THE HISTORY OF MARINE FISH SYSTEMATICS IN SOUTH AFRICA

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ABSTRACT

South African marine fish collections and systematic research are relatively young, essentially a product of the 20th century. Their history in South Africa comprises three distinct periods: the emergence of fish collections (before 1895), the beginning of research (1895-1945) and modern research (1945-1999).

From the outset of their arrival in South Africa in the mid-17th century, the European settlers of the Cape Colony supplemented their diet with fishes. Therefore it is not surprising that when natural history museums appeared in the 19th century fishes were among the first specimens they procured or received from the public. In these early days, fishes were acquired for display purposes and were curated together with other natural history specimens. There were no fish collections as such and, in many ways, the early history of South African fish collections closely followed the history of the institutions in which they were housed. Major political events in South Africa between 1850-1910 had little effect on the slow growth of fish collections as the low influx of specimens from the public did not change. None of the museums did any active fish collecting and no fish research as such took place during these years.

The second period in the growth of fish collections in South Africa was characterised by a general shift to collecting for research rather than display. It was also a period during which the need for aquatic research was recognized by and began to attract funding from the South African government, starting with the establishment of the Marine Biological Survey in Cape Town. However, with the exception of the Albany Museum's self-trained J.L.B. Smith, no trained marine fish systematists were working in museums either as curators or as researchers. In the first half of the 20th century South Africa experienced the fast growth of the fishing industry, the development of academic and applied research in marine biology, and the thriving of sport fishing. These developments created a demand for well-trained professional ichthyologists. J.L.B. Smith was the first to fill this professional gap. The growth rate of fish collections increased significantly through the interaction between museum scientists, such as Smith in Grahamstown and K.H. Barnard in Cape Town, with the fishing industry, government biologists and fisheries officers, and anglers. Barnard's review of the South African marine fish fauna was published in mid-1920s. The discovery of the first living coelacanth placed South African ichthyology and Smith on the

international stage. The identification of this fish, made by a relatively inexperienced Smith, changed the way ichthyology has been viewed in South Africa.

At the beginning of the third period, largely due to the establishment of the Council for Scientific and Industrial Research in 1945, science in South Africa underwent a process of reorganisation. As funding became more available museums were able to enlarge their research staff. Natural history museums hired qualified experts to conduct research and manage collections of specific groups of organisms. For the first time, trained ichthyologists started working in museums and initiated research projects that were the main contributors to the growth of fish collections around the country. Furthermore it was a period of consolidation of fish collections resulting in two large marine fish collections, one at the South African Museum, Cape Town, and another at the J.L.B. Smith Institute of Ichthyology, Grahamstown. This period also witnessed the establishment of the latter as a research institute dedicated to the study of fishes and its rise to international prominence. The last 55 years at J.L.B. Smith Institute of Ichthyology can be divided into two distinct periods, 1945-1967 and 1968-1999, each consisting of similar elements of research work and objectives. These included the research and production of major reviews of the fish faunas of South Africa, the western Indian Ocean and the Southern Ocean, as well as research on the coelacanth. While in the former period the work was done by one scientist, J.L.B. Smith, the latter period has been characterised by collaborative projects including scientists from South Africa and abroad.

As this history shows, the establishment of a viable, long-lasting collection is a lengthy process. For about 60 years the durability of fish collections depended on the enthusiasm and persistence of individual curators and scientists who were not ichthyologists. More often than not, enthusiasm disappeared when such individuals left their museums. This dependence existed until Rhodes University College established the Department of Ichthyology (1947) and the South African Museum created a post specifically for the curation of the fish collection (1957) and thus ensured continuity.

The continuity of biosystematic research in South Africa has been a major concern for the nation's systematists for decades. The threats to marine fish systematics have been of a financial, political and professional nature. The latter has been the most serious one because of the dearth

of South Africans trained in marine fish systematics. After J.L.B. Smith's death in 1968 M.M. Smith had to work hard to convince the Council for Scientific and Industrial Research and Rhodes University that she could step into her late husband's shoes. Realizing that there was nobody to take over from her she initiated the first and only postgraduate programme in ichthyology in South Africa. The teaching started in the academic year of 1970/71 at the J.L.B. Smith Institute of Ichthyology, but to date only one student has completed a thesis in marine fish systematics. Due to the government's transformation policy all the practising marine fish systematists in South Africa will be retiring in the course of the present decade. Consequently, if no aspiring, motivated students appear on the scene in the next couple of years marine fish systematics in this country will be in a deep crisis by the year 2010, possibly even earlier.

CONTENTS

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ABBREVIATIONS AND GLOSSARY

ACTAG – Arts and Culture Task Group of the Department of Art, Culture, Science & Technology

ANC – African National Congress

Biological classification – A hierarchical biological information system

BIOMASS – Biological Investigations of Marine Antarctic Systems and Stocks

Boers – The Dutch settlers of the Cape, also called Afrikaners

CCC – Coelacanth Conservation Council

CITES – Convention on International Trade in Endangered Species

CSP – Co-operative Scientific Programmes group of the CSIR

CSIR – Council for Scientific and Industrial Research

DACST – Department of Arts, Culture, Science and Technology

DEAT – Department of Environmental Affairs and Tourism

DIFS – Department of Ichthyology and Fisheries Science, Rhodes University

DNE – Department of National Education of South Africa

FAO – Food and Agricultural Organisation of the United Nations, Rome

FRD – Foundation for Research Development (predecessor of the NRF)

FSO – *Fishes of the Southern Ocean*

JLBSI – J.L.B. Smith Institute of Ichthyology, Grahamstown (now the South African Institute for Aquatic Biodiversity)

km – kilometre

m – metre

MCM – Marine and Coastal Management, Cape Town (successor of SFRI)

MOES – Marion Offshore Ecosystem Study

NRF – National Research Foundation, Pretoria (successor of the FRD)

ORI – Oceanographic Research Institute, Durban

Parental oophagy – Hatched embryos feeding on eggs within the body of the parent fish

