selected institutions on the Fisheries Division's mailing and "exchange" list. The Research Programs Section of the Biology Branch, with S.J. Holt as Chief, produced the bulletin which from Volume 2 Number 1, January 1959, changed its name to Current Bibliography for Aquatic Sciences and Fisheries.

The Current Bibliography appeared at an opportune time and was welcomed by users in many countries. Based on material received in the Fisheries Branch Library and the Fisheries Division, it was produced by fisheries scientists with the needs of the research community in mind, and although the records did not include abstracts, the bulletin contained good taxonomic and geographic indexes, as well as author and subject indexes. Well in advance of its time, the Current Bibliography also included citation indexes.⁽²⁾ From Volume 3, 1960 the Current Bibliography was printed by the London publishers Taylor and Francis, with Erdogan F. Akyüz (Biologist in the

Research Programs Section of the Biology Branch) as editor, while by this time Sidney Holt was Chief of the Biology Branch.

Meanwhile in the United States Joel S. O'Connor and Saul B. Saila were developing a pilot project at the Aquatic Sciences Information Retrieval Center (ASIRC) of the University of Rhode Island's Narragansett Marine Laboratory to produce mechanised indexes to the technical literature. Using punched card technology and taxonomic, geographic and subject index terms from the *Current Bibliography* and also from the *Bibliographia Oceanographica* (with which FAO were collaborating, but which was, unfortunately, in terminal decline), the aim was to develop a literature searching and retrieval system, and users were invited to submit enquiries to test the system.⁽³⁾⁽⁴⁾

ASIRC was assisted financially by the United States Fish and Wildlife Service Bureau of Commercial Fisheries, and by 1962 had developed an operational system.⁽⁵⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾ The pilot project had added about 7,000 index terms and it was envisaged that during the year some 40,000 documents would be indexed (publications dated 1957 to 1962 listed in the *Current Bibliography*), with an annual addition of some 15,000.

In 1961 Dr Mario Ruivo became Chief of the Research Programs Section of the Biology Branch of the Fisheries Division. The close alliance of Holt, Ruivo and Akyüz and their links with other members of the international fisheries and oceanographic research communities were to be significant factors in the development of aquatic information services over the next quarter century.

Saul B. Saila and the Aquatic Sciences Information Retrieval Center continued to be associated with *Current Bibliography* until the closure of ASIRC in 1965; Volume 9 of the *Current Bibliography* (1966) optimistically mentions the continuation of computer-oriented services "formerly provided by ASIRC".

The value of the *Current Bibliography* was endorsed by Working Group 15 of the Scientific Committee on Oceanic Research (SCOR) at meetings in Plymouth (December 1963) and Marseille (October 1965). The Group's concern was "Abstracts and bibliographies of use in marine sciences" and at the second meeting Ed Akyüz listed some of the problems, due mainly to lack of sufficient staff and resources, affecting the *Current Bibliography*. The Working Group made a number of resolutions regarding more active participation by Unesco in documentation work, collaboration between Unesco and FAO,⁽⁹⁾⁽¹⁰⁾ and recommended the inauguration of a *Current Contents in Marine Sciences* service. A precedent for collaboration on information activities already existed in the form of *International Marine Science*, a quarterly newsletter prepared jointly between the Unesco Office of Oceanography and the FAO Fisheries Biology Branch, and published by Unesco from April 1963.

The need for mechanisation was acknowledged, and the Working Group were informed that one of their members, the Deutsche Hydrographische Institut (DHI), had been provided with a Friden's Flexowriter by the German Institut für Dokumentationswesen (IDW) to facilitate the production of DHI's *Hydrographische Bibliographie*. Flexowriters were "tape typewriters", using paper tape as a machine readable storage medium. The tapes could be manipulated by Friden or IBM machines, and could be converted to sets of punched cards for greater flexibility in searching and retrieval. FAO and DHI, the two members with capabilities, were invited to store machine readable versions of their bibliographies in the form of Flexowriter tapes for later merger in a common pool for mechanised search and retrieval.

As a result of discussions between Professor P.F. Meyer-Waarden (Head of the Information

and Documentation Office of the Bundesforschungsanstalt für Fischerei (BF), Hamburg) and delegates to the October 1968 meeting of the International Council for the Exploration of the Sea (ICES), on 3 December 1968 Dr Udo Schützsack, a Division Chief of IDW, and Professor Meyer-Waarden visited FAO for discussions with Ed Akyüz on collaboration between FAO, BF, DHI and IDW.⁽¹¹⁾ It was noted that BF planned to establish a documentation service, principally to serve the national fisheries bodies in Germany, and that IDW had expertise in the mechanised production of the International Food Information Service (IFIS). Collaboration was proposed whereby IDW would provide computer programs, expertise and training, BF would provide input from some 500 periodicals in the field of marine and inland fisheries science, and an approach would be made to DHI who would hopefully cover a similar number of periodicals. The *Current Bibliography* would be produced under a joint Editorial Board and would possibly be published by BF. Flexowriters would be used for decentralised data recording, with information in a common bibliographic style being held on paper or magnetic tape, the ultimate aim being to achieve electronic type-setting from tape, and for FAO to store and disseminate information from the tapes. At this stage there was no agreement that the records would include abstracts. FAO's contribution to IDW would be to cover the literature and also to supply references with abstracts on fish food sciences for IFIS.

In May 1969 FAO's concept of involving additional national partners in a cooperative effort was furthered through an exchange of correspondence between Allen Varley of the Marine Biological Association of the United Kingdom (MBA), Plymouth, and Sidney Holt, who was now the FAO Marine Science and Fishery Coordinator with UNESCO in Paris. The letters discuss the problems of *Current Bibliography*, particularly the delays in its publication, and stress the need for a timely, comprehensive information service to be made available without duplication of effort. It was agreed that MBA would immediately begin to supply FAO with monthly sets of current references on marine pollution. Sidney Holt, referring to the new *Aquatic Biology Abstracts* published by IRL, London, hoped to "be able to bring the undoubted competence and experience of Information Retrieval Ltd. into our joint efforts".

Aquatic Biology Abstracts, which commenced publication in January 1969, was one of a group of inexpensive abstract journals in the life sciences published by IRL. Other titles included *Calcified Tissue Abstracts*, *Entomology Abstracts*, *Genetics Abstracts*, *Microbiology Abstracts*, and *Virology Abstracts*.

Meanwhile Ed Akyüz was continuing to produce *Current Bibliography*, while strengthening links with the German partners and enlisting French support through Dr Richard Vibert (a friend of Professor Meyer-Waarden) of the Institut national de Recherche agronomique Station d'Hydrobiologie continentale (INRA/SHC), Biarritz. Overtures were being made to IRL, and the concept of mechanised and improved information services was promoted strongly at meetings, for example, of SCOR, and of the newly-formed IMCO/FAO/UNESCO/WHO/IAEA Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP).⁽¹²⁾

In April 1970 participants in a meeting of SCOR Working Group 32 on Biological Data Inventories, held at the National Oceanographic Data Center (NODC) in Washington DC, included Ed Akyüz, Sidney Holt and Saul B. Saila. Dr Elaine Collins (NODC), who was also Rapporteur, described her work on the NODC's Biological Information Retrieval System, which involved indexing the literature on marine ecology and the distribution of organisms. In October 1970 the United States consolidated a number of separate agencies into the National Oceanic and

Atmospheric Administration (NOAA). Mr R.R. Freeman, seeking sources for cooperation on oceanographic and fisheries literature and information, but unaware of the April 1970 meeting, contacted Ed Akyüz in early 1971. The seeds were sown for United States' cooperation in ASFA.⁽¹³⁾

A landmark meeting on "Cooperation of FAO, BF, SHC, IDW, ZMD on Aquatic Science Bibliography" was held at BF Hamburg on 10-11 November 1970. The meeting was chaired by Udo Schützsack (IDW) and participants included Dr Bauer and Mr Koch of the Zentralstelle für maschinelle Dokumentation (ZMD), Frankfurt-am-Main, Dr Richard Vibert and Mme Michelle Le Faurichon (INRA/SHC), and Ed Akyüz of FAO. BF participants included Professor Tiews, Professor Meyer-Waarden, Mrs F. Diestel, and Dr Wulf P. Kirchner who at the time of writing (1994), more than twenty three years later, is still actively involved with ASFA. Two publishers, Dr Heenemann of Heenemann and Hartmann, Berlin, and Anthony G. Woolcott of IRL London were present. The main problem was printing and publishing, and the declared intention was to move towards a mechanised system as soon as possible. Although Dr Heenemann was experienced in modern printing technology, he was reluctant to assume a significant financial risk with only a vague promise of benefit from computer tapes in the future. Woolcott on the other hand was able to offer to produce abstracts and to take on the obligations of a partner, and not be merely a printer or publisher. His proposal to cease publication of *Aquatic Biology Abstracts*, and to cooperate in the production of a new title which would also supersede the *Current Bibliography* was an offer which could not be resisted, though some members felt uneasy about a partnership between government bodies and a private company. From the beginning, a totally computerised system was envisaged, with a new scope description, a new indexing system and a new monitoring list. However it was recognised that a mechanised system would not be ready, and it was agreed that the first issue of the new journal, to be advertised as a merger of *Current Bibliography* and *Aquatic Biology Abstracts* would be published by IRL in July 1971. Input would be provided by FAO, BF, INRA/SHC, and IRL. Kit Woolcott (as he was always known) proposed that abstracts should be included, and IRL would be prepared to produce them. ZMD, who had recent experience with the computerisation of the German National Bibliography, would develop the computerised system, to be operational from January 1973. Wulf Kirchner, who had already carried out preliminary work on the thesaurus, would continue this work which would be regarded as a Hamburg responsibility.

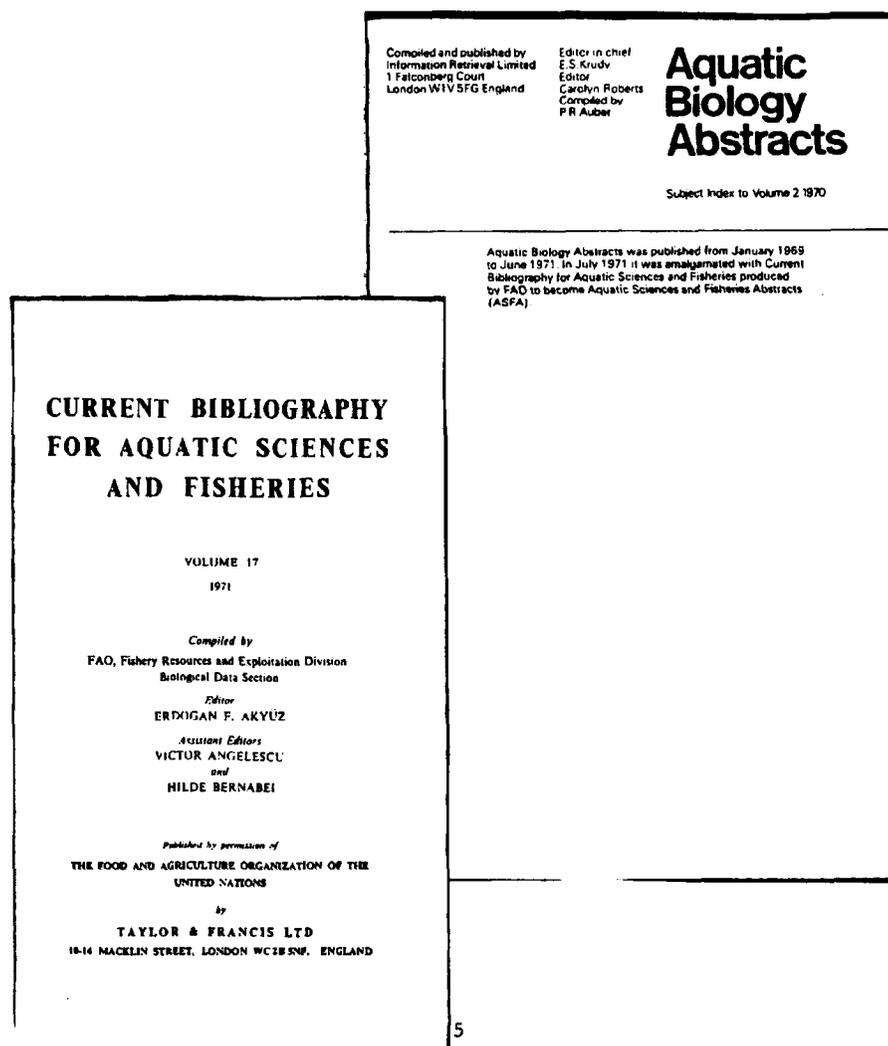
In December 1970, Cynthia Page, editor of IRL's *Aquatic Biology Abstracts*, joined FAO and Kit Woolcott visited Ed Akyüz in Rome in January 1971. The following week in a letter to Allen Varley (MBA Plymouth) dated 22 January he summarised the situation. The new abstracting publication entitled *Aquatic Sciences and Fisheries Abstracts* would be published monthly with an estimated 15,000 abstracts annually. Initially FAO would cover 500 journals, BF approximately 250, SHC approximately 125, with IRL monitoring its entire list of 2,750 journals. Abstracts would be based on authors' summaries, and where summaries did not exist, IRL would create abstracts. Initially the publication would be manually produced but IDW had "expressed a willingness to cooperate in developing a completely machine based information retrieval system in Aquatic Sciences and Fisheries, which system would produce the abstracting publication as well as providing a computer based information retrieval system in the aquatic sciences." At their meeting Ed Akyüz and Kit Woolcott had discussed the possibility of inviting other institutes to become involved in the project and agreed that Kit Woolcott should make preliminary approaches to the MBA. The response of the MBA was positive, and it was arranged that Kit Woolcott would visit Plymouth for more detailed discussions.

Following a meeting with Kit Woolcott at the MBA in May 1971, Allen Varley confirmed that the MBA would be willing to participate and would supply citations and abstracts of

publications on marine and estuarine pollution. The work would be undertaken mainly by Mr David Moulder, who was head of the library's Marine Pollution Information Centre. Since the MBA was funded by the UK Natural Environment Research Council (NERC), it would be advisable to have NERC support for MBA participation, though no problems were foreseen. This information was relayed to Ed Akyüz who responded in June welcoming the MBA as a potential partner, and hoping that the members of the Editorial Board at their forthcoming meeting in October would go along with the proposal. By this time Ed Akyüz was Chief of the Research Information Section with Mario Ruivo being Director of the Fishery Resources Division.

In April and May 1971 subscribers to *Current Bibliography for Aquatic Sciences and Fisheries* and *Aquatic Biology Abstracts* received notices from the two publishing companies, Taylor and Francis and IRL, informing them of the change and offering to transfer subscriptions to the new journal *Aquatic Sciences and Fisheries Abstracts*, Volume 1 of which would comprise six issues running from July to December 1971. The subscription rates for Volume 2, 1972 would be fifty pounds sterling per annum in Europe and one hundred and fifty dollars for the United States and elsewhere (airmail).

The first issue of ASFA duly appeared in July 1971.



Aquatic Sciences & Fisheries Abstracts

Volume 1 number 1 July 1971

Compiled by the Research Information Section,
Fisheries Resources Division, FAO, Rome,
with the collaboration of
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Bundesforschungsanstalt für Fischerei, Hamburg
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Published and printed in England by
Information Retrieval Limited

CHAPTER TWO

ASFIS: THE DEVELOPMENT OF THE AQUATIC SCIENCES AND FISHERIES INFORMATION SYSTEM CONCEPT

The FAO-IOC document *Scientific information system on aquatic sciences and fisheries*, prepared in 1971 and used as a basis for securing UNESCO/Intergovernmental Oceanographic Commission (IOC) support for ASFA and what was to become known as the Aquatic Sciences and Fisheries Information System (ASFIS), was also used as an annex to background papers at meetings such as the first session of the International Council for the Southeast Atlantic Fisheries.⁽¹⁴⁾

The nine-page document is well argued and presented, and two paragraphs are particularly worth quoting:

"It is clear that the demand for aquatic sciences information will continue to increase and both governmental and non-governmental institutions will be forced to look into establishing services to be able to satisfy that demand. It is essential to establish such services as rapidly as possible, before the communication problem becomes even more difficult and expensive to solve.

The nucleus of an integrated sectoral (marine science) international documentation system has now been established. With the co-operation of national, regional and UN agencies, and keeping in mind the UNISIST proposal, the system may be enlarged to meet the special requirements of the aquatic sciences community, the special needs of developing countries, as well as the demands from regional undertakings."

The Intergovernmental Oceanographic Commission of UNESCO

The original statutes of the IOC, adopted by the 11th and 13th sessions of the UNESCO General Conference, mention oceanographic data exchange but do not deal specifically with information. However the revised statutes adopted in 1970 include the need to "promote and make recommendations for the exchange of oceanographic data and the publication and dissemination of results of scientific investigation of the oceans". Other functions concerned with international research, education, mutual assistance and the special needs and interests of developing countries carry an implicit mandate for information activities. Although from the start the IOC placed great importance on oceanographic data, it is perhaps surprising that more positive statements regarding information were not included in these revised statutes.

As has been mentioned above, the *Proceedings* of the Scientific Committee on Oceanic Research (SCOR) carry reports of meetings in 1963 and 1965 of SCOR Working Group 12 on abstracts and bibliographies of use in marine sciences.⁽⁹⁾⁽¹⁰⁾

In 1967 SCOR published a report on international ocean affairs⁽¹⁵⁾ which included some consideration of marine scientific information. The report, which was produced by a joint working group of SCOR, the FAO Advisory Committee on Marine Resources Research, and the World Meteorological Organisation (WMO) Advisory Committee, identified the following elements:

- (i) Transmission, storage, exchange, retrieval and processing of data;
- (ii) Storage, exchange, retrieval, indexing, abstracting and translating of literature and other documentation;
- (iii) Exchange of information about research programmes, scientists, institutions and facilities.