PEI – Prince Edward Islands

Phylogenetics – The theory and practice of inferring the evolutionary history of taxa

RUC – Rhodes University College, Grahamstown

RU – Rhodes University, Grahamstown

SAAMBR – South African Association for Marine Biological Research

SAM – South African Museum, Cape Town

SAMSS – South African Marine Science Symposium

SANCOR – South African National Committee on Oceanographic Research

SASCAR – South African Scientific Committee for Antarctic Research

SASOL – Suid Afrikaanse Steenkool en Olie

SFRI – Sea Fisheries Research Institute, Cape Town (predecessor of MCM)

SFSA – *Sea Fishes of Southern Africa*

SIBEX – Second International BIOMASS Experiment

SSF – *Smiths' Sea Fishes*

Taxon (pl. taxa) – Any taxonomic unit (e.g. family; subgenus; species), whether named or not, including its subordinate taxa and individuals

Taxonomy – The theory and practice of classifying organisms

Type specimens – Specimens used for the descriptions of new nominal taxa and are considered by convention as the name-bearing standard reference for the new taxa

UCT – University of Cape Town

Uterine cannibalism – Hatched embryos feeding on smaller, less developed siblings in the parental uterus

Voortrekkers – The term given to Dutch, Huguenot and German farmers who left the Cape Colony in search of independence from British rule

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CHAPTER ONE

INTRODUCTION

The science of systematics is concerned with the study of biological diversity on earth. Humans realized long ago that there is some order in nature, but early systematists used intuition more than scientific methodology in their attempts to describe this order. Darwin's discovery of evolution proved that the diversity of organisms on this planet is a result of descent with modification over time. A consequence of the theory of evolution is the recognition that all life forms are genetically related to each other. Systematists attempt to reconstruct these relationships and uncover the patterns that led to the distribution and diversity of life as we know it.[1] Systematic research involves three major steps:

- ❑ discovering, classifying and naming taxa (i.e. taxonomy);
- ❑ investigating the relationship among these taxa (i.e. phylogenetics);
- ❑ creating meaningful biological classifications.

Systematics is the language of biology without which the flow of information resulting from all kinds of biological research is not possible. Phylogenetic studies provide the basis for evolutionary interpretations in other fields of biology (e.g. evolutionary biology; historical biogeography; historical ecology). Classifications based on phylogenetic hypotheses predict the properties of newly discovered or poorly known organisms. Although it is not a highly publicised scientific discipline, systematics touches the life of every human being through medicine, agriculture, aquaculture, the fishing industry, nature conservation, and certain leisure activities.

South Africa has a coastline of about 3,000 km encompassing a variety of marine habitats. This coast is influenced by two major current systems. On the east coast, the Agulhas current brings water that is warm, though low in oxygen and nutrient content, from tropical Mozambique and Madagascar to the southern Cape. On the west coast, southerly and southeasterly winds blow

[1] D. Lipscomb, "Basics of cladistic analysis" (unpublished guide, Washington, D.C., George Washington University, 1998), pp. 1-2.

the surface water of the Benguela current offshore resulting in upwelling that brings cold, oxygenated and nutrient-rich water to the surface. The continental shelf of the east coast is narrow, particularly off northern KwaZulu-Natal (4 km between St. Lucia and Lake Sibaya) and along the Transkei coast (12,5 km off Port St. Johns), dropping rapidly to abyssal depth. On the other hand, the south and west coasts have a relatively wide shelf. South of Knysna the large Agulhas Plateau reaches a depth of 200 m about 300 km off shore.[2]

The South African coastline, although relatively linear and exposed, has numerous rocky headlands jutting into the sea that are separated by embayments and rocky inlets. The largest of the embayments are on the Cape south coast, including Algoa Bay, St. Francis Bay, Plettenberg Bay and Mossel Bay. St. Helena Bay is the largest such feature on the west coast. The south and east coasts are characterised by numerous, mostly small, estuaries.[3]

There are close to 25,000 species of fishes in the aquatic environments of our planet, of which 15,000 are marine.[4] The South African marine fish fauna, with over 2,200 known marine fish species, is among the most diverse in the world.[5] This high species richness is due mainly to three factors:

- ❑ the diversity of habitats, including coral and rocky reefs, mangroves, estuaries, kelp beds, tidal pools, sand and mud flats, and marine canyons;
- ❑ the fauna is composed of elements from three biogeographic regions, namely the Indo-Pacific, the Atlantic and the Southern Ocean;
- ❑ a considerable component (about 13%) of endemic taxa.

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[2] F.A. Shillington, "Oceanography of the southern African region," in M.M. Smith and P.C. Heemstra, eds, *Smiths' Sea Fishes* (Johannesburg, Macmillan South Africa, 1986), pp. 22-25.

[3] K.R. Tinley, "Coastal dunes of South Africa," South African National Scientific Programmes, Report No. 109, 1985, pp. 10, 72-75.

[4] J.S. Nelson, *Fishes of the World* (New York, John Wiley, 1994), p. 5. W.N. Eschmeyer, "Introduction," in W.N. Eschmeyer, ed., *Catalog of Fishes* (San Francisco, 1998), p. 7.

[5] Smith and Heemstra, *Smiths' Sea Fishes*, p. 1.

The South African coast can be divided into three sections, each with its own characteristic oceanographic conditions and fish communities. On the west coast, the colder, nutrient-rich water and the slow decline of the continental shelf support a relatively low species diversity, mainly of Atlantic Ocean origin, but high fish biomass. The narrow shelf and warmer water of the east coast support high species diversity, mainly of Indo-Pacific origin, but lower in biomass. The Cape south coast, featuring variable and unpredictable conditions, has the highest number of endemic species.

Science in South Africa has had a relatively short history compared to that of European countries and the U.S.A. Although the Cape was colonised by European settlers in 1652 the Cape Colony population remained small until well into the 1800s; by 1830 Cape Town, the only urban settlement of significant size, had about 20,000 residents.[6] From the beginning, the governments of the Cape Colony were occupied with having to administer a growing settlement and, at the same time, produce fresh food for the ships travelling between Europe and the Far East; trying to bring stability to volatile frontier zones; and coping with the social tensions of a fledgling multi-racial society, as well as the consequences of European geopolitics. Education in the Cape Colony was poor. In 1814 Cape Town had no secondary education other than the Latin School. The rural areas, where most of the population resided, had hardly any educational facilities. An important factor in the slow development of education was the inability or unwillingness of colonial governments to provide financial support for it.[7]

This picture started to change in the 1800s following the second British occupation. By 1830 the Cape government had established the Vaccine Institute (1811), the Royal Observatory (1820), the South African Museum (SAM, 1825), and the South African College (1829), now the University of Cape Town (UCT). A significant influx of European settlers from 1820 onwards

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[6] R. Ross, "The Cape of Good Hope and the world economy, 1652-1835," in R. Elphick and H. Giliomee, eds, *The Shaping of South African Society, 1652-1840* (Cape Town, Maskew Miller Longman, 1989), p. 244.

[7] W.M. Freund, "The Cape under the transitional governments, 1795-1814," in Elphick and Giliomee, *South African Society*, pp. 347-348.

accelerated the pace of development and by the time of the Anglo-Boer War the number of tertiary education and scientific institutions and societies had more than tripled.[8]

In the 17th and 18th centuries European professionals and naturalists sent by the Dutch Verenigde Oostindische Compagnie (East India Company), the British Army and various European universities and societies, produced the first collections and descriptions of South African fauna and flora (W.J. Burchell, P. Kolb, F. Masson, W. Paterson, A. Sparrman, C.P. Thunberg, F. le Vaillant). They also made the first cartographic surveys and astronomical observations (C.F. Brink, N.L. de la Caille, P. Potter, C.D. Wenzel).[9] During the 19th century and in the first years of the Union of South Africa, scientific expertise was either recruited from the British military, for example the military surgeon Andrew Smith and the Royal Engineer Captain Bailey, or imported from Europe, for example Drs K.H. Barnard, J.D.F. Gilchrist and S. Schonland. Some of these scientists made South Africa their new home. Gifted individuals, and professional and amateur associations also played a role.[10]

The period from 1652 to 1910 is marked by a general lack of government organisation and coordination of scientific activities. In addition, the absence of internal or external incentives during most of the colonial period, the poor state of secondary education and the absence of tertiary education during most of this time, all contributed to the slow development of science in South Africa.

Little work has been done on the history of science in South Africa. I am not aware of any work dedicated to the study of the history of ichthyology in South Africa other than two essays.[11] The earliest work on science in South Africa deals only briefly with the actual history

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[8] S. Meiring Naudé and A.C. Brown, "The growth of scientific institutions in South Africa," in A.C. Brown, ed., *A History of Scientific Endeavour in South Africa* (Cape Town, Royal Society of South Africa, 1977), p. 70 [The authors overlooked the Marine Biological Survey, founded in 1895, which is not on their list of institutions.]

[9] W.J. Talbot, "Pathfinders and pioneers, explorers and scientists 1487-1976," in Brown, *Scientific Endeavour*, pp. 1-32. V.S. Forbes, "Some scientific matters in early writings of the Cape," in Brown, *Scientific Endeavour*, pp. 33-59.

[10] A.C. Brown, "The amateur scientist," in Brown, *Scientific Endeavour*, pp. 454-473.

[11] O. Gon and P.H. Skelton, "A history of the fish collections of South Africa," in T.W. Pietsch and W.D. Anderson, eds, *Collection building in ichthyology and herpetology* (Lawrence,

of science, merely listing famous expeditions, such as *Novara* and *Challenger*, that stopped in Cape Town during the second half of the 19th century.[12] The published scientific reports of these expeditions include new records and descriptions of new fish species from South African waters.

In 1977 the Royal Society of South Africa celebrated its first centenary. To mark this important anniversary the society published a book on the history of science in South Africa, which is the most authoritative publication on the subject to date. The book does not cover the history of science in the country as a whole. It includes 21 essays by invited leading scientists, mostly on the history of their respective disciplines. Priority was given to disciplines that reflected the activities of the society through papers published in its journal, several in the biological sciences and palaeontology.[13] The short section on ichthyology, in the chapter on marine biology, covers little more than the story of the coelacanth.[14]

In 1975 the SAM published a book on its own history.[15] Marine fish systematics in South Africa started at the SAM and in its early days its growth was concomitant with that of the museum. The book describes this stage in the history of the discipline through the activities of A. Smith, J.D.F. Gilchrist and K.H. Barnard. These two publications treat ichthyology briefly, referring mostly to the first 50 years of the discipline more or less chronologically. Ichthyology is also mentioned incidentally in a recent book on the history of the South African Council for Scientific and Industrial Research (CSIR).[16]

Allen Press, 1997), pp. 133-168. O. Gon, "Fifty years of marine fish systematics at the J.L.B. Smith Institute of Ichthyology," *Transactions of the Royal Society of South Africa*, Vol. 51, pp. 45-78.

[12] J.D.F. Gilchrist, "The South African marine fauna and its environment," in W. Flint and J.D.F. Gilchrist, eds, *Science in South Africa* (Cape Town, T. Maskew Miller, 1905), pp. 182-183.

[13] Brown, *Scientific Endeavour*, pp. vii-viii.

[14] J.H. Day, "Marine biology in South Africa," in Brown, *Scientific Endeavour*, pp. 86-108.

[15] R.F.H. Summers, *A History of the South African Museum 1825-1975* (Cape Town, A.A. Balkema, 1977), pp. 11, 83, 112-113, 158-160.

[16] D.G. Kingwill, *The CSIR the First 40 Years* (Pretoria, CSIR, 1990), pp. 47, 49.