In 1969, and although paying more attention to data than to information, the IOC's *Comprehensive outline of the scope of the long-term and expanded programme of oceanic exploration and research* (LEPOR) states that "UNESCO, FAO and ICSU in collaboration with other interested organizations such as ICES should devote increased attention to the improvement of scientific information systems in the field of marine sciences."⁽¹⁶⁾

Doubtless the IOC benefitted from the input of Sidney Holt, who in 1969 had moved from Rome to be the FAO Marine Science and Fishery Coordinator with UNESCO in Paris. This period saw the compilation of the first edition of the *International Directory of Marine Scientists*⁽¹⁷⁾ which was produced by FAO, SCOR and the UNESCO Office of Oceanography and published in 1970. In January of that year Sidney Holt was appointed Director of the UNESCO Office of Oceanography and Secretary of the IOC, while in Rome Mario Ruivo had replaced Dr Holt as Director of the Fisheries Resources Division of the FAO Department of Fisheries. By coincidence, Mario Ruivo became Secretary of the IOC a decade later, in January 1980.

In 1970 the IOC Group of Experts on Long-Term Scientific Policy and Planning (GELTSPAP) considered "the establishment of an international information service for national and regional marine science programmes essential for the successful implementation of the Expanded Programme".⁽¹⁸⁾

In 1971 the GELTSPAP recommendations were considered at the 12th meeting of the IOC Bureau and Consultative Council. Their report directs the Secretary of IOC to prepare a detailed proposal for "establishing an international information service for national and regional marine science programmes for consideration by the Seventh Session of the Commission".⁽¹⁹⁾

The IOC Working Group on International Oceanographic Data Exchange (IODE) also discussed the GELTSPAP recommendations in preparation for the Seventh Session, and reviewed developments in FAO where a plan for an Aquatic Sciences and Fisheries Information System (ASFIS) had been prepared.

Still in 1971, Commission Resolution VII-11 on "Integrated scientific information service on aquatic sciences and fisheries" instructed the IOC Secretariat and the FAO Department of Fisheries to prepare a comprehensive draft plan for consideration by the IOC Executive Council.

The United Nations Conference on the Human Environment (Stockholm Conference) and the United Nations Environment Programme (UNEP)

Further strong encouragement came from the 1972 United Nations Conference on the Human Environment.⁽²⁰⁾ Recommendation number 46 noted that FAO had already taken the lead in compiling, disseminating and coordinating information on living aquatic resources and their environment and fisheries activities, and called on other international agencies and national governments to support this programme. Recommendation number 91 suggested that IOC:

- "(a) *Ensure that provision shall be made in international marine research, monitoring and related activities for the exchange, dissemination, and referral to sources of*

data and information on baselines and on marine pollution, and that attention shall be paid to the special needs of developing countries;

- (b) Give full consideration, with the Food and Agriculture Organization of the United Nations, the World Meteorological Organization, the Inter-Governmental Maritime Consultative Organization, the World Health Organization, the International Atomic Energy Agency, the International Hydrographic Organization and the International Council for the Exploration of the Sea and other interested and relevant organizations, to the strengthening of on-going marine and related data and information exchange and dissemination activities;*
- (c) Support the concept of development of an interdisciplinary and interorganizational system primarily involving centres already in existence;*
- (d) Initiate an interdisciplinary marine pollution data and scientific information referral capability."*

The information paper *ASFIS - A computer-oriented system offering integrated information services*, prepared by the IOC and FAO Secretariats, was considered in 1973 by the IOC Executive Council in May, by the IOC Working Committee on International Oceanographic Data Exchange (IODE) in July, and the IOC Assembly in November.⁽²¹⁾

The paper was a definitive statement of ASFIS objectives, and much remains valid for the 1990s. It saw the immediate objective as improving access to marine scientific published information by bringing it under consistent bibliographic control, with the eventual objective of the establishment of a network of inter-connected information services. Implementation would be through the evolution of existing FAO services, with the pooling of resources in a cooperative effort of interested agencies, and the addition of specialised information resources. The products and services would be a suite of inter-related computerised files providing abstract and current awareness services, information on institutions, marine scientists, conferences, equipment and translations. The need to improve information services for the developing countries was also acknowledged, though the emphasis was on what could be achieved immediately through cooperative use of existing resources, while seeking support for the longer-term objectives.

The Eighth Session of the IOC Assembly, Paris, November 1973, endorsed the "philosophy and general principles of an international information system as outlined..." and agreed to the concept of a consultative board to be established jointly by FAO and IOC with membership from relevant InterSecretariat Committee on Scientific Programmes Related to Oceanography (ICSPRO) agencies and national and international bodies. This marked the IOC's formal involvement in ASFIS and with ASFA.

In response to the resolutions FAO and IOC jointly convened an *ad hoc* consultation of experts in Rome in November 1974.

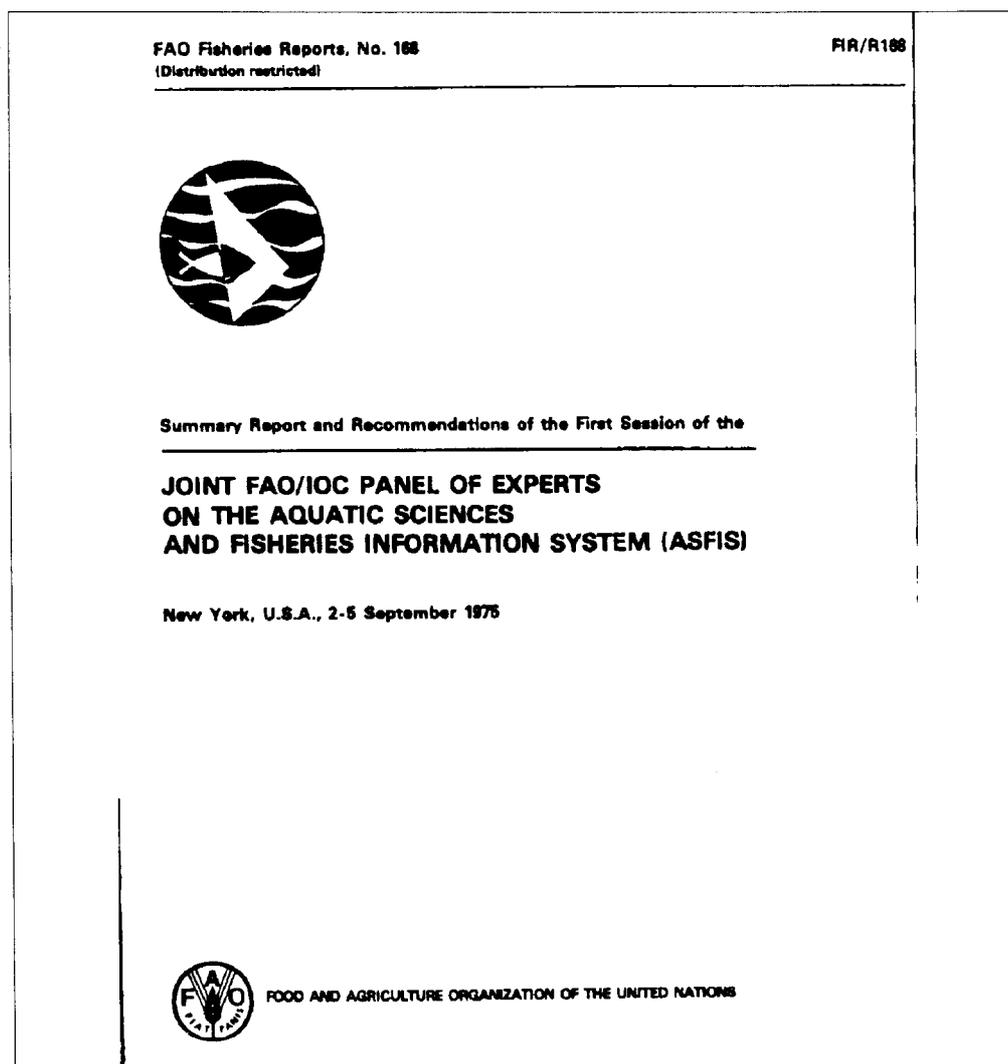
Participants included E.F. Akyüz and R. Needham of FAO, Dr Joseph Caponio of NOAA (chairman), Peter Lees of the UNEP International Referral System, Geneva, Dr Jeffery Watson of the Canadian Fisheries and Marine Service, Thomas Otley of Information Retrieval Limited, London (the ASFA publishers), with Natalie Philippon-Tulloch of the Unesco Division of Marine Sciences

representing the IOC.⁽²²⁾

The ASFIS concept was endorsed and the consultative board was formally established in 1975 as the Joint FAO/IOC Panel of Experts on the Aquatic Sciences and Fisheries Information System (ASFIS).

The first meeting of the experts was held in New York, 2-5 September 1975. With Joe Caponio as Chairman, members included G. Peluchon (CNEXO), Allen Varley (MBA) and Jeff Watson (EC). Members and observers from organisations which were to become associated with ASFA in later years included Karl-Heinz Szekiolda and Robert Gruszka of the UN Ocean Economics and Technology Office, Richard Morse (UNEP), V.S. Bhatt (National Institute of Oceanography, India), and Armando Sandoval (Universidad Nacional Autonoma de Mexico). The attendance of Desmond Scott (IOC Secretary) demonstrated IOC's serious concern, while Ed Akyüz, Ron Needham and Kit Woolcott added to the already strong representation of ASFA's interests.

The potential role and contribution of the IOC as a partner and second or joint secretariat, and the possibilities of support from a third agency, namely UNEP, reinforced the conviction that ASFIS was now accepted as a truly international system. UNEP's interest was dramatically confirmed in late 1975 when the UNEP Governing Council approved a grant of a quarter of a million dollars for the "Accelerated development of ASFIS".



CHAPTER THREE

1971-1976 THE EARLY YEARS

Undoubtedly 1971 was a propitious year in which to launch an environmental information system. There was growing public concern for the environment, and a number of oil pollution disasters had brought marine pollution to the forefront of public awareness. In February 1971 the Preparatory Committee for the UN Conference on the Human Environment discussed the importance of information exchange on aspects of the environment, including pollution, and the needs of the developing countries. Government departments were able to provide funds to cooperate internationally on services for the general good, and the concept of a World Scientific Information System (UNISIST) had been sanctioned.⁽²³⁾

Mission-oriented international information systems were under development, using the International Nuclear Information System (INIS) as a model. Elsewhere within FAO the International Information System for the Agricultural Sciences and Technology (AGRIS) was being conceived. Scientific and technological information was increasingly being regarded as a valuable resource, and improved information dissemination and exchange was regularly endorsed as desirable by scientific and regional advisory groups.

The Product

At its launch in July 1971, compared with *Current Bibliography's* 294 subscriptions, ASFA had 589 with a further 51 "pending". It was estimated that some 600 subscriptions would make the journal economically viable, and this figure would probably be exceeded in 1972. Volume one of ASFA, covering July to December 1971 included 5,837 records and abstracts and this level was maintained and gradually increased from 12,446 in 1972 to 13,967 in 1976, by which time the number of subscriptions had grown to 982.

ASFA citations 1971-1977

1971 (July to December)	5,837
1972	12,446
1973	13,094
1974	13,390
1975	13,925
1976	13,967
1977	16,877

Automation was a priority and ZMD worked on a system for producing magnetic tapes and indexes, while IRL produced the journal by conventional means, with FAO developing procedures,

aids and guidelines to ensure that ASFA conformed to evolving international standards. Volumes 1 and 2 of ASFA list Ed Akyüz as Editor-in-Chief, Cynthia Page (FAO) as "Editor and co-ordinator", with Carolyn Roberts (IRL) being given (in view of her key rôle) the rather inadequate designation "Editor of abstracts".

The Partners

The ASFA Editorial Board met in Biarritz in November 1971, discussing practical matters relating to ASFA's production, as well as the envisaged development and management of an international automated system. The pattern was set for meetings which were to be held annually (with the exception of 1985) involving representatives from FAO, the publisher, the input centres, and observers from other agencies and organisations. Originally known as the Editorial Board, briefly as the Editorial Advisory Board, but from 1978 as the Advisory Board, members combined advisory, consultative and executive functions, generally working by consensus, and without a formal, legal structure. Annual meetings were hosted by participating centres, and from 1980 a pattern was established whereby the Board aimed to meet on alternate years in FAO Rome. The close working and social relationship built up between Board members encouraged great loyalty and commitment to ASFA, eased the tensions at times of conflict and disagreement, and provided strong links useful in other aspects of their work. In the 1971-1976 period meetings were held in Biarritz (1971), Frankfurt (1972), London (1973), Moscow (1974), Washington (1975) and Rome (1976).

At its first meeting in 1971, seeking to expand national participation beyond France (INRA) and Germany (BF), the Board discussed the membership of "other co-operating institutions" agreeing that there should be only one national institute in any one country coordinating input to ASFA. MBA was accepted as an "associate" member of the Board, pending clarification of the position of the UK Natural Environment Research Council (NERC). Ed Akyüz reported that Robert Freeman of NOAA had visited Rome to discuss possible collaboration, and that he (Ed Akyüz) planned to visit the All-Union Research Institute for Fisheries and Oceanography (VNIRO) in Moscow in April 1972. In view of FAO's ongoing negotiations, the Board agreed that requests for membership by VNIRO (USSR) and NOAA (USA) should be considered favourably. Natalie Philippon-Tulloch of the Unesco Division of Marine Sciences attended the meeting as an observer, as did three INRA scientists, one from Paris and two from the Hydrobiological Station in Thonon.

The 1972 meeting (Frankfurt, 31 August to 1 September) confirmed VNIRO as "members" or "partners", with Dr A.S. Bogdanov as VNIRO's representative on the Board, and it was reported that discussions were still underway with NOAA. Mr Malcolm Rigby, the editor of *Meteorological and Geophysical Abstracts* (which included physical oceanography and marine climatology within its scope), attended as an observer for NOAA, particularly to evaluate how well the cooperation of government agencies with a private publisher was working. The MBA had originally been invited to contribute as an institution, but in considering the implications of wider membership of the ASFA partnership Ed Akyüz and the Editorial Board rightly opted for a system based on "national" centres, operating with the consensus of the relevant government departments and research institutions in the country concerned. Accordingly, the MBA's participation was negotiated by Allen Varley and Ed Akyüz through the MBA's funding body the UK Natural Environment Research Council (NERC), and with the support and agreement of the UK Ministry of Agriculture, Fisheries and Food (MAFF). The Secretary of NERC was R.J.H. Beverton, a fisheries scientist who had worked with Sidney Holt on fish stock assessment (formulating the "Beverton-Holt equation" for fishery yield assessment).⁽²⁴⁾ Ed Akyüz wrote to Ray Beverton on 9 October 1972, and immediately secured the formal support of NERC.

The French Centre national pour l'Exploitation des Océans (CNEXO) was represented by G. Peluchon, attending as an observer. He had met Ed Akyüz at an IOC meeting in Rome in September 1971, and the possibility of CNEXO participation had been discussed. At the end of the first day of the meeting, Kit Woolcott composed the document *ASFA: an aide memoire recording the respective responsibilities and entitlements of the partners*. This was the fore-runner of the *ASFA Aide Memoire* which was presented by FAO for Board consideration in 1976.

The London meeting in October 1973 formally accepted NOAA and NERC/MBA, with Bob Freeman of NOAA's Environmental Science Information Center, Washington, as the US representative, and Allen Varley of the MBA Plymouth as the UK member. It was noted that coordination of French ASFA activity had passed from INRA to the Centre Océanologique de Bretagne of the Centre national pour l'Exploitation des Océans (CNEXO), Brest, represented by Raoul Piboubès, though INRA would continue to cooperate as part of a planned French network. Although not recognised at the time, the concept was established of FAO dealing with one national partner in a country, with that national partner being responsible for the development and coordination of any national network. The meeting also agreed that Ed Akyüz should approach Japan, China and a Latin American country. It is worth noting that in the early 1970s, at a time of hostility, international suspicion and a state of "cold war", VNIRO, NOAA and Western European institutes were working together and were eager to recruit Chinese cooperation. Dr J.E. Peachey of the newly created United Nations Environment Programme (UNEP) attended part of the meeting, and described the proposed International Referral System (IRS), unintentionally confusing rather than enlightening many of the participants with repeated reference to a "yellow pages" approach.

The 1974 Board meeting was held in Moscow, and Ed Akyüz reported that Japan and Mexico had been approached, while Canada and Portugal had made enquiries regarding membership.

In November 1974, the month after the Board meeting, an *ad hoc* consultation of experts on the development of the Aquatic Sciences and Fisheries Information System (ASFIS) was held in Rome. Chaired by Dr Joseph Caponio, Director of NOAA's Environmental Science Information Centre (the US ASFA centre), the group discussed the development of an integrated information system of which ASFA would be a major product, together with directories, registers, current awareness and other services. Coordination would be through secretariats in FAO and in the IOC, and system guidance and development would be through a Joint FAO-IOC Panel of Experts on ASFIS.

The following year, in Washington, DC, the Board welcomed Canada as a member, and provisionally accepted Japan. The Fisheries and Marine Service of the Canadian Department of the Environment, Ottawa was the national partner, with ASFA activities being coordinated by Janice Heyworth of Environment Canada's Water Resources Document Reference Centre (WATDOC). The Japanese national partner was probably to be the Fisheries Agency of the Ministry of Agriculture and Forestry, Tokyo. Norway had shown interest, but Mexico and Portugal had not yet submitted formal requests.

Some participants at the 1975 meeting had also taken part in the first session of the ASFIS Panel of Experts, which had been held in New York in September, and discussion centred on the respective activities and responsibilities of the two groups, the ASFA Board and the ASFIS Panel.

The IOC was represented by Joe Caponio, Chairman of the ASFIS Panel, and Thomas Winterfeld, Chairman of the IOC Working Committee on International Oceanographic Data Exchange (IODE).

Hitherto, the responsibilities and rights of partners had evolved and had been defined somewhat pragmatically, and the Board noted that some members had formal bilateral agreements with FAO, while others participated in "a wholly informal manner". Clearly a more formalised statement was required. This would act not only as a form of contract between members, but could also be used as a basis on which to recruit and accept new partners.

The Board felt that each national partner should be responsible for: the minimum allocation of one full time professional post (with appropriate clerical assistance) or its equivalent, to prepare input; a commitment to monitor a segment of the total input to ASFA, based on some criterion such as literature of a certain type, from a certain nation, or printed in a certain language; and/or making a substantial contribution to ASFA through technical assistance in data processing, maintenance of authority lists, etc. Each member should strive to be represented at Editorial Staff meetings, as well as Board meetings. Most of the members were unaware that Kit Woolcott had prepared an "Aide Memoire" at the 1972 meeting, and FAO were requested to draft a document.

In late 1974 IRL established a subsidiary company in the United States, and from that date Kit Woolcott spent increasing amounts of time in Washington and New York.

In early 1975 an evaluation of ASFA was conducted by NOAA among users in 22 NOAA research centres and laboratories; later in the year the MBA surveyed UK users by questionnaire. The surveys produced encouraging results, though with the expected criticisms of coverage and timeliness, and were distributed to Board members.

The FAO Secretariat version of the *Aide Memoire Recording the Respective Responsibilities and Entitlements of the ASFA Partners* was first considered at the 1976 Board meeting in Rome, and the amended version (second draft) is appended to the Board report. The three-page document, referring to the Board as the Editorial Board, states that the Board is organised and coordinated by the FAO and IOC, with FAO providing the Secretariat. The main duties of the national centres were to "monitor a list of agreed primary journals and non-conventional sources", index noted references and supply bibliographic records and abstracts. Partners were entitled to a minimum of five and a maximum of 30 copies of the monthly abstract journal for internal use, the actual number to be decided by the Board "based on the level of each partner's participation". Partners were also entitled to purchase (at a price to be determined) a copy of the "eventual magnetic tape version of the file", although use for commercial purposes was to be subject to authorisation by the Board, and to a royalty to be determined by the Board. FAO and IRL had a separate memorandum of understanding.

Japan was accepted as a new partner in 1976, but was not represented at the Board meeting, and experienced problems in providing input. Mexico and Portugal had applied for membership, and an observer (Lidia Nunes) attended from Portugal. India had expressed interest, through the National Institute of Oceanography in Goa, and the Southeast Asian Fisheries Development Centre (SEAFDEC), with headquarters in Bangkok, had also enquired about cooperating. There was no progress to report regarding a centre in Norway or any another Scandinavian country.

Input

Each partner monitored an agreed list of journals and serial titles, preparing bibliographic records for all current papers within ASFA's subject scope appearing in those titles. The records were entered on input sheets, and included authors' addresses and subject, geographic and taxonomic indexing terms. The decision was made at an early stage to rely on authors' abstracts, edited as necessary, and only to prepare original abstracts in the absence of a suitable summary. As the number of input centres increased, a system evolved whereby national centres aimed to cover the literature produced in their country, including the technical and report literature, but leaving the journals with international sales and circulation to be covered by the ASFA publisher, while FAO's responsibilities included material produced by developing countries and international agencies. The coverage of books, conference proceedings, reports and other publications within the scope of ASFA, but by their nature not on a monitoring list, was coordinated by FAO and the ASFA publisher. Appropriate titles were continuously added to the monitoring list, and the MBA produced several versions of an "Un-monitoring List" of relevant serial titles not yet covered for ASFA.

As early as 1974 IRL offered to cover all journal literature, leaving partners free to concentrate on the report, non-conventional and "grey" literature, but the suggestion was resisted on the grounds that national partners were better placed and wished to be responsible for at least some of their national literature. Nevertheless IRL covered the majority of the commercially available primary journal literature, and this produced upwards of 50% of the records processed for ASFA. National partners' input was normally prepared by input centre staff, though in the case of NOAA the work was contracted out to a private company, and Canadian input was prepared at the Huntsman Marine Laboratory. IRL staff and freelance workers prepared input from journals available mainly in London libraries, while FAO processed material received in the Fisheries Branch Library.

In the early days all input centre material was checked and edited in Rome before being sent to IRL London, but eventually most centres sent input direct to London.

Common Standards and Guidelines (System Tools)

A decentralised input system required common standards and guidelines to ensure consistency and integrity in the end products - the printed abstract journal and its indexes, and the electronic database. A thesaurus of indexing terms, manuals on bibliographic description and indexing, guides, authority lists and other system tools comprising what later became known as the *ASFIS Reference Series* were developed and used by ASFA staff. Some were of interest to the users of ASFA, while in later years ASFA methodology was adopted in institutions and regional networks in many parts of the world to index and organise aquatic libraries and local databases. It was understood that ASFA as an international system should conform to emerging international standards which recognised the desirability of structuring the elements of bibliographic records in a standardised manner, not only for efficient handling and retrieval but also to permit exchange between systems.

Crucial guidance and training was provided by Ronald Needham, who joined FAO in 1972 to work under Ed Akyüz as Chief of the Research Information Section of the Fishery Resources Division. In a letter to Allen Varley in July 1972 Ron Needham envisaged a partnership of national and regional input centres, with FAO dealing with only one institution in each country, any national

network being coordinated within the country. He was not happy about the worksheet currently in use as it did not allow for adequate descriptive cataloguing, especially where there were several bibliographic levels to describe, and stressed that "good cataloguing is imperative in a system serving an international community." Ron Needham took over from Ed Akyüz the role of ASFA Editor in Chief, with Carolyn Roberts and Elda Fagetti serving as editors in London and Rome respectively, and making invaluable contributions to the successful development of ASFA.

Monitoring

FAO and IRL maintained and periodically issued the *List of periodicals monitored for ASFA*, while FAO on a related but much more ambitious project, continued to work on their *World list of periodicals for aquatic sciences and fisheries*. Originally circulated by the Biology Branch of the Fisheries Division in 1957 as *A world periodicals list for fisheries science*,⁽²⁵⁾ the *World list* was published in 1962 as *FAO Fisheries Biology Technical Paper No. 19*, with supplements 1 (1963), 2 (1964) and 3 (1966). The new *World list (Preliminary edition)* appeared in 1975 as *FAO Fisheries Technical Paper No. 147*. Supplements were issued in 1976, 1977, 1978, 1980 and 1981.

Input Preparation

In 1973 IRL agreed to prepare an input manual, provisionally entitled the *ASFA manual for bibliographic descriptions and indexing*, and based on the *AGRIS Guidelines*, and a draft was distributed in the Spring of 1974. The manual was used and periodically amended, but the Board noted in 1975 that more comprehensive guidelines for bibliographic description, abstracting and indexing were needed.

IRL prepared abstracting guidelines in 1975, and in the same year revised guidelines for subject categorisation and indexing were circulated and agreed.

Subject Indexing

A book could be written about the *Thesaurus*.

In 1964 FAO published a *List of classification and subject descriptors*, prepared by the University of Rhode Island.⁽²⁶⁾ In 1970 BF developed the list, increasing the terminology,⁽²⁷⁾ and by 1973 FAO prepared a draft thesaurus. BF and FAO were requested by the Board to collaborate on the production of a second draft. Collaboration was not achieved and a "two thesaurus" situation resulted.⁽²⁸⁾⁽²⁹⁾ Differing philosophies regarding the purpose and use of thesauri caused a problem, still unresolved today. Wulf Kirchner favoured a concise thesaurus using not more than 3,000 subject terms, to be used in post coordination, while FAO wished to use precoordinated terms, resulting in a more voluminous product, in effect resembling a glossary. An *ad hoc* Thesaurus Committee, convened to merge the two thesauri into an integrated and structured version, met in London in November 1974, compared the thesauri and produced an "ink-amended" version. Communication and coordination problems resulted in this thesaurus being used in some input centres, but not immediately in others. Frustration was expressed at the 1975 Board meeting and the radical proposal was debated as to whether the thesaurus should be discarded and ASFA should rely on "plain language" indexing. However the Board concluded that a thesaurus was, in fact, necessary. Accordingly, FAO and BF continued to structure the terminology to produce a draft structured thesaurus which was used to index ASFA until the revised and enlarged *Thesaurus of terms for aquatic sciences and fisheries* was issued by FAO in 1976.⁽³⁰⁾

This was widely distributed to specialised libraries all over the world. However, due to the increased coverage by ASFA of oceanography and the physical environment, the published thesaurus was inadequate as an indexing tool for these and related subject areas. The need for a revised thesaurus was recognised in 1976, and funds for thesaurus development were included in the UNEP Project for Accelerated Development of ASFIS.

Geographic Indexing

A list of geographic terms to form the basis of a geographic thesaurus was produced by Peter Auber of IRL in 1973 and 1974, and it was agreed that the *Times Atlas* would be regarded as the authority list for spellings. In 1976 Peter Auber moved from IRL to FAO and part of his duties included the maintenance and revision of the *Geographic authority list*.

Taxonomic Indexing

In 1973 the Board agreed that the NOAA taxonomic classification should be used and tested for taxonomic indexing. Names of additional species, including freshwater, were to be submitted by partners to Elaine Collins. By 1975 however a change of duties resulted in Dr Collins having to discontinue her bibliographic work, and NOAA requested the Board to find other arrangements for maintaining the list. In 1976 FAO agreed to assume responsibility for the *Taxonomic authority list*.

Corporate Names

The need to standardise the entry of names of institutions, organisations and other corporate bodies prompted NOAA in 1974 to volunteer to produce a *Corporate authority list*. However since there was likely to be some delay, it was agreed that the INIS List be used in the interim.

Scope and Coverage

ASFA's defined subject scope remained constant in that it aimed to cover the science, technology and management of marine and freshwater environments, including ecology, fisheries, oceanography, pollution and non-living resources, but excluded such topics as shipbuilding, ports and harbours, water supply and wastewater treatment. Coverage of the literature improved year by year, but the "information explosion" made comprehensive coverage a distant target. With the requirements of the IOC in mind, the ASFIS Panel in their first meeting in 1975, pointed out that much better coverage was required of physical and chemical oceanography, marine geology, economics and technology. They felt that "Aquatic Sciences and Fisheries" did not convey the true scope of the system, particularly to the oceanographic and marine technology community, but recognised the difficulties and dangers of changing the title. The 1975 ASFA Board noted IRL's concern that to increase coverage in a single publication would force the price up to a level not in the interests of the user, and which might imperil viability. Kit Woolcott indicated that the continuing and projected growth of ASFA had reached a point where the Board should consider dividing ASFA into two parts. This would keep the binding of the ASFA monthly journal issues from exceeding a practical size and could also generate additional revenue, supporting the production of ASFA. While some members were concerned about increased subscription rates (especially to developing countries) the Board accepted the proposal that IRL should undertake a feasibility study for dividing the published journal into two parts, one covering the life sciences and fisheries aspects, and the

other the oceanographic, physical, chemical and earth sciences aspects of ASFA.

The Board considered IRL's study at their meeting in 1976, and concluded that in order to meet the objective of expanded coverage, ASFA should be published in two parts in 1978, as an experiment.

Before forming IRL Kit Woolcott had provided a patent searching service, and from time to time he suggested to the Board that since patents were a valuable source of information they should be covered by ASFA. Members agreed and in 1974 a six-month assessment of patent literature was undertaken by IRL and input centre staff. Although it was found that a significant number of relevant patents appeared each year, the Board concluded in 1975 that it was not possible at the time to cover them systematically, and they could not be given priority.

The coverage of non-conventional literature was considered one of the strengths of ASFA, and in 1976 the International Council for the Exploration of the Sea (ICES) agreed that the 500 or so Committee Meeting papers presented at each annual meeting of ICES could be covered by BF for ASFA. Despite being widely quoted by marine scientists, ICES had hitherto attempted (without great success) to prevent the papers from being listed in bibliographies and reference lists. Although not feasible to abstract on an international basis, doctoral theses and dissertations were covered, albeit rather haphazardly, by the national input centres.

Staff Meetings

The first Editorial Staff Meeting (known as the First Workshop Meeting of Editorial Staff) was held in Rome in May 1973. Participants from the input centres, the Secretariat and IRL reviewed subject categorisation; subject indexing and thesaurus development; taxonomic indexing, and geographic indexing. A new draft worksheet was introduced and Ron Needham stressed the need to improve cataloguing consistency, and for tape products to be compatible with the MARC-like communication format proposed by UNISIST.

A second meeting of editorial staff was held in the offices of IRL, London in October 1973, and subsequent meetings, following a similar pattern and devoted to training and system tool development, were held in 1974 (Rome), 1975 (Rome) and 1976 (Brest). Input centres were visited for training purposes by Ron Needham and Elda Fagetti, and individual staff training was carried out in Rome and in national centres.

Automation

From the start, automation was a key objective, with the understanding that the printed abstract journal and its indexes would be produced from a magnetic database, which also included the type-setting characters. From this database, reformatted tapes could be produced suitable for searching and information retrieval, and for merging into ASFA databases on host computers. The preface to Volume 1 of ASFA optimistically informed readers that ZMD were developing "a completely mechanized system for storage and retrieval in respect of this publication and it is hoped that by 1973 this system will be fully operational".

At a time of rapidly developing technology IDW and ZMD were leading experts in the field, with the advantages of possessing practical experience through producing *Food Science and Technology Abstracts* and designing the system for the German National Bibliography, and, not

least, of having German government support and encouragement.

There was no possibility of utilising a fully operational automated system for the launch of ASFA in 1971, so pragmatism (always a notable feature in ASFA's development) prompted the decision to prepare and publish ASFA by conventional means while leading towards an automated system in stages, beginning with index production. Through ZMD and BF, and with IDW financial support, a system was tested and refined, and printed experimental subject indexes were produced for the Board in 1974, indicating that suitable technology was now available. However, while recognising that a system was now in place, Board members concluded that the indexes were too voluminous for economic production. Revised indexing procedures were introduced in order to generate tapes which would produce a new trial index covering the first half of 1975. Meanwhile CNEXO offered to examine the possibilities of converting earlier ASFA references into a database.

The ASFA Board in 1974, recognising that computerisation was more complex and not as close as had been anticipated, reiterated that ASFA should be a spin-off from an automated system, though additional specifications were required concerning input formats and the requirements for "MARC-type" magnetic tapes.

The experimental semi-annual index covering January to June 1975 was welcomed and accepted by Board members at their 1975 meeting in Washington DC. Through the pioneering work in Germany of IDW, ZMD and BF the indexes had been produced from a trial magnetic tape database which contained the complete records, but not the abstracts. Indexing philosophy was discussed in depth during and after the Washington meeting, and several changes were introduced. No funds were available to support the preparation of tapes for the second half of 1975, though it was hoped that the UNEP project would cover conversion to tape of 1977 material. The indexes for July to December 1975 were printed and distributed in late 1976.

The trial database was loaded by Environment Canada for testing on the QL online retrieval system in September 1976, and on Lockheed DIALOG by NOAA the following month. With the assistance of NOAA, Ed Akyüz demonstrated the possibility of worldwide online use of ASFA by accessing the database at FAO from DIALOG in California (USA) in late 1976. The demonstration helped to bolster support for ASFA among FAO's management. FAO used a Texas Instruments Silent 700 Series terminal operating at 300 baud, which was state-of-the-art equipment at that time. The Canadian and United States partners expressed their disappointment that no tape for the second half of 1975 was available.

As early as 1971 Udo Schützsack had raised questions regarding revenue derived from tape services, and the possibility of reimbursement for the efforts of ZMD. IRL had countered by pointing out that an adjustment eventually might be necessary in view of lost journal subscriptions. Board members in 1976 were faced with the reality of tape services, and questions concerning payments for the use of the database by host computers and in-house systems, royalties, transnational availability, and access by users in partner and non-partner countries. The ASFA partners were far from alone at this time in considering matters of this nature, and interested national partners were invited to prepare papers and suggestions for the next Board meeting.

Full computerisation as an ideal target was debated by the Board, based on a background paper by Ron Needham which envisaged input centres providing machine readable OCR (Optical

Character Recognition) input. The implications were not lost on IRL, who were actively studying the requirements for computerisation of their whole publishing operation. After confirming that the availability of the database should not undermine the viability of the printed version, the Board agreed that IRL should produce tapes from 1978 under a new contract with FAO. The contract would recompense IRL for producing tapes with the necessary structures and format to meet international standards; equally importantly it would confirm FAO's and the Board's ownership of the database.

Communication and Co-ordination

Any system combining international agencies, a commercial publisher and national partners with differing cultural backgrounds and languages must be subject to problems relating to coordination and communication, and ASFA is no exception. From time to time tensions surfaced between partners and secretariat staff, and IRL's need to produce a commercially viable abstract journal conflicted periodically with FAO's desire to develop a system conforming to the highest international standards. However a feature of ASFA from its creation, and still strong today, has always been the commitment, loyalty and team spirit of the participants, supported by their belief in the intrinsic value of the project, and by their close working and social links. Requests by Board members for progress reports and more management information were made regularly, and although information was circulated by FAO and IRL, the annual Board meetings were crucial for information gathering and sharing, and for the renewal of enthusiasm. *ASFA Newsletter*, edited by Allen Varley and produced in Plymouth, was an attempt to improve information flow, with circulation being restricted to ASFA and ASFIS institutions and individuals. Twenty one parts appeared between January 1974 and June 1986, when publication was suspended until a new editor could be found.

Competing services and products were regularly reviewed by the Board, and possible cooperative agreements with the publishers of *Deep-Sea Research Oceanographic Abstracts* and the producers of *Oceanic Abstracts* were investigated, but without success. The FAO Fisheries Department ceased publication of *World Fisheries Abstracts* at the end of 1972, but within FAO another group was developing the International Information System for Agricultural Science and Technology (AGRIS), destined to become a continuing problem because its scope included fisheries.

The AGRIS Coordinating Centre in FAO was created in February 1972, and an experimental issue of *AGRINDEX* appeared in August 1973. The Board at their meeting in 1974 discussed ASFA/AGRIS overlap and duplication, and recommended that national partners should follow the examples of the UK and USA in encouraging their countries to withdraw fisheries contributions to AGRIS. Regular publication of *AGRINDEX* commenced in January 1975, and although the problem was discussed within FAO by secretariat staff no further progress was made.