The subject of science funding in South Africa merits a separate, dedicated study and is beyond the scope of this work. The financial resources that have been available to marine fish systematics have been an important factor in the history of the discipline. To understand the role of funding in the past, as well as current problems, it is necessary to paint a framework within which the funding of marine fish systematics can be placed.

Before the 20th century 'research' on fish systematics was limited mainly to collecting and attempting to identify specimens for the purpose of display.[17] Such research was done only at the SAM, Cape Town, and the Albany Museum, Grahamstown. Financing the work of these museums was a problem from the outset. At the SAM, Superintendent A. Smith received a government grant of 2,000 Rix Dollars to cover all expenses, which he found insufficient "...to supply even the common wants of the Institution."[18] The governor's application in 1825 for a salary for Smith was turned down by the Secretary of State of the Colonies. Consequently, Smith retained his job as a military surgeon while he was doing his work at the museum.[19] His successor, E.L. Layard, was employed at the office of the colonial secretary and did his museum work part-time for which he was paid a mere £100 a year. Between 1855 and 1875 the government grant to the SAM amounted to £300, and in 1876 it increased to £1,000, remaining at the same level for another 15 years.[20] During this period (about 35 years) the museum had to supplement its finances with funds raised from members of the public who were invited to subscribe to the museum. However the plan worked only in the first few years following which the number of subscribers dropped gradually. In 1895 no subscription fees were received and from then on the museum relied only on its government grant.[21] The initial government grant to the Albany Museum, paid for the first time in 1858, was £150.[22] It remained unchanged for at

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[17] The SAM's Andrew Smith was an exception to this as he described several new species of fishes from South Africa (see page 21).

[18] Summers, *A History*, pp. 6, 9.

[19] *Ibid.*

[20] *Ibid.*, pp. 25, 46-47.

[21] *Ibid.*

[22] Report on the Albany Museum for the Year 1858, p. 3.

least 15 years, but increased to £850 by 1897.[23] The government grant to the Port Elizabeth Museum (PEM) also started at £150, but the museum supplemented it with money raised from the municipality and from public donations.[24] The grant increased to £550 by 1897.[25] Despite these increases in the grants, government support to the museums was never adequate. Consequently, the SAM could not hire another scientist or a collection assistant when Barnard became involved in museum administration.[26] The Albany, Port Elizabeth and Natal museums each could afford to employ only one scientist, who was also the director, until the middle of the 20th century. The salary of the director of the Albany Museum in 1955 was about half of that paid to a Head of Department (HOD) at Rhodes University (RU).[27]

In 1895 the Marine Biological Survey was created and funded by the Cape government, with Dr J.D.F. Gilchrist as director, in response to a recognised need for fisheries related research.[28] At that early stage, marine fish systematics benefited from the three fish-related jobs held by Gilchrist simultaneously – director and scientist for the Survey, curator of fishes at the SAM, and professor of zoology at UCT. Consequently, the SAM built a substantial collection at a relatively small cost. Other museums used their own meagre budget, usually made of a small government grant and public donations, to build their collections.

Following the establishment of the Union of South Africa in 1910 various government departments identified research needs and created research institutes funded from departmental

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[23] Report on the Albany Museum for the Year 1873, p. 5. Report of the Committee of the Albany Museum for the Year 1897, p. 18.

[24] Report on the Port Elizabeth Museum for 1888, p. 3.

[25] Report on the Port Elizabeth Museum for the Year Ending 31st December, 1897, p. 11.

[26] See page 47.

[27] Records of the J.L.B. Smith Institute of Ichthyology (JLBSI), Grahamstown, including correspondence and related documents, at the JLBSI and the Cory Library, RU, file A/5, Albany Museum, letter of 11 September 1945 from J.V.L. Rennie to the provincial secretary, and "Report of Financial Position," p. 4.

[28] See pages 39, 42.

budgets.[29] The Marine Biological Survey was taken over by the Department of Commerce and Industry and in 1932 its name was changed to the Division of Sea Fisheries.[30] It has since remained under departmental control and funding. These research institutes were founded to provide answers to specific problems and were not backed by a coherent national policy on research development.

The need for a policy for scientific research in South Africa was recognised first by non-governmental organisations. Following on recommendations made by a joint meeting of scientific and technical societies in 1916 the government established the Advisory Board for Industry and Science.[31] The Advisory Board created the Research Grant Board, the first government body for supporting research in South Africa, under the Department of Mines and Industries. The Research Grant Board operated from 1918-1938 and administered government funds for research, as well as donations from the Carnegie Corporation in the U.S.A. In 1938 it was divided into a policy-making body (the National Research Council) and an executive body (the National Research Board) responsible for the administration of research grants. However these structures never got off the ground due to the Second World War.[32]

The important contribution of science to the world wars, particularly the second, brought about a new appreciation of science all over the world. In post-Second World War South Africa, Prime Minister Smuts recognised the importance of science to the future of his country. Soon after the war he appointed professor Basil F.J. Schonland as scientific advisor to the Prime Minister. Schonland's mandate included advising the government on research development and coordination. Following his recommendations, the CSIR was formally established on 5 October 1945.[33]

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[29] Kingwill, *The CSIR*, p. 2-4.

[30] The Survey went through several name changes (see pages 13, 15, 51).

[31] Kingwill, *The CSIR*, p. 5.

[32] *Ibid.*, p. 6.

[33] Government Gazette No. 3553, Proclamation No. 204, 5 Oct. 1945, p. 1. Scientific Research Council Act, 1945, No. 33, pp. 298-312.