By the end of 1976 ASFA was firmly established as the flagship product of the growing ASFIS network. A functional and flexible management structure was in place, although much continued to depend on individual effort, enthusiasm and initiative. If still somewhat tenuous, the arrangements for bringing ASFA into the rapidly growing world of online database access were beginning to be established.

CHAPTER FOUR

1977-1981 EXPANSION AND COMPUTERISATION

The partners were relieved and justifiably proud when the availability of ASFA online, albeit as a trial database, signalled that computerisation was a reality. IOC's commitment to ASFA, the links with UNEP and other international bodies, and the general acceptance of the ASFIS concept, were strong grounds for optimism and confidence as the Board considered future developments.

Full computerisation, the expansion of the ASFA partnership, and improved coverage of the subject scope were priorities, and the Board was aware that moves must be made to demonstrate action in response to the demands which were being made for developing countries to be more actively involved.

Board meetings were held in Plymouth (1977), Rome (1978), Ottawa (1979) and Hamburg (1980). In an effort to secure greater participation in Editorial Staff meetings, it was agreed that separate North American and European meetings could be arranged, and staff met in Washington in 1977, and in Rome (1978), Plymouth (1979), Rome (1980) and Lisbon (1981).

The Product

In 1977 ASFA contained 16,877 references, representing a gratifying increase on the 1976 total of 13,967. At the 1977 Board meeting in Plymouth, the Board reviewed IRL's proposals for the experimental "ASFA split", and also agreed on the titles for the two parts: (*ASFA-1 Biological Sciences and Living Resources; ASFA-2 Ocean Technology, Policy and Non-living Resources*) and the allocation of subject coverage.

In 1978, the first year of the "split", ASFA-1 contained 15,430 records, with ASFA-2 containing 8,953. The degree of overlap was 8%, with the number of unique records (on the Lockheed DIALOG tape) being 22,292. The trend was maintained and rose consistently to 1981 when the total reached more than 26,000 unique records. In 1978 there were 990 subscribers to ASFA-1, with 478 to ASFA-2. Of these, 468 were taking both parts, with 471 subscribing to ASFA-1 only, and 13 subscribing to ASFA-2 only. By 1980 the sales had risen to 1,029 for ASFA-1 and 574 for ASFA-2.

The Partners

IOC was represented at the 1977 Board by Steven Tibbitt, who was on secondment to IOC from NOAA. Portugal and Mexico were accepted, subject to satisfactory agreement with FAO regarding input, and were formally confirmed as members at the 1978 Board meeting. The Instituto Nacional de Investigação das Pescas (INIP), Lisbon (Mario Ruivo's former institute) was the Portuguese national centre, represented on the ASFA Board by Lidia Nunes (Mario's wife), who was Head of INIP's Divisao de Informaçao e Documentaçao. Members of INIP's library staff visited Rome (1978), Plymouth (1979) and Brest (1981) for training. Dr Armando Sandoval, Head of the Centro de Informacion Cientifica y Humanistica (CICH) of the Universidad Nacional Autonoma de Mexico, represented the Mexican centre whose aim was to cover Spanish language material published not only in Mexico but throughout the region. Needless to say this laudable aim was more

ambitious than could be achieved, and it was acknowledged that the active cooperation of the other countries of Latin America and the Caribbean was both desirable and necessary.

1978 also saw the arrival of a third international "sponsor" or "coordinator". In 1973 the UN Economic and Social Council had resolved that an information service and focal point for information and reference should be set up in the Ocean Economics and Technology Office (OETO) in New York. The service would collect and interpret pertinent information which would also serve as background documentation for international action such as the Law of the Sea Conference which was to be convened in 1974.

Two OETO staff members, Karl-Heinz Szekiolda and Robert Gruszka, attended the first meeting of the Joint ASFIS Panel in 1975, as observers, and as a result of further contacts and negotiations, OETO agreed to combine its information efforts with those of FAO and the IOC. In 1977 the Economic and Social Council decided to implement a Marine and Coastal Technology Information Service (MACTIS) in conjunction with ASFIS, and requested the Secretary-General:

"to co-operate with the Intergovernmental Oceanographic Commission and the Food and Agriculture Organization of the United Nations and other competent United Nations organizations in the development of the Aquatic Sciences and Fisheries Information System..."

OETO's expertise, as its name suggests, was in policy, non-living resources, and increasingly in the law of the sea. The final "O" became "B" in 1980 with the change from "Office" to "Branch" (OETB).

Agreement with the Tokyo University of Fisheries was finally reached in 1979, with input being provided by the Marine Sciences and Fisheries Research Information Centre. Their representative Dr Y. Aruga was unable to attend a Board meeting, and the situation lasted for only two years, leaving Ed Akyüz to search for a more permanent arrangement elsewhere. Chinese participation was discussed in 1980, but was regarded as premature at that time.

Visits in 1977 to the Canadian International Development Research Centre (IDRC), Ottawa by Joe Caponio, Jeff Watson and (later) by Ron Needham established that IDRC would be willing to consider supporting ASFA/ASFIS activities in developing countries. Well known for their support of information projects, and in particular for their role in AGRIS development, IDRC was to become a major provider of funds for fisheries and aquaculture projects, normally with information and training components using ASFIS methodology. Links were reinforced in 1979 when, through the courtesy of IDRC, the Board's Ottawa meeting was held at IDRC headquarters, and Board members spent half a day in discussions with IDRC staff. Mr John Woolston of IDRC expressed interest in the concept of ASFIS, but indicated that IDRC would require a programme development plan agreed upon by the sponsoring international agencies before any substantial support could be initiated; nevertheless requests from developing countries for assistance with marine, fisheries and aquaculture information activities could be encouraged. Thereafter it became customary for an IDRC observer (usually Kieran Broadbent) to attend ASFA-related meetings, and for IDRC to participate in ASFIS training and other activities.

IOC has a small secretariat and it operates through regional subsidiary bodies, and with the assistance of Working Committees, Groups of Experts, Task Teams, consultants and advisers. In 1977 the IOC appointed an *ad hoc* Group on Marine Information Management, under the

chairmanship of Joe Caponio, to review international information and referral systems related to marine programmes, and advise the IOC on the development and implementation of information systems and on their participation in ASFIS. It was arranged that the *ad hoc* Group would report through the IOC Working Committee on International Oceanographic Data Exchange (IODE), and their first report (with a substantial contribution from Natalie Philippon-Tulloch) was prepared in December 1977 and presented at the IODE meeting in New York in August 1978.

In June 1978, in response to requests from the IOC Association for the Caribbean and Adjacent Regions (IOCARIBE) for "action leading to improvement of bibliographic support and the establishment of a regional system for the exchange of documentation and bibliographies" a four-man ASFIS survey team visited Mexico, Jamaica, Costa Rica, Colombia, Venezuela and Trinidad and Tobago. The team consisted of Allen Varley (leader), Robert Lankford (IOCARIBE Secretary), Armando Sandoval (CICH), with Michael Brandreth (IDRC) demonstrating IDRC's emerging interest in supporting ASFIS. The report described the current marine information facilities and activities in the region, drawing attention to user needs, and despite being impressed by the scale of the marine library and information services provided at the Universidad de Oriente Instituto Oceanografico, Cumana, in remote northern Venezuela, the team identified CICH as the most appropriate centre to undertake regional responsibilities. Possible models for a regional cooperative system were given, and criteria for ASFIS centres and their operations were listed.⁽³¹⁾

A Training Workshop was held in Cartagena, Colombia in December 1979, with participants from the region and from the ASFA input centres. Training was given in ASFA methodology and input preparation and it was hoped that links would be established within the region which would lead to the provision of input to ASFA, and output services, on a regional basis.

Although CICH has operated successfully as an ASFA centre, no regional ASFIS cooperative system has yet been established in Latin America or the Caribbean, despite clear needs being demonstrated by many of the countries, and interest expressed by a number of relevant institutions. Politics, lack of funding, national and institutional rivalries, lack of sustained effort by and in the secretariats, and the absence of an accepted plan for ASFA/ASFIS development until 1990, can be cited as contributing factors.

The IOC *ad hoc* Group became a Task Team, continuing to work, and to report through IODE. Although never comfortable at being a minority group in a Working Committee totally dominated by oceanographic data interests, the Task Team eventually became the IODE Group of Experts on Marine Information Management, and continued the work of the ASFIS Panel which held its third and final meeting in Paris in 1980.

The *Aide Memoire recording the respective responsibilities and entitlements of the ASFA partners* was reviewed and amended at the 1978 Board meeting, with a new chapter being added on policy on the use of the magnetic tape database. A policy on charging was adopted, including provision for a surcharge (royalty) to be recovered from non-domestic users and paid into a trust fund. Policy on new partners was discussed, and it was resolved that additional input centres and the development of national networks in partner countries (as were being established in France, Germany and the United Kingdom) should be the responsibility of the respective national partner. As they represented the partners with immediate concerns regarding database access and use, Bob Freeman and Janice Heyworth examined the experiences and practices of other database producers, providing the Board with guidance, and publishing a paper on the subject (with Allen Varley) in

1979.⁽³²⁾

Subsequent Board meetings revised and added to the *Aide Memoire*, but uncertainties about the status of an ASFA trust fund as an element of the IOC Trust Fund with a possible loss of Board control, led to the ASFA Trust Fund being opened in London 1980 by IRL as a separate bank account.

In 1980 Udo Schützsack, now of the Gesellschaft für Information und Dokumentation (GID) which had been formed in 1977 through the merger of IDW, ZMD and other German institutes, agreed to act as agent for the lease of the magnetic tape database to interested institutions and agencies in both developed and developing countries.

In May 1980 Carolyn Roberts, who as editor had played a vital role in ASFA's birth and early years, left IRL to prepare for the arrival of her daughter Isabella, born in June. Peter Auber, who worked for IRL from 1972 to 1975 before moving to FAO, left his post in Rome in November 1980. He was eventually replaced in 1981 by Richard Pepe.

Production and Coverage

Continuing efforts were made to improve coverage, particularly of the ASFA-2 subject areas of physical oceanography and non-living resources, while improvements were called for in citation speed and indexing consistency. The coverage of patents was again raised by IRL in 1978, but the 1979 Board decided that the issue should be dropped until a real need was determined, with the priority remaining the achievement of more comprehensive coverage of the published literature. The MBA's "unmonitoring list" of serial sources not covered by ASFA was updated and considered regularly, and *A consolidated list of serial titles not covered by ASFA* was produced for the 1979 Editorial Staff meeting.

From time to time there was speculation about the likely total number of publications issued annually within the scope of ASFA. Estimates by Board members put the figure at a possible 40,000, and it was felt that a medium-term target of 30,000 records to be processed annually was achievable and economically viable. Fearing that the amount of available literature would continue to grow at a rate faster than could be handled technically and economically, it was acknowledged that records of some "grey" and locally-produced publications might suitably remain in regional databases, which in the future might be created for local use and as feeder systems for ASFA as the international database.

The possibility that papers could be selected or rejected on quality or other criteria was firmly rejected and on several occasions the Board reiterated that all papers within scope in titles on the monitoring list must be covered. The "ASFA split" was agreed as a permanent arrangement in 1979, although there had been some discussions as to whether a marine/freshwater split would have been logical. The following year, with the growing realisation that the database was now producing the printed products, rather than the reverse, the possibilities of ASFA sub-products covering aquaculture, fisheries and other subject areas were examined, both as marketable services and as products which would help to improve ASFA's use in developing countries.

System Tools

The updated monitoring list was published and distributed as an *FAO Fisheries Circular* in

1078, and the new *Guidelines for Bibliographic Description*, produced by Harold Dierickx, Head of the UNISIST International Centre for Bibliographic Description, and based at the British Library, were issued in 1979. Revised *Abstracting Guidelines* were printed and distributed by FAO in 1978.

In 1977 Mr D.W. Privett, Librarian of the UK Institute of Oceanographic Sciences was recruited as a consultant by FAO to add and structure new terms covering physical oceanography and non-living resources to be integrated into a revised thesaurus. Working from the 1976 version, descriptors were added and structured across the whole ASFA subject area, and keyboarded by FAO. It was arranged that processing would be in Paris, using Unesco SPINES software, with a target of late 1980 for printing. By 1980 a draft "ASFA-2 thesaurus" was ready, with terms being used for indexing. Lack of a unified thesaurus was causing problems for input staff who indexed from periodically updated lists of terms, and frustration, not least to Dick Privett's wife Anne, who threatened to destroy the 30,000 handwritten cards which were distributed on all available flat surfaces in their home. Delays, misunderstandings over the requirements (and restrictions) of the SPINES software, and under-estimates of the time required not only to add new terms but to identify "forbidden" terms, meant that 1980 and 1981 passed without a completed thesaurus.

In 1980, mindful that there had been suggestions by IOC/IODE that the thesaurus could be used as a basis for the development of a multilingual glossary of oceanographic terms, CNEXO volunteered to translate the thesaurus into French, possibly with Canadian cooperation, if IOC could seek funding. It was also understood that a Spanish translation of the 1976 version of the thesaurus was being prepared in a Latin American country.

The revised *Geographic authority list* was distributed by FAO in 1977, but use by input staff identified gaps and the need for another update. NOAA completed and distributed the list of corporate names in 1979, and in the same year a draft database user guide was produced by Bob Freeman and Janice Heyworth. Discussions regarding a *Taxonomic authority list* were inconclusive because of the enormous amount of work involved, though FAO began to keyboard a list.

Automation

The ASFA partners were relieved (and perhaps surprised) when IRL met their target of automation in time for January 1978 production. Inevitably there were problems in the early months when tapes were produced by a London bureau, but from April 1978 IRL produced them in-house through the ASSASSIN system (a name which provoked wry comments from Ron Needham). Developed by ICI's Agricultural Division, the Agricultural System for Storing and Subsequently Selecting Information (ASSASSIN) offered a bureau service to UK users. FAO in turn had some problems in converting the tapes to ISO 2709 format (although the FAO/IRL contract allowed for \$0.85 per record to ensure compatibility). Janice Heyworth was able to arrange for the tapes to run on QL Systems thereby offering the first regularly updated ASFA database service from October 1978, and from October 1979 to offer batch current awareness services through CAN/SDI by the Canada Institute for Scientific and Technical Information. In France in 1980 the tapes were run on CNEXO's DOCOCEAN system, and from July 1981 they were made accessible to other French institutes through TRANSPAC and to other countries through EURONET links. ASFA was publicly available on DIALOG as File 44 from October 1979 and was searched online by users in many countries, though Canada (under the terms of the *Aide Memoire*) did not permit DIALOG or any other non-Canadian host to offer ASFA to Canadian users. In Germany ASFA was tested on

the DIMDI host, Cologne, and the French, German and United Kingdom partners discussed ASFA access in the context of EURONET services being developed within the European Economic Community (EEC).

Mechanisms for correcting the database were discussed, and the problem of the missing records which were lost during ISO 2709 conversion prompted the suggestion that a 13th tape could perhaps be produced each year. However this idea was not implemented.

BF experienced many problems, both technical and bureaucratic, in proceeding with the conversion to tape of the 1975-1977 material, and arranging production of the 1977 indexes. The possibility of converting the pre-1975 records was discussed in 1979, and although it would be feasible and desirable, it could not be justified at the time due to cost.

Communication and Co-ordination

Rapid communication in a geographically decentralised system is vital, though postal services remained slow, with the Italian system in particular being blamed (or used as an excuse) for delays. In 1978 Bob Freeman described a new electronic mail (or, in the terminology of the time, "computer conferencing") system which was used by NOAA and which had successfully been extended to include EC, IOC, MBA and CICH using the new satellite data transmission links Telenet and Cyphernet. Bob urged other centres and ASFIS participants to join the group using "Sam's Club". Within a few years it became the preferred means of communication with an active membership much wider than the original ASFA group. The acronym stood for "System of Automatic Message Switching for Communicating Lucidly with Brevity", though in fact it was named after its Plymouth birthplace, a night club at which 1977 Board meeting participants had conceived the system. In later years, some new members over-sensitive to North American influence, would object to ASFA, an international system, naming one of its most-used services after "Uncle Sam".

The AGRIS duplication continued to be a problem, but hopes were raised with the publication of the report of the Unesco/UNISIST appraisal of AGRIS in April 1977.⁽³³⁾ The report (pp.27-28) recommended that fisheries and oceanography information should be excluded from AGRIS:

"While discussing scope, the problem of fisheries and oceanographic information should be mentioned. The Aquatic Sciences and Fisheries Information System (ASFIS), which is also coordinated by FAO, covers this information and produces a monthly abstracting journal called Aquatic Sciences and Fisheries Abstracts (ASFA). A number of countries, including the United Kingdom and the United States have declined to process information in this area for AGRIS, since they provide input to ASFIS, and it is recommended that in order to avoid unnecessary duplication, fisheries and oceanographic information be excluded from the scope of AGRIS Level 1."

In February 1980 Wulf Kirchner, Udo Schützsack and Allen Varley visited European Economic Community (EEC) offices in Luxembourg to discuss AGRIS, ASFA and the possible handling of European fisheries information with secretariat staff of the EEC Agricultural Working Group and Euragris. The secretariat worked with EEC funding, and coordinated European participation in AGRIS. Predictably they were defensive of the scope of AGRIS, and politely non-committal regarding EEC support for ASFA.

ASFIS was a specific item on the agenda of the Second Technical Consultation of AGRIS Participating Centres, Rome, 12-15 May 1980. A resolution re-affirmed that fisheries should be included in AGRIS scope, and urged AGRIS and ASFIS Secretariats to work together to make the two systems more compatible.

In 1980 British Library suggested that an ASFA evaluation, similar to the AGRIS and the UNEP INFOTERRA evaluations might be useful, and the Secretariats were asked to take up the matter with the ASFIS Panel and with the Unesco General Information Programme. In the event no action was taken.

The Editorial Staff meeting in Lisbon in May 1981 analysed citation speed in an effort to make improvements, and the emerging aquaculture information networks were discussed by Ron Needham and by Jay Maclean of the International Center for Living Aquatic Resources Management (ICLARM), Manila, The Philippines, who attended as an observer.

Those attending the Editorial Staff meeting, together with virtually the whole ASFA partnership, had no intimation of the drastic change which was almost upon them. In the Summer of 1981 rumours swept through the members and the centres that ASFA had been sold, or taken over, by a North American company, and these were confirmed by Ed Akyüz in a circular letter dated 13 August 1981. Cambridge Scientific Abstracts (CSA) were the new owners of ASFA, and Ed Akyüz had held discussions and made provisional agreements.

CHAPTER FIVE

1981-1985 YEARS OF CHANGE

"The old order changeth, yielding place to new". The words spoken by Tennyson's dying King Arthur headed the *FAO Management Report*, prepared for the Board meeting in Rome in November 1981, and written in Ron Needham's characteristically robust style. The abrupt and unexpected change of publisher had left the partners disorientated and uncertain about the future. There was a sense of betrayal in the input centres, and outrage that "their" ASFA had been treated as a commercial product to be bought and sold with no consultation and no prior notice to the Board.

Ed Akyüz and CSA staff members were aware of the tensions and of the Board members' feelings of impotence at the *fait accompli*, and demonstrated their diplomacy and conciliatory skills at the Board meeting. Ed Akyüz looked forward to a mutually beneficial association, and Philip Hixon, the CSA President and ASFA Board member, gave the reassurances of CSA that they were committed to the ASFA philosophy, and with advanced technology would make improvements. Ron Needham was optimistic that CSA's technology would permit the ASFA database to retain (and in some cases regain) its international standards, and he drew attention to technical problems and immediate necessary changes in established procedures. The upheaval was not, after all, the fault of CSA, and the publisher was fortunate in recruiting Jonathan Sears, formerly IRL's editor of ASFA-2, to cross the Atlantic as editor of ASFA. Jon Sears, well known to Board members, having worked for IRL since 1974, attended the 1981 meeting and was able to act as the link between the new publisher and the Board, and provided continuity not only at the first meeting, but through successive years. Pamela Clare, a second IRL staff member who had moved to the USA but who returned to England to work as a consultant after a year with CSA, also represented CSA at Board meetings between 1981 and 1988.

By the end of the meeting input centre representatives felt more reassured and optimistic, though doubts remained and it was clear to some that recent events had demonstrated that control and ownership were no longer in their hands.

Priorities for the partners were to rebuild confidence, to establish working relationships with CSA, and to continue to improve ASFA's coverage, quality and distribution. Growing concern that ASFA was neither reaching developing country users adequately nor involving developing country institutions in its production and management, coincided with the beginning of financial stringency in the UN agencies and in most of the input centres. Budget cuts, reductions in staff numbers and increasing bureaucratic pressures to recover costs or to transfer functions to the private sector affected members for the whole of the decade. Meanwhile the rapid advances in information technology, the wide use of online services and the phenomenal growth in the power and use of microcomputers, raised questions about the future of printed abstract journals and the viability of cooperative mission-oriented information services.

Subsequent Advisory Board meetings were held in 1982 (Washington DC), 1983 (Rome), and 1984 (Lisbon). At the Lisbon meeting the Board agreed to experiment with biennial meetings and to devote the available resources for 1985 to a special meeting to complete work on the thesaurus. By 1986 however, the Board agreed that an interval of two years between meetings was too long and permitted too many issues to accumulate.

Editorial staff meetings were held in 1982 (Rome), and 1983 (Brest). Sales of the printed journal declined from 1,041 (ASFA-1) and 595 (ASFA-2) in 1981 to 840 and 424 respectively in 1985. The trend reflected the experience of other abstract journal producers and emphasised the growing importance of the electronic database as a means of providing services to users while recovering costs.

The Product

Because of the actual, potential or feared impact of online searching on the sales of the printed journal the 1981 Board recognised that it was necessary for the publisher to receive adequate reimbursement. This could be achieved by increasing the amount paid by FAO through the contract or by ensuring that CSA derived income in other ways. Consequently CSA were given rights to use input prepared by other centres in other CSA databases, subject to royalties being paid into the Trust Fund, and also to market the ASFA database.

In 1982 the possibility of an ASFA freshwater subset was discussed, though it was concluded that an aquaculture subset would probably be more viable, particularly since by 1984 SEAFDEC centres might generate significant input on aquaculture. CSA therefore proposed to consider introducing an aquaculture subset, and the first quarterly issue of *ASFA Aquaculture Abstracts*, with more than 200 subscribers, appeared in January 1984. Another possibility was the introduction of a "special bibliography" database subfile which would contain a suite of retrospective bibliographic files covering subjects such as mangroves, krill, marine minerals, and specific geographic areas.

The number of records in the database for 1981, as in the previous year, exceeded 26,000, but this dropped to 22,535 in 1982, perhaps understandably as this was CSA's first full year of production. The figure rose to 27,859 in 1983, 33,480 in 1984, then down to 30,598 in 1985. The partners were gratified that the provisional target of 30,000 had been passed, but concerned that the continuing information explosion had already pushed the potential number of papers within ASFA scope beyond 40,000 annually.

The Partners

1981 saw the creation of the Fishery Information, Data and Statistics Service (FIDI), with Ed Akyüz as Chief and Ron Needham in charge of information activities. Links had been established between FAO and the proposed Southeast Asian Fisheries Information Service (SEAFIS), and it was expected that IDRC would support the project. Inge Svendsen from the Norwegian Oceanographic Data Centre attended the 1981 Board meeting as an observer, and the Centre began to provide input in early 1983.

In January 1981 Janice Heyworth and Bob Freeman married and received the congratulations of their ASFA friends and colleagues. Janice moved to join Bob in Washington DC, and from 1981 Canadian ASFA activity was coordinated by the Scientific Information and Publications Branch of the Department of Fisheries and Oceans, Ottawa. Jeff Watson attended the 1981 Board meeting and thereafter the Canadian Board member was Heather Cameron. The Japanese input centre ceased its activity in early 1981, and it was not until 1983 that input was resumed through the Japanese Fisheries Resource Conservation Association.

In Southeast Asia a landmark seminar in 1982, hosted in Bangkok by SEAFDEC and funded by IDRC, brought together fisheries and aquaculture information professionals from the region to share ideas, exchange experiences and examine information needs and possibilities for future cooperation.⁽³⁴⁾

National and regional fisheries information and library activities were developed in the following years in Southeast Asia and the Pacific Islands. ASFIS methodology and the ASFA database were utilised, and the intention was to be in a position to transfer to ASFA appropriate records from local databases. This is still a valid concept but it has not yet been achieved. IDRC also supported information activities at the International Center for Living Aquatic Resources Management (ICLARM), Manila, The Philippines. Jay Maclean, ICLARM's editor, was already well-known to the ASFA community, as was Rosalinda Temprosa, who as ICLARM's librarian was responsible for developing the highly successful range of information services provided to users in the region.

Mary Fisk attended the 1982 meeting as OETB's representative and informed the members that following the adoption of the UN Convention on the Law of the Sea and of the resolution of the Third UN Conference on the Law of the Sea on the development of national marine science, technology and ocean service infrastructures, which gave additional legitimacy to the ASFIS concept, the information activities of OETB would be strengthened allowing them to take on additional monitoring responsibilities.

The possibility of establishing a Brazilian centre was discussed in 1983, and in the same year IOC announced that it was supporting data and information activities at the National Institute of Oceanography, Goa, India, which could lead to ASFA participation. The implications of increased membership, the recruitment of new centres, and responses to be made to countries requesting participation were regularly debated by the Board. Members were aware of the importance of securing the cooperation of the most appropriate centres, and of the dangers of accepting self-nominated and self-designated "national" centres who lacked the support of government departments and related major centres within their country, problems which would be magnified at regional level if several centres from different countries competed for the perceived prize of international recognition, and possible funding, as a "regional" centre. The needs for clear policies and procedures, for acceptable patterns for network structures, and for a stable resource base were indisputable.

In 1983 an *ad hoc* information planning meeting on future ASFIS development and support, chaired by Jeff Watson, was held in Paris. One result was agreement not to resurrect the ASFIS Panel (which had last met in 1980), and to rely in the short term on the IOC/IODE Group of Experts on Marine Information Management (MIM). The MIM Group held their first meeting (as a Group of Experts) in Rome in November 1984, under the chairmanship of Jeff Watson. A major area of concern was the lack of a "Programme Development Plan" for ASFIS, without which they felt that it would be difficult to persuade UN and donor agencies to support the development of a truly international system based on an interactive network of national and regional centres.

In August 1983 Steve Tibbitt returned to NOAA Washington after seven years with the IOC. Armando Sandoval retired from his post as Director of CICH Mexico in 1984, and in 1985 Ron Needham went to Bangkok for one year on contract to IDRC in support of SEAFDEC information activities.

CSA, as the new partner, questioned the legal status of the *Aide Memoire* at the Board meeting in 1981, and members agreed that although it was an agreement made in good faith lawyers would doubtless regard it as unenforceable. Nevertheless, the partners continued to add to and revise the document which retained most of its original wording and structure, and the *Aide Memoire* continued to be used as an annex to the contract between FAO and CSA. The document was debated section by section at the 1981 meeting and changes included a revised definition of ownership of the database to read "ownership of the database is vested in FAO on behalf of the Board". Rights were given to CSA to use partners' records in other CSA databases, subject to royalties being paid, and changes were made in rights to market the database.

The *Aide Memoire* allowed each partner to receive up to 30 free copies of the printed abstract journal as an entitlement and as some recompense for effort. The copies which became known, perhaps erroneously, as "complimentary copies" were provided by the publisher for internal use by each partner, the number depending upon a notional level of each partner's participation. In 1982 CSA pointed out that the number amounted to twenty percent of paid subscriptions, must be affecting sales, and was costing them over \$9,000 a year in postage. Members felt that the copies were a negotiated right but agreed to review and attempt to decrease the numbers, and also to investigate the possible use of the UN pouch system for distribution. The review failed to reduce the number by any significant amount, and CSA in 1983 again drew attention to the cost of printing and mailing the 195 copies. The UN pouch system had proved impossible, so FAO agreed to review their Memorandum of Understanding and contract with CSA in order to continue to meet the requirement for the "complimentary" copies. The question continued to be debated at Board meetings and a partial solution was found when FAO agreed to cover the mailing costs.

The right of partners to market the database in their own country proved particularly advantageous to NOAA, because of the presence of DIALOG (as it was now known) in California, and its dominance in the rapidly growing provision of online services to users worldwide. In 1982 NOAA announced that under a new agreement CSA would be responsible for preparing input on behalf of NOAA, while having the rights to market and to mount the ASFA database on DIALOG and other systems in the USA.

In 1983 Heather Cameron announced that the database was to be offered to a second Canadian host - CAN/OLE, and that the Canadian border would be opened to DIALOG and other external services.

At the 1982 Board meeting Peter Lees, UNEP's regular and acute observer at Board and ASFIS meetings, recalling UNEP's links over many years with ASFA, reported on UNEP's use and support of ASFIS methodology, and suggested that UNEP should become a partner in ASFIS. The suggestion was welcomed by the Board, though it was to be several more years before UNEP presented a formal application for membership.

In 1984 NOAA reported on meetings held between NOAA, the US National Agricultural Library (NAL) and FAO regarding the improved coverage of aquaculture literature through cooperation with NAL. ASFA would receive aquaculture-related records which NAL was providing for AGRICOLA and for AGRIS, and in return NAL wished to receive copies, for their document delivery service, of the mainly grey literature aquaculture papers which were being processed by the other partners. NAL also asked for their library "call numbers" to be added to

records in the ASFA database. The Board welcomed the participation of NAL but had reservations on including NAL codes in ASFA records, and about the copyright and other implications of mass photocopying of documents for NAL.

The Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) was created in mid-1984 through the merger of CNEXO and other French marine and fisheries institutes. Some changes were made to the DOCOCEAN system, but ASFA remained online, and ASFA input continued to be coordinated from Brest.

In 1984 Joe Caponio, now Director of the US National Technical Information Service (NTIS) attended the Lisbon Board meeting and suggested possible areas of cooperation between ASFA and NTIS, including document delivery, training, and ASFIS related matters.

With the support of IOC and IDRC and organisational assistance from NOAA and NTIS, marine information specialists and librarians from many developing countries attended an information management training workshop held in the United States in October 1985. Participants attended the International Association of Marine Science Libraries and Information Centers (IAMSLIC) annual conference in Williamsburg, Virginia, where a special session on international marine information was organised and chaired by Bob Freeman, with Kerry Broadbent, Allen Varley and Jeff Watson as speakers.⁽³⁵⁾ The participants then spent two weeks in Washington DC attending a training course conducted by NTIS.

The ASFA Trust Fund account was transferred to Washington on behalf of the Board by CSA. The problems of applying different rates for the use of the database by domestic and non-domestic users, and by users in participating and non-participating countries were debated. The Trust Fund grew from under \$10,000 in 1981 to more than \$20,000 in 1985; suggested uses included the processing of the tape backlog, conversion of pre-1975 material, support of Sam's Club computer conferencing/electronic mail operations, and preparation of training and publicity materials. Use of the Fund for travel or for ongoing ASFA operation and production were ruled out.

Production and Coverage

Quality, timeliness and input procedures were examined and debated at Board and Editorial Staff meetings. CSA now produced 26 journals, established by four previous publishers and some, like ASFA had their own special requirements. There was some conflict between various systems, and compromises were made to fulfill the requirements of a unified production system. Changes were made in 1981 and 1982, but some matters remained outstanding, including field lengths, input sheet design, indexing strings and terms rotation, author fields having authors at more than one bibliographic level, and other departures from the ideal international standard.

CSA's proposal to limit abstracts to 150 words in length was accepted with extreme reluctance, and the continuing need to minimise the conflict between economic realities and the international ideal provoked the comment that ASFA was in danger of "becoming just another commercial product".

Oceanic Abstracts (originally *Oceanic Citation Journal* and *Oceanic Index*) had appeared since 1964 and was acquired by CSA from Data Courier Inc., together with *Pollution Abstracts*, and published by CSA from 1981. In 1978 Kit Woolcott had approached Data Courier with a view to acquiring *Oceanic Abstracts* but had been unable to make a sufficiently attractive financial offer. The

possibility of merging the *Oceanic Abstracts* database (1964-1981) with ASFA had been discussed by the Board for a number of years, and was now achievable. There were problems of field structures, ownership and copyright, but at the 1981 Board meeting FAO and CSA agreed to examine the possibilities and report back.

The following year the Board reviewed the problems of merging the *Oceanic Abstracts* 1964-1981 backfile with ASFA. Massive re-indexing would be necessary, and the Board realised that their unequivocal ownership of the database would be lost. CSA were willing to undertake the work but pointed out that there would be a loss of income from users who habitually searched both databases. It was felt that the merger should not be proceeded with, but the matter could be kept under review for possible future implementation. Nevertheless, members had the uneasy feeling that the best interests of the user community had not been served, and perhaps more effort should have been made to achieve a merger.

The 1983 CSA and FAO reports to the Board revealed a backlog of records awaiting publication, estimated at 4,000 by CSA and upwards of 6,000 by FAO. CSA stated that the data entry system had been streamlined and the backlog was being eliminated by entering a portion of it month by month. This resulted in more than 33,000 records appearing in the 1984 database.

Problems continued to be reported over the processing of the 1975-1977 tapes, and with the generation of the printed indexes for 1977. Machine readable input as a desirable goal was again discussed, and in 1981 FAO, BF, and CICH agreed to experiment, and in 1984 DFO volunteered to design a pilot system. In 1984 CSA agreed to investigate the possibility of converting pre-1975 material using optical scanning.

Automation

The ASFA database was made publicly available on the Deutsches Institut für Medizinische Dokumentation und Information (DIMDI, Cologne) host at the end of 1981. Usage was low initially, although the search software permitted sophisticated searching and analysis. From 1983 a regular feature of Wulf Kirchner's annual report to the Board were tables and statistics relating to database content and input, year by year, by input centre, by language, and other factors of potential interest. DIMDI estimated that some 15000 records had format problems, about 4000 of them serious, and the possibility of a thirteenth annual correction tape was again raised. CSA, aware of errors on the DIALOG tape, proposed to reload in 1982, using the ASSASSIN tapes converted to ISO 2709 format. The need to maintain file consistency was stressed, though it was to be several years before the reload was achieved. In 1982 CSA approached the ESA/IRS host (European Space Agency Information Retrieval Service, Esrin, Frascati, Italy), and provided a test tape. Similar approaches were made in 1985 to BRS and Pergamon/Infoline.

The possibilities of "microdisc publishing" were discussed in 1982, whereby portions of the database, say on aquaculture, mangroves, or other subjects or geographic areas would be distributed on microcomputer discs, or even cassette tape or video tape, with suitable retrieval software. In 1984 CSA provided partners with the newly-developed MicroCAMBRIDGE software which permitted IBM PC users to access ASFA and other CSA databases online on DIALOG, to search and to download files of records. The software was aimed at individual scientists as well as information professionals.

System Tools

Although a new *Monitoring list* had been expected in 1982, preparation was delayed and it was agreed that it could be a by-product of the new *World List* which was due at the end of 1983. In the event, it was to be six years before a *Monitoring list* appeared and more than ten years before a *World list* was published.

Guidelines for bibliographic description and new Abstracting guidelines (now referred to as ASFIS-3 and ASFIS-4 of the *ASFIS Reference Series*) were issued in 1985.