One of the policy objectives stated by the new organisation was "Fostering research in universities through grants and bursaries, and in cooperation with universities, creating conditions in which the best science students could be offered a reasonable livelihood in scientific research."[34] Schonland devised a system for the administration of university research grants. The new system was introduced in 1946 with a budget of £27,800.[35] Initially, the applications submitted amounted to less than the available funds, but by 1962 the amount requested was about twice the available funds. This later shortage of funds was due in part to a ceiling of 7.5% annual growth imposed by the Treasury on the government allocation to the CSIR in 1955.[36] It also shows that the system achieved its objective of stimulating university research. Schonland's Research Support Programme, though changed in name and detail and much expanded in scope, still operates at present. The National Research Foundation's (NRF) 1999/2000 budget for its Research Support Agency was R129 million.[37]

South African participation in successful international programmes organised by the International Council of Scientific Unions (ICSU),[38] particularly the International Geophysical Year (1957/58) and the International Indian Ocean Expedition (1964/65), highlighted the need for a multi-disciplinary approach to research problems of national importance. Consequently, the Co-operative Scientific Programmes (CSP) group was formed in 1975 around the CSIR's South African National Committee on Oceanographic Research (SANCOR). SANCOR was established in the early 1960s to co-ordinate national marine research activities with ICSU programmes and later on to manage the national programme on oceanographic research.[39] The CSP initiated multi-

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[34] Kingwill, *The CSIR*, p. 13.

[35] *Ibid.*, p. 46.

[36] *Ibid.*, pp. 44, 46.

[37] *FRD News*, February/March, 1999, p. 1.

[38] South Africa became a member of the ICSU, and of several of the scientific unions under its umbrella, in 1931. For a summary of the national structures required by this membership and how international activities benefited university researchers, see Kingwill, *The CSIR*, pp. 55, 67.

[39] *Ibid.*, pp. 73-74, 171.

disciplinary research programmes and offered management and administration services for such programmes. Funding came from CSIR resources and from other stake-holders in the programmes, such as government departments and industry. The CSP developed quickly and by 1984 had a budget of R15 million.[40] Numerous scientists from universities and museums participated in the CSP programme. SANCOR funded ichthyological research projects at the SAM and the J.L.B. Smith Institute of Ichthyology (JLBSI).

In 1961 South Africa signed the Antarctic Treaty.[41] To maintain a base in Antarctica it was necessary for South Africa to take part in Antarctic research co-ordinated internationally by the ICSU's Scientific Committee for Antarctic Research (SCAR). To co-ordinate the South African Antarctic effort, internally and with SCAR, the CSIR established in 1961 the South African National Antarctic Research Committee, later renamed the South African Scientific Committee for Antarctic Research (SASCAR).[42] The Department of Transport was given the task of handling all Antarctic-related matters, including the financial and logistic administration of the South African National Antarctic Research Programme (SANARP). The CSIR, assisted by SASCAR, agreed to direct and co-ordinate the scientific projects of the SANARP.[43] The JLBSI joined the SANARP in 1984. It received funding for two consecutive three-year projects in the period 1984-1990.[44]

In 1984 the Research Grants Division and the CSP of the CSIR were combined to form a new division of the CSIR called the Foundation for Research Development (FRD), with Dr R. Arndt in charge.[45] The restructuring of the CSIR into a parastatal with a new mission was

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[40] *Ibid.*, p. 50.

[41] J.D. Viall, "South Africa: the road to the Antarctic Treaty," *South African Journal of Antarctic Research*, Vol. 21, Part 2, p. 125, 1991.

[42] Kingwill, *The CSIR*, p. 68.

[43] *Ibid.*, pp. 68, 75-76.

[44] See pages 152 to 156.

[45] Kingwill, *The CSIR*, pp. 39, 49. *FRD Times*, a brief history, p. 3 (the last, special edition of *FRD News*, undated, but probably produced in January/February 1999).

followed by the FRD becoming an independent body in 1990.[46] The concurrent restructuring of the scientific programmes of the FRD created much uncertainty in the South African scientific community, prompting scientists to leave the country or change careers. The FRD was accused of changing the programmes "...in the interest of political expediency and it's [sic] own survival," and rumours implied that funding for environmental sciences might dry up.[47] The FRD made two important contributions to science funding in South Africa: first, the introduction of an innovative funding system in which the level of support researchers receive is determined by peer evaluation and rating of their published work;[48] and second, the launching of the Technology and Human Resource for Industry Programme (THRIP).[49] THRIP has been a most successful programme. Its budget has grown from R1.5 million in 1991 to over R250 million in 2000.[50]

All the presidents of the CSIR and FRD between 1945 and 1999, except Dr P.J. du Toit (1950-1952), either came from a university research environment, or were managers of the Research Grants Division before being appointed as president of their organisation.[51] They

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[46] Research Development Act, 1990, Government Gazette, no. 1450, 29 April 1990, p. 3.

[47] Records of the JLBSI, file T/3, Transvaal Museum, letter of 12 January 1995 from I.L. Rautenbach. M.N. Bruton, "Is this the way to manage scientific manpower?" *South African Journal of Science*, Vol. 85, 1989, p. 687.

[48] *FRD Times*, p. 3.

[49] *Ibid.*, p. 5.

[50] *News@nrf*, June 2000, p. 1.

[51] Dr B.F.J. Schonland was professor of Geophysics at the University of the Witwatersrand and director of the Bernard Price Institute of Geophysical Research before he was appointed the first president of the CSIR in 1945. Schonland designed and launched the programme of Consolidated University Research Grants in 1946.
Dr S. Meiring Naudé was professor of Experimental Physics at the University of Stellenbosch before joining the CSIR. As president of the organisation he devoted much time and energy to the development of university research. During his presidency funding for university and museum research increased from R64,520 (1952) to R1,329,300 (1967).
Dr C. van der Merwe Brink joined the CSIR in 1967 as vice-president responsible for the University Grants Division. The CSP (see above) was established during Brink's presidency.
Dr C.F. Garbers joined the CSIR in 1979 as vice-president with a special responsibility for the University Grants Division. When Brink died in 1980 Garbers became president.
Dr R.R. Arndt joined the CSIR in 1981, leaving the post of professor of Organic Chemistry at

understood the long-term importance of a strong fundamental science sector to the future of the country and made efforts to ensure that it was well funded. Consequently the continuous support that fundamental science has enjoyed since the establishment of the CSIR has been a major contributor to the strength of university and, to a lesser extent, museum research in South Africa.