The *Thesaurus* terms were keyboarded by FAO and a print of the merged list was produced in Paris and distributed to centres in 1982. It was clear that some amendments, additions and structuring were still required, and that since it was a UN system thesaurus any terms in American spelling should be converted to English. FAO hoped to provide camera-ready copy to CSA who would publish by mid-1983. The question of pricing user-aids and system tools was discussed and FAO was requested to ensure that they would continue to be made available to developing countries free of charge. No progress had been made on the French translation, but the terms in the 1976 thesaurus had been translated into Spanish by Alicia Mileo of the Centro de Investigación de Biología Marina, Buenos Aires, and checked by Elda Fagetti.⁽³⁶⁾

Further delays were reported to the 1983 Board meeting and it was agreed that when available from Paris a printout should be provided to all centres and evaluated for six months, at the end of which comments and suggestions would be evaluated by the Thesaurus Committee (consisting of Mary Fisk (OETB), Wulf Kirchner (BF), Marie-Louise Marchalot (CNEXO), David Moulder (MBA), Jon Sears (CSA) and Secretariat staff). The final version should then be available by the end of 1984. It was not, and at the 1984 Board meeting members set a strict timetable which would ensure publication by the end of 1985. Members should have learned by experience that setting a timetable could not ensure action, and acrimonious exchanges surfaced as centres began to fear that the *Thesaurus* would never appear and as enquiries from users became more pressing. It was not until June 1985 that the Thesaurus Committee was able to meet.

Meanwhile in Argentina Alicia Mileo had continued her work of translating the 1976 *Thesaurus* and the 202 page document was published in 1985.⁽³⁷⁾

The revised *Geographic authority list* prepared by David Moulder (MBA) was printed and distributed by FAO in 1985, with the MBA agreeing to continue to maintain the *List*.

Communication

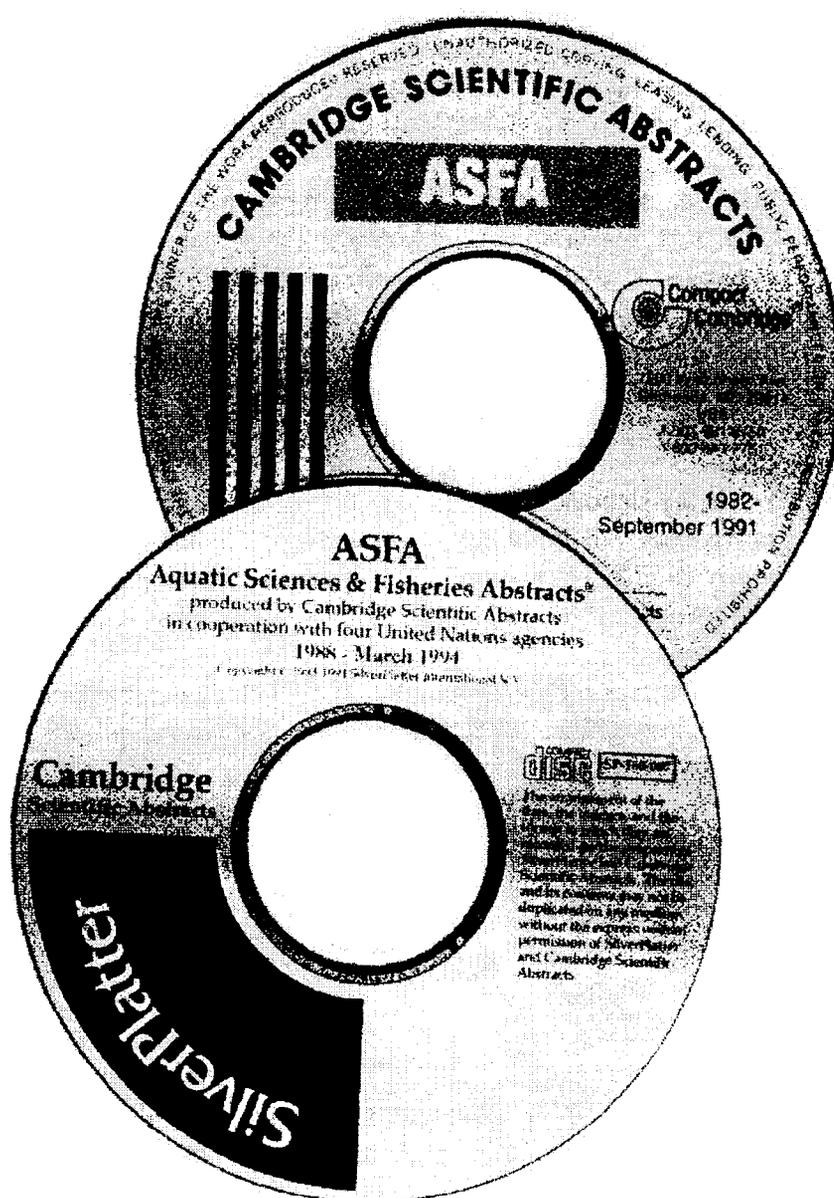
Bob Freeman reported in 1982 that Sam's Club activity, which now included members of the oceanographic data community, amounted to some 2,000 messages per year and funding by NOAA might become a problem. It was agreed that for 1983 the Trust Fund could contribute \$1,000 if necessary. New publicity brochures and pamphlets were produced by DFO in 1982, and in 1983 FAO issued ASFA and ASFIS brochures in English, French, Spanish, Arabic and Chinese.

Members of the Board recognised the need for more active communication with the user community. In 1982 Bob Freeman reported on ASFA progress to the annual conference of IAMSLIC. As representatives of the user community the group showed considerable interest in ASFA, and thereafter, at many of IAMSLIC's meetings, ASFA and ASFIS-related matters were

discussed, often with Jon Sears (CSA) in attendance. In 1984 at the Board meeting in Lisbon members were shown two ASFIS tape/slide presentations, one produced in Rome and the other, in Portuguese, prepared by Maria Luisa Cabral of INIP. Copies of the FAO version were distributed to centres.

A major technological advance

In December 1985 CSA announced that the ASFA database was available on Compact Disc (CD-ROM). It contained about 100,000 records from the January 1982 to June 1985 database and was to be updated quarterly. It was planned that the full database from 1978 would be made available on disc.



CHAPTER SIX

1986-1990 CONSOLIDATION AND NEW DIRECTIONS

The acceptance and rapid spread of compact disc (CD or CD-ROM) technology and the fact that ASFA was one of the first databases to be distributed in the new medium was a cause for great satisfaction to the partners. Although critics warned that it was a "transient technology", CD as a medium for database distribution at reasonable cost was adopted by libraries throughout the world, and brought ASFA in electronic form to developing country institutions without the costs and uncertainties of using international telecommunications.

The news of Ed Akyüz's appointment as Director of the Computer Services Centre of FAO's Administration and Finance Department came as a shock to the partners. Although the centres were aware that Ed Akyüz was not immortal and must retire within the next few years, ASFA in 1986 was suddenly leaderless, particularly with Ron Needham still away in Bangkok. Rumour and speculation were replaced by approval and optimism with the Samsclub message on 16 May 1986 announcing that Bob Freeman was to serve as Chief of FIDI from July 1986.

At the Board meeting in Paris in June 1986 it was fitting that the IOC Secretary, Dr Mario Ruivo, in welcoming the participants, also paid tribute to the pioneering work of his friend and former colleague Ed Akyüz. Members did not minimise the size of the task now facing Bob Freeman. Apart from adapting to operating within (and around) the FAO bureaucracy and sub-culture, at a time of diminishing funds he had to persuade the UN partners and other agencies to provide a more stable resource base for ASFA, together with a realistic programme for ASFIS development. Board members appreciated the fact that Bob Freeman represented continuity.

The euphoria which welcomed CSA's introduction of the compact disc was tempered by serious concern when the numbers of records processed in 1986, 1987 and 1988 unexpectedly dropped to the low levels of 23,058, 22,380 and 23,860. A serious backlog accumulated and ASFA struggled to get back on course in 1989 with 31,793 records, and in 1990 with 34,580.

Board meetings were held in Paris (1986), Rome (1987), Plymouth (1988), Rome (1989) and Bergen (1990). North American Editorial Staff met in Washington DC in 1988, and a European Staff meeting was held in Rome in 1989.

Members of the ASFA community were saddened to learn of the death of Kit Woolcott in 1986.

The Product

In 1988 the Board decided that a major review of options and progress should be undertaken by each partner, and time should be devoted at the 1989 meeting to "ASFA for the 1990s". FAO and CSA produced background papers on the topic, and at the 1989 meeting in Rome a major result of the debate was another ASFA split. ASFA-3, covering marine and freshwater pollution and environmental quality would be produced from 1990; ASFA-1/ASFA-2 overlap would be minimised, and a new spin-off publication, *ASFA Marine Biotechnology Abstracts*, which would include patents, would appear quarterly from 1990. Efforts would be made to eliminate superfluous indexing terms to reduce the size of the printed indexes, which had become unwieldy.

Discussion on the possibility of "database only" records was inconclusive in 1989, but in 1990 agreement was reached that certain categories would be omitted from the printed journals from 1991. These included annual reports, statistical compilations, dissertations, summary or abstract-only material, and some older publications.

Just as online had an effect, there was a feeling that the availability of the compact disc must affect journal sales, as well as, in turn, reducing online use. Circulation figures remained stable until 1989 however, with *ASFA Aquaculture Abstracts* showing satisfactory growth. The new split in 1990, and the appearance of *ASFA-3: Aquatic Pollution and Environmental Quality*, proved acceptable, and in 1990 there were ASFA subscribers in 81 countries.

In 1986 the annual subscription for the 1987 compact disc was \$1,250, with \$2,500 for the 1982-1986 backfile. Although the technology was new, and many of the early customers also had to acquire a microcomputer and to invest in and install a compact disc reader, in 1988 there were some 40 subscribers in ten countries. By 1990 the now widespread availability of microcomputers and CD readers in libraries in both developing and developed countries, and the enthusiastic acceptance of the new medium was reflected in CD subscriptions which early in the year were little over 100 in 26 countries, growing to over 170 in 30 countries for the 1991 disc. Early problems with the search software, particularly with the retrieval and display of analytical author records and with merged fields, were resolved with succeeding software releases and enhancements.

A perennial criticism of information systems is that they provide users with lists of references and abstracts, creating a demand but failing to supply copies of the documents cited. NOAA on behalf of NAL continued to press for NAL "call numbers" to be included in the aquaculture records. The Board, while sympathetic, felt that document delivery was a wider concern, possibly for ASFIS, but was by no means subject-specific and could equally appropriately be resolved by national libraries and international action under the "Universal Availability of Publications" programme. Nevertheless it was reiterated that "available from" statements could be included in the grey literature records, and most of the national centres reminded the Board that already they responded to appreciable numbers of requests for photocopies. Some of the centres would be willing to expand their document delivery services if the UN agencies could obtain funds to cover the costs of additional staff effort, equipment and supplies. Microfiche, fax, and electronic transmission of documents were considered as possibilities, and the use of ASFA-related compact discs containing full text of key papers, textbooks and core journals was a desirable development.

The Partners

By the 1980s Board members regarded ASFA's development phase as over, and recognised that ASFIS, as a truly international system with a range of directories and other information products had lost impetus. However the concept remained valid of a global system linking marine and freshwater institutions and researchers through national and regional networks and centres ("focal points" or "ASFIS centres") into the international system. ASFA input would be produced nationally and regionally by the centres, which would also provide information and "output" services to local users while coordinating ASFIS-related activities. In earlier years, in debating the effect of incrementally accepting more countries into the partnership, the Board had felt that beyond a membership of ten or twelve, management would become cumbersome and inefficient. Although all FAO and IOC member countries should be encouraged to participate, the size of the Board would

need to be limited, perhaps by rotation of members, or alternatively, ASFA management would need to be devolved to a subgroup or executive committee.

The *Aide Memoire* was added to and amended annually, and in 1987, in response to requests from the Board, Bob Freeman presented two versions: the first being essentially the existing *Aide Memoire* updated and revised, and the second being a completely new version. After debate and consideration the Board concluded that since the document merely represented an agreement in good faith between the partners, a totally legal agreement would be the only worthwhile alternative. This would be costly to produce, probably incomprehensible, and would involve examination by lawyers and possibly unsympathetic government departments in members' countries. Therefore it was preferable to remain with the original version.

The ASFA Trust Fund was designed as a repository for royalties and other payments accruing from ASFA, and in order for it to remain totally in the control of the Board and not submerged in general IOC or FAO funds, it was established away from Paris or Rome. In 1988 however it was suggested that ASFA needed a fund for development and expansion into which contributions could be solicited from aid agencies, benefactors and IOC or FAO member countries. It was pointed out that the Fund might more readily attract such contributions if it were associated with IOC or FAO, rather than as a Board bank account set up by CSA. It was agreed that IOC would look into the possibilities of transferring the Fund to Paris as an IOC Trust Fund, so long as shields and safeguards were in place. This was achieved in 1990, by which time the Fund stood at over \$40,000, though no determined attempts had been made to attract contributions from outside the ASFA community.

The "complimentary copies" question continued to be debated regularly, and a ceiling of 160 was fixed on the number that CSA would supply, regardless of any increase in the number of input centres. Partners resisted any further encroachment, and impatient with the often-repeated arguments, referred the matter for the UN agencies and CSA to resolve. In 1990 it was agreed that one copy of the CD-ROM, for internal use, could be exchanged by centres for two copies of their complimentary entitlement, and a majority of the centres took advantage of this offer.

Armando Sandoval's successor as Director of CICH and ASFA Board member, Dr Margarita Almada de Ascencio, attended the 1986 meeting and informed the Board that the ASFA database had been implemented on an HP-300 minicomputer using Minisis software.

The Cuban Fisheries Ministry, through the Cuban Mission to FAO, pressed strongly for access to ASFA and assistance in developing an ASFIS centre in Cuba. As a result, and with FAO support, Pedro Galvan (CICH) travelled to Cuba in 1987 to strengthen links, and in 1989 he trained a group from eight Cuban institutes in input preparation.

INIP developed contacts with Portuguese-speaking African countries, particularly Mozambique, and attempted to assist in the improvement of fisheries information in civil war-stricken Angola. In 1987 Lidia Nunes reported that under a National Project for the Development of Oceanography INIP had been selected as a lead centre for marine information, which should result in increased utilisation of ASFA in Portugal.

Two new members of CSA staff who were responsible for ASFA matters and who became regular Board meeting attendees with Jon Sears, were Ted Caris (from 1987) and Angela Hitti (from 1988). Trevor Sankey, previously with the British Oceanographic Data Service, joined IOC in

January 1985 following Steve Tibbitt's return to Washington DC, worked with the ASFA and MIM groups, and attended meetings from 1986 to 1990 as IOC's Board representative.

In his report to the 1988 meeting Bob Gruszka informed members that the functions of the OETB had been transferred to the United Nations Office of Ocean Affairs and the Law of the Sea (OALOS). There was no threat to participation in ASFA, and with increased interest in the Law of the Sea, additional input on the subject could result.

In 1988 the FAO/CSA contract included \$1.50 for each record up to 25,000 and \$2.00 thereafter up to a maximum of 40,000 records for the year, plus the bulk purchase of the "complimentary copies". Bob Freeman gave notice that new arrangements would be necessary, with the other international partners playing a more active role. The following year IOC contributed \$10,000 towards the ASFA production contract, and \$22,000 in 1990, but FAO was left to carry most of the costs.

The need to increase the availability of ASFA in developing countries was regularly debated by the Board. Conscious that ASFA was a hybrid product which relied upon income from sales while being produced by a group predominantly with a mission to disseminate information as widely as possible, the members looked to the UN agencies and to the ASFIS and MIM groups to find a suitable formula.

The second session of the IODE Group of Experts on Marine Information Management, held in Moscow in December 1986 under the chairmanship of Jeff Watson, and aware that there had been no response to the earlier call for funds to support the preparation of a comprehensive Programme Development Plan for ASFIS, stressed again the need for a recognised strategy and stable resource base. As a result of taking up a post with the newly-created International Centre for Ocean Development (ICOD), Jeff Watson relinquished his role as MIM Chairman, but planned to continue to maintain contact and working links. Joe Caponio agreed to serve as Chairman for the intersessional period.

The MIM group with other invited experts and representatives attended an IOC *ad hoc* consultation of experts at Enghien-les-Bains, France in October 1987. The aim was to prepare a strategy for IOC's information endeavours, and the consultation concluded that a strengthened ASFIS, operating at global level through national and regional centres and networks was the most logical development. However strong support was required from the international sponsors of ASFIS, together with extra-budgetary funds and assistance from donor agencies, in order to achieve a truly global system with participation by all member countries.

In 1989 Bob Freeman prepared *A strategy for the development of the international Aquatic Sciences and Fisheries Information System (ASFIS)* which was agreed by IOC and OALOS, and published by FAO in 1990.⁽³⁸⁾ The document reviewed the mandates for action, and set out a scenario for a programme to permit all member countries of each of the sponsoring agencies to participate in a global system through building stronger national and regional capabilities. Implicit was the message that FAO would narrow its efforts to concentrate on fisheries aspects, while IOC should be responsible for oceanography, and UN/OALOS for ocean policy, law and economics. Although not formally an ASFIS sponsor, UNEP logically could assume responsibility for pollution, conservation and related subject areas of the system, which would also rely upon the support of

donor agencies and other relevant UN bodies.

A novel alternative to the practice of recognising one representative agency or institution in a country was suggested. Bob Freeman argued that since the national agencies most closely identified with each of the ASFIS international sponsors were often not the same, and in many cases were responsible to different government departments, it would be logical to permit national agencies to request and support participation by as many as one organisation for each international sponsor. In this way there could be one participant specialising in fisheries, linked to FAO, one in oceanography, linked to IOC, one in marine policy and the law of the sea, linked to OALOS, and one in environmental conservation and protection, associated with UNEP. The concept would fit into the established pattern of sub-national centres operating as part of a national network, though national agreement would be required regarding which centre should act as the focal point. Similar arrangements could operate at regional level, provided that the countries represented were in agreement.