It is important to understand that the national system of funding of fundamental science in its various forms has always supported individual scientists, not organisations.[52] Funding has been determined on the basis of the scientific record of the applicant and/or the strength of the application.[53] Nevertheless the system has been designed for university scientists, and museum scientists have complained that their applications receive low priority from the committees that evaluate proposals.[54] J.L.B. Smith had been a CSIR senior research fellow since the establishment of the university research grant system, starting with an annual grant of £800 and running expenses.[55] In the 1950s the CSIR identified ichthyology as one of several scientific disciplines that were not receiving adequate attention from university researchers. Recognising the Department of Ichthyology at the Rhodes University College (RUC) as a centre of excellence, J.L.B. Smith was made the head of a special research unit intended to bolster research in this

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Stellenbosch University. He took over the University Grants Division when Garbers became president. In 1984 he took charge of FRD.
Dr K. Mokhele was a researcher and lecturer at the University of Fort Hare and the University of Cape Town. He joined the FRD as vice-president in 1992, became president of the FRD in 1996 and president of the NRF in 2000.
Sources: Kingwill, *The CSIR*, pp. 303, 304, 311, 321, 325. *FRD News*, March 1996, p. 1. *FRD Times*, pp. 2-12.

[52] JLBSI, minutes of the council meeting held at the JLBSI on Tuesday 30th June, 1981 at 14h15, p. 3. As this reference implies, the CSIR made an exception for the JLBSI when it became a national museum; at that point in time the research funding had to be split between the JLBSI and re-established Department of Ichthyology, and grant ownership posed a problem.

[53] Kingwill, *The CSIR*, pp. 48-49.

[54] E.P. du Plessis, "Taxonomy in South Africa," Report to the National Committee for the International Union of Biological Sciences, Pretoria, CSIR, 1985, p. 12.

[55] Records of the JLBSI, file K/7, D.G. Kingwill, CSIR, letters of 24 November 1947 and 21 March 1949 to J.L.B. Smith. Smith, "The JLB Smith Institute of Ichthyology: one of South African's great heritages," *Fathoms*, November/December 1980, p. 19.

discipline.[56] This initiative was highly successful from the research point of view, but it failed to see the need for long term-research continuity and made no provision for it.[57]

The purpose of this study is to provide an historical perspective on marine fish systematics in South Africa. At present four systematists are employed in two South African institutions; one is at the SAM, Cape Town, and three are at the JLBSI, Grahamstown. Grahamstown has been the dominant centre for marine fish systematics in South Africa since the discovery of the first living coelacanth in 1938. These scientists serve the needs of a large community of people with an interest in marine fishes, be it for subsistence, recreational, scientific or commercial purposes.[58]

I will attempt to show that, given the environmental setting described above and the socio-economic conditions of the Cape Colony, the initiation and growth of this scientific discipline with its human and research resources were a response to a tangible need. Marine fish systematics in South Africa arose from several unrelated events at the end of the 19th century that made the Cape government commission a study of fishing and fisheries resources in the Cape. This process culminated in the formation of a government division, now called Marine and Coastal Management (MCM), dedicated to the study and management of these resources. However earlier the SAM had started a fish collection, mainly for the purpose of display, to satisfy public interest. Both institutions required the services of a systematist, and at the turn of the 20th century this role was fulfilled by J.D.F. Gilchrist, largely regarded as 'the father of ichthyology' in South Africa.

The most important tool of the marine fish systematist is the fish collection. Collections built around active researchers are dynamic entities which develop and grow with the science. Consequently, unveiling the history of South African fish collections and the main players associated with them is an important objective of this study. In South Africa the growth of fish

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[56] The CSIR created several research units intended to enhance research in 'neglected' disciplines (see Kingwill, *The CSIR*, pp. 46-47.)

[57] See page 184.

[58] Elasmobranchs (L.J.V. Compagno, South African Museum); bony fishes: shallow water and shore fishes (O.Gon and P.C. Heemstra, J.L.B. Smith Institute), deep-sea and pelagic fishes (M.E. Anderson, J.L.B. Smith Institute).

collections proceeded hand in hand with the development of the natural history museums that housed them. The first research collection was established at the turn of the last century by the Marine Biological Survey (now MCM) in collaboration with the SAM, both in Cape Town. Another developed at the Albany Museum, Grahamstown, in the early 1900s. At about the same time display collections were established in Durban, East London, Pietermaritzburg, Port Elizabeth and Pretoria. The birth, growth and fate of the various collections around the country are used to demonstrate that when research does not occur, or stops, collections deteriorate and eventually die out. In South Africa this historical process culminated in the creation of the national fish collections.

The history of marine fish systematics in South Africa is marked by several milestones. These include both successes and disasters. On the one hand, the finding of the first living coelacanth by M. Courtenay-Latimer of the East London Museum and J.L.B. Smith of RU, followed by the finding of the second coelacanth, brought with it international recognition.[59] On the other hand the debacle of the PICKLE collections culminated in the loss of important scientific material.[60] The major players in the successes and failures of the discipline were people with unique personalities. Rivalry, co-operation and dedication all contributed to paving a remarkable historical path for the discipline. South African ichthyological research has made an impact internationally. Over the last century a series of high quality products gave marine fish systematics in South Africa a significant international profile. Again, J.L.B. Smith's work on the coelacanth is the obvious example, but there were other less glamorous projects that received international recognition. These projects were born from necessity and vision, and played a role in the development of the discipline, if only by their large scope. Special attention is given here to the Department of Ichthyology at RU and the JLBSI, the leading institutions over the last 50 years, and to J.L.B. Smith, by far South Africa's best known and most productive marine fish systematist.

The future of systematic biology in South Africa has always been a concern for the people involved. Changing priorities in government spending have resulted in diminishing subsidies for

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[59] See pages 62, 66, 108.