Expansion and regional activity

Peter Lees presented UNEP's formal application for ASFA membership to the 1986 Board in a letter from Dr Stjepan Keckes, Director of the Ocean and Coastal Areas Programme Activity Centre in Nairobi. The architect and driving force behind UNEP's Regional Seas Programme, Dr Keckes recalled UNEP's contributions to ASFIS, starting with the grant of a quarter of a million dollars for accelerated development of ASFIS in 1975. The Board unanimously welcomed UNEP to the partnership, and extended their thanks and good wishes to Peter Lees, who was shortly to cease working for UNEP. His departure from UNEP and the transfer of the UNEP Ocean and Coastal Areas Programme Activity Centre (OCAPAC) office from Geneva to Nairobi caused a hiatus in UNEP's participation, and the termination of the joint UNEP-FAO directories and bibliographies project which had started many years earlier. At the 1990 Board meeting, Kevin Grose, introducing himself as the new representative for UNEP, recognised that the new publication ASFA-3 was a product with which UNEP could identify closely. He would investigate the possibility of financial support, but nothing would be available before 1991.

China's membership was approved in 1986, when Yu Xiaoqun and Zhao Xucai of the State Oceanic Administration Institute of Marine Scientific and Technological Information (IMSTI), Tianjin, attended the Board meeting. CSA provided and installed a compact disc system, and IMSTI rapidly established an input network, and provided substantial numbers of input records. By 1990 the Chinese input centre had four ASFA sub-centres running local databases with records downloaded from ASFA CD-ROM and converted to CDS/ISIS, and was active in publishing guides and brochures relating to ASFA in the Chinese language.

In March 1986 IOC and the Unesco General Information Programme supported a regional seminar on the handling and dissemination of oceanographic information and data, held at the National Institute of Oceanography (NIO), Goa, India.⁽³⁹⁾ It was clear that NIO had the potential to be the Indian national ASFA/ASFIS centre, and links were established between the NIO library and FAO. With the agreement of IOC and UNOALOS, FAO issued a formal invitation for India to join ASFIS, and the Director of NIO accepted in early 1990. The ASFA Board meeting in Bergen in 1990 welcomed NIO as the national partner, with Murari Tapaswi as their representative.

An El Niño/Humboldt Current Marine Information Workshop, sponsored by IDRC and held in Cartagena, Colombia in July 1986 highlighted information and training needs, but failed to lead to

any formal cooperative structure in the region.

Ron Needham returned to his post in Rome in August 1986 following his work with SEAFDEC, and reported to the 1987 Board on information activities in the region, including the widespread use of ASFIS methodology. SEAFDEC was provisionally accepted as a partner, with K.I. Matics as the Board member, and as such was listed in ASFA and in publicity material. This proved to be premature and over-optimistic, and by 1989, as it was clear that there were operational and funding problems, it was decided that SEAFDEC should be removed from ASFA listings until a regular flow of input was assured.

Dr Alwinur of the Indonesian Fisheries Information Service (INFIS) project, Jakarta, and Mrs Lalitha Bandaranayake of the National Aquatic Research Agency (NARA), Sri Lanka, also attended the 1987 meeting as observers, through the support of IDRC, and described their information activities and proposed services which utilised ASFA CD-ROM and ASFIS methodology.

In 1986 enquiries regarding ASFA participation were received from Brazil, Chile, Cuba, Egypt, Madagascar, Romania, Sri Lanka, Trinidad and Tobago, Turkey, and Yemen. Greece, Kuwait and Senegal enquired in 1987, and between 1987 and 1990 there was repeated contact with a number of organisations in Australia, where the marine librarians showed a keen interest in the establishment of an ASFA/ASFIS centre in their country.

The possibility of ICLARM becoming an input centre was regarded favourably because of the exceptional success of the range of information and training activities developed by Linda Temprosa and Jay Maclean, though ICLARM's status as neither a national institution nor a UN agency presented a new category of partner not covered by the *Aide Memoire*.

In 1986 the Canadian government established a new donor agency, the International Centre for Ocean Development (ICOD), based in Halifax, Nova Scotia. Jeff Watson was chosen to head a component devoted to sponsoring marine information development projects.

At a meeting of the South Pacific Commission in March 1987, a proposal to develop a regional information system was discussed. Under the leadership of Esther Williams, Librarian of the University of the South Pacific, and with the support of ICOD, a workshop was held at the South Pacific Commission in Noumea, New Caledonia. The workshop endorsed the concept and the name of the Pacific Islands Marine Resources Information System (PIMRIS). Subsequently ICOD funded the development of PIMRIS. Based in the library of the University of the South Pacific, Suva, Fiji, PIMRIS offered a range of services using ASFA and ASFIS methodology, similar to those being developed or provided in other regional and national centres. The main elements were information services based on the ASFA CD-ROM, document delivery, and a regional marine resources bibliographic database using Unesco CDS/ISIS software.

Marianne Harvey of the International Maritime Organisation (IMO), London, attended the 1988 meeting, stressing IMO's interest in ASFA/ASFIS and opening up the possibilities of more formal links in the future. Harry Dooley of the International Council for the Exploration of the Sea (ICES), Copenhagen, joined the 1989 meeting as an observer. Well-known to IOC and FAO staff, and to Board members who also participated in IODE/MIM activities, Harry Dooley outlined

potential areas for collaboration between ICES and ASFA.

With Belgian funding, IOC established a regional centre in 1989 based in the Kenya Marine and Fisheries Research Institute, Mombasa, to coordinate the Regional Cooperation in Scientific Information Exchange - Western Indian Ocean (RECOSCIX-WIO) project. Activities inaugurated by Peter Pissierssens, the IOC Associate Expert in Mombasa, included a regional database and a regional directory of institutions and scientists, using Unesco CDS/ISIS software, information services from the ASFA CD-ROM, document delivery, and training.

Jean Collins of the North Sea Centre, Hirtshals, and Mogens Sandfaer, Librarian of the Danish Institute for Fisheries and Marine Research, attended the 1987 meeting as observers in order to explore ways of improving the coverage of the literature of the Nordic countries. Staff and funding problems at the Norwegian Oceanographic Data Centre had resulted in only a low level of ASFA input, and the advantages of a Scandinavian input network were clear. Bent Gaardstrup of the Danish Institute for Fisheries and Marine Research attended the 1989 meeting, and reported on discussions which had been held regarding cooperative Nordic input. The librarians were ready to collaborate but resources were scarce, and they felt that they now required political support in order to persuade their countries and their institutes to participate. Board members again regretted the absence of well-defined procedures, and of sufficient awareness in national agencies, which would enable ASFA and the user community to benefit from appropriate offers of national and regional cooperation. Impetus was lost (but there were gains in other directions) when Jean Collins moved to Rome to take up the post of FAO Fisheries Branch Librarian on the retirement of Clare Cuerden.

FAO had communicated with the Director of the Sea Fisheries Institute (SFI), Gdynia, Poland, who was a former FAO Fisheries Department staff member, to determine whether Poland, a major fishing nation, would join ASFIS. As a result, Henryk Ganowiak, the SFI Librarian, attended the 1989 meeting as an observer, and FAO agreed to develop links which could lead to SFI becoming an input centre.

For several years the partners had been aware of the information activities of the Baltic Marine Environmental Commission (Helsinki Commission), which included the preparation of an annual *Baltic Bibliography*, using ASFIS methodology. Mr Sauli Laitinen, Director of the Technical Research Centre of Finland, where the Baltic database was produced on contract to the Commission, attended the 1990 Board meeting in Bergen and discussed possible areas of cooperation. The growing availability of bibliographic and regional ASFA-related databases, and their potential for inclusion on the ASFA CD-ROM or ASFA-associated discs was debated. No positive action was taken regarding the *Baltic Bibliography*, leaving some members feeling that an opportunity had been lost.

Production

In earlier years, in discussing guidelines and criteria for centres, the Board had considered that the minimum annual target for the number of records prepared by an input centre should be one thousand. Allowances should be made for a suitable training period, for centres having to prepare and translate appreciable numbers of abstracts, and for centres contributing in other ways. During 1986-1990 three of the centres averaged fewer than 300 records annually; four fluctuated between 600 and 1,000; three averaged at least 1,000, and one (BF) averaged more than 2,000. NOAA input, prepared by CSA, was well over 2,000 annually, while FAO averaged more than 4,000. IOC and UNEP prepared no input in the period, their publications being covered by the other partners.

CSA's annual input was approximately 14,000 records.

The reasons for the backlog which accumulated in 1986, 1987 and 1988 were never adequately explained, but factors included production system changes and over-extended staff at CSA, and delays in agreeing and signing the FAO/CSA contracts. Total input submitted was shown to be in excess of 30,000 annually, while the number of records added to the database did not exceed 24,000 in any of the three years. Timeliness, missing records, discrepancies in annual totals of records and of input by centre, reported by FAO, CSA, BF and individual partners, were matters of serious concern.

With the agreement on new contract terms between FAO and CSA and the subsequent agreement of the Board to changes in entitlements for complimentary copies of ASFA, CSA took measures to eliminate the backlog. In the 1989 production year almost 32,000 records were processed. The following year, to the relief of the Board the total approached 35,000. CSA felt that in 1990/1991, economically and technically, under the existing system, the limit on the number of records which could be processed was 36,600.

Automation

In 1988 Wulf Kirchner reported that after many years of editing, correcting, sorting and data conversion of the tapes for 1975-1977, and photocomposition of the indexes, the end was in sight. The 1977 indexes were printed and distributed in 1988, and all that remained was to reformat the original tape for the first half of 1975 to make it compatible with work carried out using different computer technology in more recent years. This was achieved, and a complete reload, including the 1975-1977 database (without abstracts) was undertaken by DIMDI in 1990.

DIALOG online usage declined slightly during the period, correlating with the growth in use of the ASFA CD-ROM, with minor fluctuations at CAN/OLE and DIMDI. After many delays the database was running on ESA/IRS by 1988, and on BRS in 1989. In Japan the tapes were made available online to a network of agricultural and fisheries institutions in 1989.

In 1990 the DIALOG figure was a substantial 800 hours of connect time, retrieving 252,533 references, with United States users representing 52.5% and non-US users 47.5%. CAN/OLE recorded 213 hours, DIMDI 128 hours, and IFREMER 737 hours, most of which was in-house use by IFREMER staff. ESA/IRS totalled 93 hours, while the figure for BRS was calculated at 26 hours, ASFA being loaded as part of the combined CSA Life Sciences database.

Centres with the compact disc reported heavy use, not limited to bibliographic purposes. Addresses of scientists, location of institutes and subject specialists, spelling or verification of taxonomic and common names, identification of potential referees by journal editors, and analyses of the most potentially productive journals in specific subject areas, were among the uses described.

Figure 1 Annual totals of records added to the ASFA database
1978 to 1990
(DIMDI statistics)

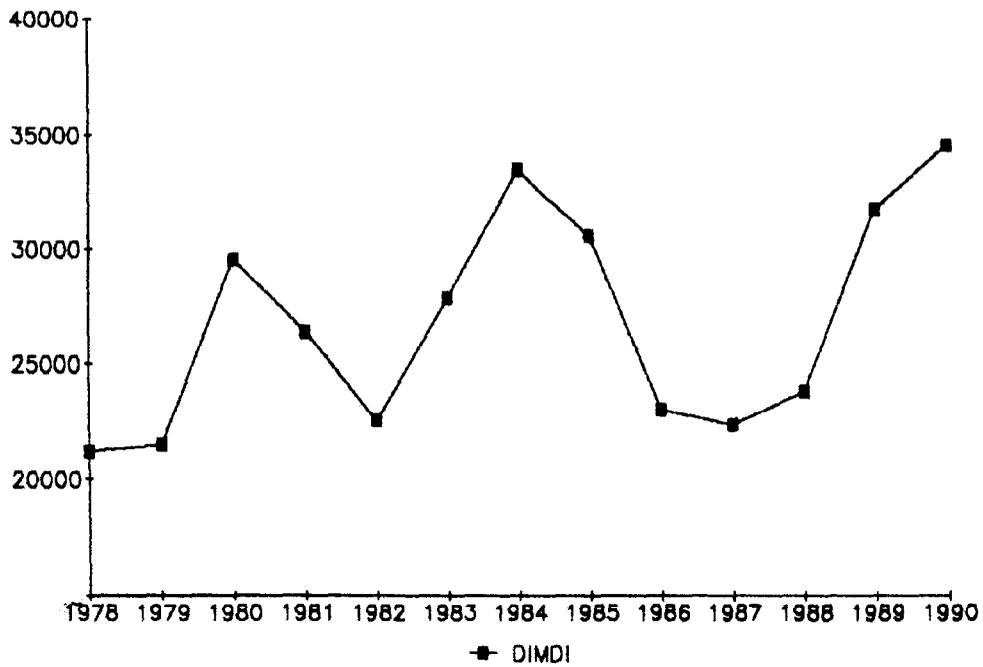
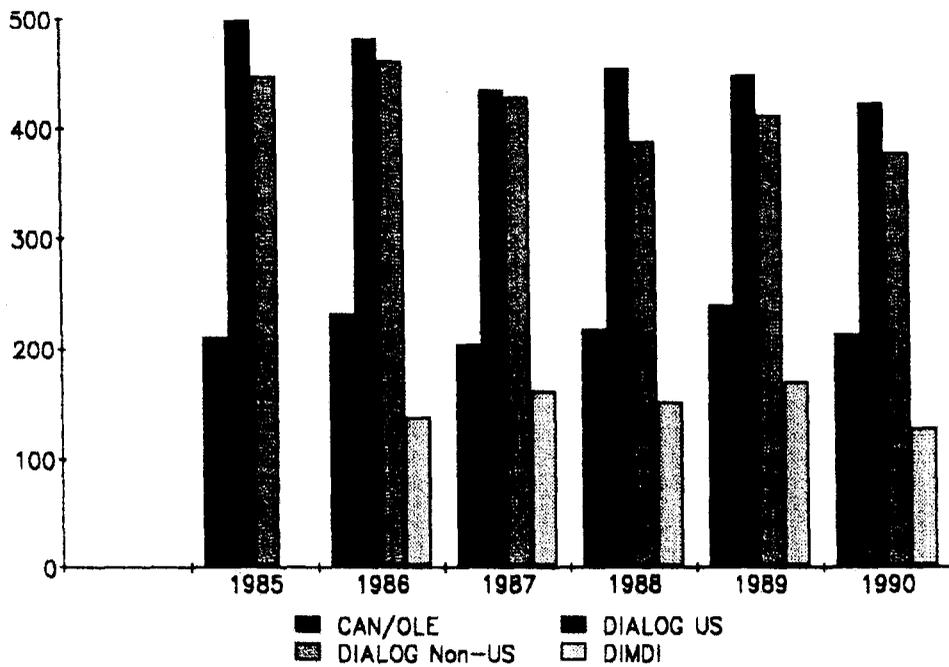


Figure 2 Online usage - connect hours - 1985 to 1990



During the Board meeting in Paris in 1986 members visited the UNESCO Library, Archives and Documentation Division for a demonstration of micro CDS/ISIS by the Deputy Director, Giampaolo del Bigio. CDS/ISIS was the most widely used bibliographic software in the world, particularly in the developing countries, and members were aware that it was being used by AGRIS centres to prepare machine-readable input. Impressed by the power and flexibility of the software, and not least by the fact that it was free yet under continuous improvement, members requested IOC and FAO to arrange for its distribution to interested centres. After a period of negotiation, FAO provided copies of the software and the manual to a number of centres and to CSA, followed in 1987 by a test input structure, named ASFISIS, developed by Bob Freeman, and compatible with AGRIS structures and with Unesco's Common Communication Format. The Head of the AGRIS Co-ordinating Centre, Abe Lebowitz, attended the 1987 Board meeting and offered to provide AGRIS input structures and documentation to input centres. CDS/ISIS was adopted by a number of the input centres, and experiments showed that it was quite feasible to prepare machine-readable input with CDS/ISIS or with word processing software. However no consensus was reached, and impetus was lost. In many other areas however CDS/ISIS became the software of choice, being used for bibliographic, directory and library management databases at institutional, national and regional levels.

System Tools

With the availability of CDS/ISIS and the new desktop publishing software which had become available for microcomputers, FAO began a programme of updating and republishing the system tools in both paper and electronic media. Changes were required to upwards of 50% of the entries in ASFIS-1, *List of periodicals monitored*, and the revised list was converted to a CDS/ISIS database by FAO in 1988.

Revisions were needed of ASFIS-2 (*Subject categories and scope descriptions*), ASFIS-3 (*Guidelines for bibliographic description*), ASFIS-4 (*Abstracting guidelines*), ASFIS-5 (*Guidelines for subject categorization and indexing*), ASFIS-9 (*Database user guide*), ASFIS-10 (*Authority list for corporate names and acronyms*) and ASFIS-11 (*Magnetic tape specifications and record format*). Although in most cases drafts were prepared and circulated, only ASFIS-9 and ASFIS-10 reached publication stage before the end of 1990.

In February 1986 a draft ASFIS-6 *Thesaurus* was circulated. Changes recommended by the Thesaurus Committee had resulted in the need for further alterations to ensure consistency, and a number of unstructured terms were worked on by Jon Sears. The Board decided that there should be no further delays and the *Thesaurus* should be published, while acknowledging that some 20% of the terms were not fully structured. This was achieved in October 1986.⁽⁴⁰⁾ Fifteen hundred copies were printed, of which FAO received 1,000 for distribution to the input centres and to developing country institutions. CSA rapidly sold the remainder and printed a further batch.

In 1987 the Board considered that a revised edition should be prepared for publication in 1989, but acknowledged that limitations of the UNESCO SPINES software at that time prevented adequate hierarchical structuring of terms. Opinion still differed as to whether the *Thesaurus* should be a comprehensive glossary of terms, or whether it should drastically be reduced in size by eliminating terms not in actual use in the database as indexing terms, and in 1990 the Board gave 1992 as the target date for the new edition. FAO converted the *Thesaurus* into a CDS/ISIS

database in 1989, providing copies to centres that wanted it. CICH continued to work on a Spanish translation, and reported in 1989 that it was almost finished. A translation into Chinese by IMSTI was completed in 1989.

In Plymouth David Moulder continued to update the *Geographic authority list* (ASFIS-7), which in 1990 was converted to a CDS/ISIS database by FAO and PML.