[60] See pages 51 to 58.

systematic research in South Africa, ichthyology included. In the 1990s, rapid political changes added to the uncertainty for the future of systematics. Over the last two decades South African systematists have launched several initiatives in an attempt to draw more support from funding agencies. Against this background, the current situation of marine fish systematics is reviewed in a historical context and with a view to its future in South Africa.

Both primary and secondary sources have been used for this project. Topics dealt with in depth, such as the growth of collections and the work of J.L.B. Smith, are based mostly on primary sources. The information for issues that are not covered in detail, for example science funding in South Africa, comes mostly from secondary sources.

The most important and frequently used sources are institutional reports. The annual reports of museums are the best source of information for the history of fish collections at institutions that have or had such collections. These reports were usually studied at the actual institutions, sometimes the only places where a complete series is available. Unfortunately some institutions did not allow access to minutes taken during meetings of governing bodies (i.e. councils and control boards) as these were deemed to contain sensitive material of a personal nature. Thanks to a conscious effort made by Margaret Smith to keep records of her husband's work, the archive of the JLBSI has a valuable and comprehensive collection of project files and correspondence dating back to the early 1930s, when J.L.B. Smith worked voluntarily as curator of the fish collection at the Albany Museum.[61] These records were crucial for understanding J.L.B. Smith's emergence as an ichthyologist and his relationships with scientists such as K.H. Barnard of the SAM and C. von Bonde of the Sea Fisheries Research Institute (SFRI). They also provided an insight into how important projects, such as *The Sea Fishes of Southern Africa* (SFSA), developed. In some files the record is apparently incomplete and copies of important

[61] In some cases the same file number was used for different entities (i.e. C/27 and L/5), but on the advice of Cory Library personnel they have not been changed. To prevent confusion these file numbers are accompanied by their entity's name throughout this work.

correspondence are inexplicably missing.[62] This collection of documents is in the process of being donated to the Cory Library at RU, Grahamstown.

Information on socio-economic conditions and some key events that led to the development of fish science in South Africa is derived mostly from books.[63] Information on the early history of several institutions, of science and of science funding in South Africa was collated from books and internal reports produced by several of the investigated institutions.[64]

In 1995-96 South Africa's scientific community celebrated two milestones in the history of marine science in this country. The first was the centenary of the SFRI, Cape Town. The second was the 50th anniversary of the JLBSI and the Department of Ichthyology and Fisheries Science (DIFS) of RU, both in Grahamstown. While the first institution grew out of certain socio-economic conditions, the other two evolved out of the sheer determination and insatiable craving for knowledge of one man, Professor J.L.B. Smith. This research demonstrates that institutions and individuals are inextricably linked in the development of science, and that science cannot be sustained by one of these alone.

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[62] When Margaret Smith retired she had the whole archive transported to her house and is rumoured to have removed anything that could tarnish her husband's reputation (R.E. Stobbs, personal communication, 23 November 2001).

[63] Elphick and Giliomee (eds), *South African Society*. W.W. Thompson, *The Sea Fisheries of the Cape Colony* (Cape Town, T. Maskew Miller, 1913).

[64] Brown, *Scientific Endeavour*. N. Fowler, "A history of the Albany Museum, 1855-1958," unpublished and undated internal report, Albany Museum, 2 volumes. Kingwill, *The CSIR*. P.R. Kirby, "Andrew Smith, M.D., founder of the South African Museum," *Annals of the South African Museum*, Vol. 36, No. 1, 1942, pp. 1-126. C. Quickelberge, *Collection & Recollections, the Durban Natural History Museum* (Durban, Durban Natural History Museum, 1987). Summers, *A History*.

CHAPTER TWO

THE EMERGENCE OF MUSEUMS AND EARLY FISH COLLECTIONS: THE 19TH CENTURY

Most fish collections in South Africa originated in natural history museums around the country. Natural history museums were the first type of museum built in South Africa, with the objective of educating the public about the natural history of their respective regions. From the outset of their arrival in South Africa, in the mid 17th century, the European settlers of the old Cape Colony supplemented their diet with fishes.[1] There is little wonder that fishes were among the first natural history specimens the new museums received from the public. In these early days, fishes were collected for display purposes and were curated together with other natural history specimens. Therefore in many ways the history of South African fish collections closely follows that of the institutions in which they were housed and has to be seen through the history of those particular institutions.

After Vasco da Gama opened the "Cape route" to India and the East Indies in 1498 Portuguese and Dutch trading ships regularly made use of Table Bay as a resting place where ships could be repaired, the sick could recover, and fleets reunited for the journey north. The narratives of these sailors indicate a plentiful and easily obtained supply of fishes in Table and Saldanha Bays.[2] It was much later though, in the 1650s, that a permanent garden settlement was established near Table Bay. Land-based fishing by European settlers in South Africa started on an April day in 1652, when Jan van Riebeeck and his party arrived in Table Bay, and has never stopped since.

At the close of the 18th century, the Dutch Cape Colony extended as far as the Buffels River on the west coast and the Great Fish River on the east coast. The political events that changed the face of western Europe during the last two decades of that century, primarily the French Revolution (1789) and the French occupation of the Netherlands (1795), also shaped the future of South Africa. The latter presented the British Empire with a potential threat to a free

[1] Thompson, *The Sea Fisheries*, pp. 3-5.

[2] *Ibid.*, p. 3.

passage to India. To remove this threat, British forces invaded and occupied the Cape in 1795. The occupation lasted eight years and in 1803 the British relinquished control of the Cape Colony to the Batavian Republic.[3] However in 1806 Napoleon Bonaparte's aggression brought the British forces back to the Cape. This was followed by the installation of a colonial administration in 1807 and the beginning of emigration from the British Isles. The urbanization of Port Elizabeth and Grahamstown started with the arrival of the "1820 Settlers", a group of about 4,500 immigrants that landed in Algoa Bay during 1820-1821. Algoa Bay proved to be a rich fishing ground and before long Port Elizabeth fishermen joined the growing fishing industry of the Cape Colony.