For a number of years the NOAA NODC *Taxonomic list* had been used as the "unofficial" ASFIS-8 *Taxonomic authority list*, but from 1986 NODC had to make a charge for updated versions. In 1989 FAO's list, used for many years as a reference source for their fishery statistical database, was updated and distributed to centres.

Many problems were experienced with the *World list of serial titles* (ASFIS-12). FAO had agreed that CSA should undertake the work, with the right to sell the publication, and a draft based on records provided by FAO and edited by CSA was circulated in 1987. Many errors were identified, including truncated and incomplete entries and incorrect alphabetisation. The magnitude of the task, and of handling the continual changes of titles, and their frequency, publishers and other information, prompted the Board in 1988 to agree that less detailed entries could be accepted, but to avoid confusion the name should be changed to *International directory of serial titles in aquatic sciences and fisheries*. Work continued at CSA on this basis, but problems prevented completion of the work in time for 1990 publication.

In 1990 IMSTI, with the financial support of FAO, produced a new title in the *ASFIS Reference Series*: ASFIS-13 *Indexing and user guide in the Chinese language*.

Communication

In January 1987 the thirty members of Sam's Club were transferred by NOAA to the Sciencenet electronic mail and conference system administered by Omnet Inc., of Boston, Massachusetts. At that time Sciencenet's Ocean Subdivision had over 1,000 users, and rapidly the system became the normal means of communication of the ASFA group, as well as linking them to marine scientists and information staff worldwide.

New ASFA brochures were produced in 1988, but it was recognised that updated versions would be needed with the introduction of ASFA-3 and *ASFA Marine Biotechnology Abstracts*, and these appeared in 1990. The need for a new tape/slide presentation was acknowledged, and the possibilities of a video tape or a personal computer interactive package were discussed.

In 1988 Allen Varley announced that he wished to relinquish the editorship of *ASFA Newsletter*, the last issue of which had appeared in June 1986. No volunteers were found, and the Board, reluctant to terminate the *Newsletter*, suggested that it should remain dormant until a new editor could be found. Members were reminded that ASFA news could be published in CSA's newsletter and IOC's *IMS Newsletter*. Allen Varley agreed to continue to maintain a bibliography of publications concerned with ASFA and its use, and in 1990 the references were incorporated into *A bibliography on information services, systems and centres for marine and freshwater resources and environment*, compiled by Allen Varley and Bob Freeman, and published by FAO.⁽⁴¹⁾ Based on the work, the compilers also published a bibliometric analysis of the literature concerning marine and freshwater information services and systems in the 1990 *IAMSLIC Proceedings*.⁽⁴²⁾

In 1989 an ASFA user survey, supported by NOAA, was undertaken by Drexel's College of Information Studies. The low response rate (100 questionnaires) and the variety of opinions and comments received made it difficult to draw specific conclusions. However the Board recognised the value of such surveys, and felt that a follow-up, considering ASFIS as a whole, could be useful, and the matter should be referred to the Group of Experts on MIM.

The end of an era

The 1990 Board meeting in Bergen included a celebration of twenty years of ASFA. In a statement sent on behalf of the FAO Fisheries Department, Dr Armin Lindquist, Assistant Director-General for Fisheries recalled the broad needs for information that had been expressed at the United Nations Conference on the Human Environment (1972) and the United Nations Convention on the Law of the Sea (1982), and congratulated the Board on producing the major bibliographic information service for the aquatic sciences and fisheries. Dr Ulf Lie, Chairman of the IOC and Professor at the University of Bergen, spoke at the celebration, saying "It is well known to all of us that the average marine scientist is less than convinced that international organisations are engaged in useful activities. I think that ASFA is a shining exception from this general rule. I have heard nothing but praise for ASFA from my scientist friends". Members of the Board took great satisfaction that these words could summarise their twenty years of effort.

POSTSCRIPT

ASFA for the Twenty-first Century

The 1980s saw the growth in the number of countries with formal or informal cooperative networks of aquatic sciences libraries. The International Association of Marine Science Libraries and Information Centers (IAMSLIC) made determined efforts to enlist a wider membership outside North America, and with affiliated groups such as the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC), inaugurated in Plymouth in 1988, provided a knowledgeable and vocal user group. At the 1988 IAMSLIC meeting in Miami, Florida (USA), Bob Freeman presented a paper on the state and future of ASFIS, inviting increased contact, participation and feedback from the community of aquatic libraries and information centres,⁽⁴³⁾ and the IOC, through the MIM group, similarly made regular efforts to encourage the support and interaction of the information professionals.

By 1990, although an integrated aquatic information network of national and regional centres in all UN member countries did not exist, the library networks and associations, together with the ASFA centres and the various regional marine and fisheries information systems comprised many of the elements, and possessed the capabilities to supply many of the services envisaged by Sidney Holt and his colleagues 25 years earlier, when the ASFIS concept first emerged. ASFA was recognised as the major database in the subject area, with over 350,000 records, and developments in technology had permitted spectacular advances in information handling and dissemination. User requirements were relatively unchanged, but user expectations had increased dramatically and some of the old criticisms of ASFA relating to coverage, timeliness and relevance to developing countries continued to surface.

Bob and Janice Freeman left Rome and returned to the United States in August 1990 on the completion of Bob's period of appointment with FAO. Dr Chris Newton, formerly with FAO's Fishery Development Planning Service, took up the post as Head of FIDI in January 1991. Speculation regarding ASFA's future intensified when FAO recruited a consultant in February 1991 to evaluate FAO's ASFA experience and future role, and Ron Needham confirmed his intention to retire. At the 1991 Board meeting in Rome, FAO made it clear that new arrangements would be necessary, and various options were being examined. The breakfast and late-night discussions in the normally tranquil garden of the Sant' Anselmo, the Board's preferred hotel on Rome's Aventino hill, took on added urgency. Uncertainty continued through 1992, and the marine and freshwater user community worldwide, worried by rumours of ASFA's possible demise, showed commendable loyalty, expressing concern and emphasising their reliance not only upon ASFA as their database of first choice, but also on ASFIS methodology and system tools.

In the event, ASFA survived, and the partners were offered new challenges and opportunities. A chapter covering the years 1991 to 2000 will make interesting reading...

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ANNEX 1

List of ASFA Board members and participants at Board meetings

- Akyüz, Erdogan F.
FAO
Founder of ASFA. Board member 1970-1986. Attended 1971-1984 Board meetings
- Almada de Ascencio, Margarita
CICH
Board member from 1986. Attended 1986-1988, 1990 Board meetings
- Alwinur, Dr
Indonesian Fisheries Information Service
Attended 1987 Board meeting
- Amini, M.
UNEP
Attended 1987 Board meeting
- Aruga, Y.
Marine Sciences and Fisheries Research Information Centre, Tokyo University of Fisheries
Board member 1980
- Auber, Peter R.
IRL then FAO
Observer at 1976 Board meeting
- Bandaranayake, Lalitha
National Aquatic Resources Agency, Sri Lanka
Observer at 1987 Board meeting
- Bauer, Dr
ZMD
Attended 1972 Board meeting
- Bogdanov, A.S.
VNIRO
Board member 1973-1989. Attended 1974 Board meeting
- Broadbent, Kieran P.
IDRC
Observer at 1979, 1986, 1987 Board meetings
- Bukhanevich, Ivan B.
VNIRO
Attended 1989, 1990 Board meetings
- Cameron, Heather
DFO
Board member from 1982. Attended 1982-1989 Board meetings
- Caponio, Joseph
NOAA
Board member 1975. Attended 1975, 1977, 1984, 1987 Board meetings
- Caris, Theodore
CSA
Attended 1987-1990 Board meetings

Chen Boyong
IMSTI
Attended 1990 Board meeting

Clare, Pamela
IRL then CSA
Attended 1981-1988 Board meetings

Coast, Elaine
IRL
Attended 1980 Board meeting

Collins, Elaine
NOAA
Attended 1974 Board meeting

Collins, Jean
North Sea Centre, then FAO
Observer at 1987 Board meeting

Cremer, Dr
IDW
Attended 1972 Board meeting

Deckard, Kate
CSA editor of *Oceanic Abstracts*
Attended 1981 Board meeting

Delgado Andrade, H.
CICH
Board member 1985

Dierickx, Harold
British Library
Observer at 1977 Board meeting

Dooley, Harry
ICES
Observer at 1989 Board meeting

Dorosheva, Yu.N.
VNIRO
Attended 1974 Board meeting

Elizarov, Anatoliy
VNIRO
Attended 1988 Board meeting

Ettl, W.
IDW
Attended 1975 Board meeting

Fagetti, Elda
FAO
Attended 1978, 1981 Board meetings

Fisk, Mary
UNOETB
Attended 1982-1984 Board meetings

- Fourault-Coltier, Elisabeth
CNEXO
Attended 1973, 1975, 1976 Board Meetings
- Foxton, Peter
NERC
Board member 1975. Attended 1975, 1977 Board meetings
- Freeman, Robert R.
NOAA and FAO
Board member from 1973. Attended 1973, 1975-1990 Board meetings
- Gaardstrup, Bent
Danish Institute for Fisheries and Marine Research
Observer at 1989 Board meeting
- Gai Mingju
IMSTI
Attended 1988 Board meeting
- Galvan, Pedro A.
CICH
Attended 1989 Board meeting
- Ganowiak, Henryk
Sea Fisheries Institute, Gdynia
Observer at 1989 Board meeting
- Grose, Kevin
UNEP, Nairobi
Attended 1990 Board meeting
- Gruszka, Robert J.
UN/OALOS
Attended 1988-1990 Board meetings
- Harvey, Marianne
IMO
Observer at 1988 Board meeting
- Heyworth, Janice
WATDOC
Board member 1977-1980. Attended 1978-1980 Board meetings
- Hitti, Angela
CSA
Attended 1988-1990 Board meetings
- Hixon, Philip E.
CSA
Board member from 1982. Attended 1981, 1982 Board meetings
- Howells, Gwyneth
NERC
Board member 1973-1974. Attended 1973 Board meeting
- Keckes, Stjepan
UNEP
Board member 1988-1990

Khlatina, Lena

VNIRO

Attended 1981, 1982 Board meetings

Kirchner, Wulf P.

BF

Board member from 1975. Attended 1971-1990 Board meetings

Koch, K.H.

ZMD

Attended 1972, 1974, 1975 Board meetings

Krudy, E.

IRL

Attended 1971 Board meeting

LeBlond, R.

IDRC

Observer at 1984 Board meeting

Lebowitz, A.I.

FAO AGRIS

Observer at 1987 Board meeting

Lee, R.

UNOETO

Attended 1978 Board meeting

Lees, Peter

UNEP, Geneva

Observer at 1979, 1982, 1984-1987 Board meetings

Leinebo, Reidar

NOD

Attended 1987-1990 Board meetings

Levy, Jean-Pierre

UNOETB

Attended 1981, 1986 Board meetings

Makayev, Vladimir

VNIRO

Attended 1982 Board meeting

Matics, K.I.

SEAFIS

Board member 1986-1987

Meyer-Waarden, P.F.

BF

Board member 1970-1974

Moiseev, P.A.

VNIRO

Board member 1980

Moulder, David S.
MBA/PML
Rapporteur at 1977 and 1988 Board meetings

Nazarova, Lidya G.
VNIRO
Attended 1974, 1981 Board meetings

Needham, Ronald
FAO
Attended 1973-1978, 1981, 1983-1987, 1989 Board meetings

Nunes, Lidia
INIP
Observer at 1976 Board meeting; Board member from 1981. Attended 1979,
1981-1987, 1989 Board meetings

Otley, Thomas
IRL
Attended 1971, 1977 Board meetings

Pal, Mati
UNOETO
Attended 1979 Board meeting

Pan Xueliang
IMSTI
Attended 1990 Board meeting

Peachey, G.
UNEP
Observer at 1973 Board meeting

Peluchon, G.
CNEXO
Attended 1972 Board meeting

Pepe, Richard
FAO
Attended 1983, 1986, 1987, 1989 Board meetings

Philippon-Tulloch, Natalie
Unesco/IOC
Attended 1971, 1984, 1986 Board meetings

Piboubès, Raoul
CNEXO/IFREMER
Board member from 1974. Attended 1973-1987 Board meetings

Privett, D.W.
IOS
Observer at 1977 Board meeting

Prod'homme, Jacqueline
IFREMER
Attended 1988 Board meeting

Rigby, Malcolm
American Meteorological Society
Observer at 1972 Board meeting

- Roberts, Carolyn
IRL
Attended 1976-1978 Board meetings
- Ruivo, Mario
FAO, IOC
Attended 1986 Board meeting
- Sandfaer, Mogens
Danish Institute for Fisheries and Marine Research
Observer at 1987 Board meeting
- Sandoval, Armando
CICH
Board member 1980-1984. Attended 1981, 1983 Board meetings
- Sankey, Trevor
IOC
Attended 1986-1990 Board meetings
- Schützsack, Udo
IDW
Board member 1970-1985. Attended 1971-1973, 1975, 1979, 1980 Board meetings
- Sears, Jonathan R.L.
IRL and CSA
Attended 1981-1990 Board meetings
- Shechkov, Boris N.
USSR All Union Research Institute of Hydrometeorological Information, Obninsk
Attended 1986 Board meeting
- Smolianova, Tatiana I.
VNIRO
Attended 1986, 1987, 1989 Board meetings
- Sudara, Suraphol
SEAFDEC
Attended 1986 Board meeting
- Svendsen, Inge
NOD
Attended 1981, 1983, 1986 Board meetings
- Tibbitt, Steven J.
IOC and NOAA
Board member 1980-1983 and 1987-1990. Attended 1979-1983, 1987- 1990 Board meetings
- Varley, Allen
MBA/PML
Board member from 1973. Attended 1973-1990 Board meetings
- Vibert, Richard
INRA
Board member 1970-1975 Attended 1971, 1972 Board meetings
- Watson, Jeffery
DFO/EC
Attended 1975, 1979, 1981, 1982 Board meetings

Whelan, Hilary

IRL

Attended 1977 Board meeting

Winterfeld, Thomas

NOAA

Attended 1975 Board meeting

Woolcott, Anthony G.

IRL

Board member 1970-1981. Attended 1972-1980 Board meetings

Yu Xiaoqun

IMSTI

Board member from 1986. Attended 1986-1988 Board meetings

Zhao Xucai

IMSTI

Attended 1986, 1987 Board meetings

Zhuravleva, M.V.

VNIRO

Attended 1974 Board meeting

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ANNEX 3

List of Acronyms

AGRIS	International Information System for the Agricultural Sciences and Technology
ASFA	Aquatic Sciences and Fisheries Abstracts
ASFIS	Aquatic Sciences and Fisheries Information System
ASIRC	Aquatic Sciences Information Retrieval Center
ASSASSIN	Agricultural System for Storing and Subsequently Selecting Information
BF	Bundesforschungsanstalt für Fischerei
CICH	Centro de Información Científica y Humanística
CNEXO	Centre national pour l'Exploitation des océans
CSA	Cambridge Scientific Abstracts
DHI	Deutsche Hydrographische Institut
DIMDI	Deutsches Institut für Medizinische Dokumentation und Information
EC	Environment Canada
EEC	European Economic Community
ESA/IRS	European Space Agency - Information Retrieval System
EURASLIC	European Association of Aquatic Sciences Libraries and Information Centres
FAO	Food and Agriculture Organisation of the United Nations
FIDI	Fishery Information, Data and Statistics Service
GELTSPAP	IOC Group of Experts on Long-Term Scientific Policy and Planning
GESAMP	IMO-FAO-UNESCO-WMO-WHO-IAEA-UN-UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GID	Gesellschaft für Information und Dokumentation
IAMSLIC	International Association of Aquatic and Marine Science Libraries and Information Centers
ICES	International Council for the Exploration of the Sea
ICLARM	International Centre for Living Aquatic Resources Management
ICOD	International Centre for Ocean Development
ICSPRO	Inter-secretariat Committee on Scientific Programmes Relating to Oceanography
IDRC	International Development Research Centre of Canada
IDW	Institut für Dokumentationswesen
IFIS	International Food Information Service
IFREMER	Institut français de recherche pour l'exploitation de la mer
IMO	International Maritime Organisation
IMSTI	Institute of Marine Scientific and Technological Information
INFIS	Indonesian Aquatic Sciences and Fisheries Information System
INIP	Instituto Nacional de Investigaçao das Pescas
INIS	International Nuclear Information System
INRA	Institut national de Recherche agronomique
IOC	Intergovernmental Oceanographic Commission of UNESCO
IODE	International Oceanographic Data and Information Exchange

IRL	Information Retrieval Limited
MACTIS	Marine and Coastal Technology Information Service
MAFF	Ministry of Agriculture, Fisheries and Food
MBA	Marine Biological Association of the United Kingdom
MIM	Marine Information Management
NAL	National Agricultural Library
NARA	National Aquatic Research Agency (Sri Lanka)
NERC	Natural Environment Research Council (UK)
NIO	National Institute of Oceanography (India)
NOAA	National Oceanic and Atmospheric Administration (USA)
NOD	Norsk Oseanografisk Datasenter (Norway)
NODC	National Oceanographic Data Center
NTIS	National Technical Information Service (USA)
OALOS	Office for Ocean Affairs and the Law of the Sea
OETB	United Nations Ocean Economics and Technology Branch
OETO	United Nations Ocean Economics and Technology Office
PIMRIS	Pacific Islands Marine Resources Information System
PML	Plymouth Marine Laboratory
RECOSCIX-WIO	Regional Cooperation in Scientific Information Exchange in the Western Indian Ocean
SCOR	Scientific Committee on Oceanic Research
SEAFDEC	South-East Asian Fisheries Development Center
SEAFIS	South-East Asian Fisheries Information System
SFI	Sea Fisheries Institute
SHC	Station d'hydrobiologie continentale
UNAM	Universidad Nacional Autonoma de Mexico
UNEP	United Nations Environment Programme
UNISIST	World Scientific Information System
VNIRO	All-Russia Research Institute for Fisheries and Oceanography
WATDOC	Water Resources Document Reference Centre
WMO	World Meteorological Organisation
ZMD	Zentralstelle für maschinelle Dokumentation