Steady economic growth, a functional administration, and relative peace in the southern and western Cape created a sense of prosperity and with it the necessary conditions for the emergence of tertiary education, museums, and science in South Africa. Much of the rest of South Africa, however, remained poorly developed, as well as politically unstable until the end of the 19th century.

The South African Museum, Cape Town

In the 18th century, private museums of various types existed in Cape Town, including a small museum in the Gardens that was established by governor (1699-1707) Willem Adriaan van der Stel and remained open until the establishment of the SAM in the 1820s. At the beginning of the 19th century, the European demand for South African wildlife encouraged the proliferation of businesses that traded in animals, live or dead, and often displayed them to the public before they were shipped away.[4] Under these circumstances and considering the cultural origin of the Cape's white inhabitants, it may be presumed that increasing public demand was behind the Cape

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[3] At the end of the 18th century, in the wake of the French Revolution, the Dutch monarchy was toppled and replaced by a new administration called the Batavian Republic. This name was taken from a German tribe that occupied the Rhine estuary during Roman times. The Batavian Republic was an ally of post-revolution France and inherited all the assets of the Dutch East India Company, which was dissolved in 1798 (N. Mostert, *Frontiers. The Epic of South Africa's Creation and the Tragedy of the Xhosa People*, London, Jonathan Cape, 1992, pp. 325-326).

[4] Meiring Naudé and Brown, "Scientific institutions," in Brown, *Scientific Endeavour*, p. 60.

government's decision to establish a natural history museum in Cape Town.

Figure 1. Dr Andrew Smith, first Superintendent of SAM.

Early in 1825 Lord Charles Somerset, governor of the Cape during the years 1814-20 and 1821-26, visited the military garrison in Grahamstown, then a frontier town on the eastern border. There he met Dr Andrew Smith, a young military medical officer, and a naturalist. Smith showed the governor his collection of reptiles, birds, mammal skins, and ethnographic artifacts, and raised the question of a museum for the Colony. The governor was apparently impressed because several months later he transferred Smith to Cape Town. On 11 June 1825 the SAM was founded by a government proclamation in the *Cape Town Gazette and African Advertiser*, with Smith appointed as the first Superintendent of the new museum.[5]

Andrew Smith (Fig. 1), the eldest son of a lowland shepherd, was born in Kirkton, Scotland. In 1812-1813 he went to Edinburgh to study medicine. At the same time, he was also an apprentice with a local doctor. In 1815 he joined the Army as a hospital assistant and was lucky to acquire the director general of the Army Medical Department, Sir James McGrigor, as his patron. He was assigned to a regiment in Edinburgh and was able to complete his studies and receive the M.D. degree in 1819. Smith's interest in nature, museums and collections apparently developed when, as part of his military training, he became familiar with McGrigor's museum of "Anatomy and Natural History, bearing upon Military Surgery" at Fort Pitt, Chatham. Although it was a teaching museum, it also promoted interest in zoology, botany and geology among medical officers whose duties would take them to all parts of the world.[6] After a short period of service in North America and Malta, Smith was seconded to the Cape of Good Hope. He arrived at Cape Town in August 1821 and several weeks later was posted to Grahamstown. It is

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[5] Kirby, "Andrew Smith, M.D.," p. 4.

[6] *Ibid.*, pp. 6-7.

presumed that the natural history and ethnographic specimens he collected during his four years in Grahamstown formed the nucleus of the SAM collections.

Financing the museum was a problem from the outset. Smith received a grant of 2,000 Rix Dollars to cover all expenses, which he found insufficient.[7] Although military demands on Smith's time often kept him away from the museum, and at times for long periods, he always returned with new specimens for the collections. But he was not the only contributor to the collections: his first action as Superintendent was to ask the public for donations of specimens with a promise to publish lists of donors on a monthly basis in a Cape Town newspaper. The first list was published on 8 July 1826 and listed over 900 specimens donated by 18 different people.[8]

Between 1825 and 1829 the museum was run by a staff of two, Smith and his assistant, Private John Minton, both paid soldiers.[9] In 1830 the museum was taken over by the South African Institution, a society created in 1829 for the purpose of investigating the geography, natural history, and resources of South Africa. The Institution immediately appointed a curator, Jules Verreaux, who was also the taxidermist and attendant of the museum. This relieved Smith of personal responsibility for the collections, a necessary step because of his frequent absence from the museum. The Institution's first annual report described the fish component of the natural history collection as having "...about ninety, including several of great rarity and interest, particularly in the family of the sharks, of which the species are above twenty."[10] Smith apparently had little interest in museum displays. His collections were preserved and documented for his wide range of scientific interests. In a testimony given to a government inquiry in 1859 one museum trustee described the museum material left from Smith's days as a research collection

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[7] See page 6.

[8] Kirby, "Andrew Smith, M.D.," p. 8.

[9] John Minton was a private in the 98th Foot (a Scottish regiment of which Andrew Smith was the medical officer). He had been trained in taxidermy and accompanied Smith on his collecting trips. Minton was Smith's assistant and taxidermist at the museum from 1825 to 1829. He apparently returned to England with Smith and remained in his service for many years (see Summers, *A History*, pp. 9, 10, 12, 55).

[10] Anonymous, "Annual Report of the South African Institution, 1830," *South African Quarterly Journal*, Vol. 1, p. 323.

rather than a display one.[11] Beyond administration and collecting, Smith managed to do a significant amount of research during his years in the SAM and published 25 zoological papers. He described several new species of marine fishes from South African waters, including the whale shark, *Rhincodon typus*.[12] Smith was the first museum scientist in South Africa and his collection was the first research collection in the SAM. Dr V. Fitzsimons, a former director of the Transvaal Museum, justly referred to Smith as "the father of South African zoology," but he may also be honoured as the father of South African museology.

Smith employed the services of excellent illustrators of wild animals, notably George Henry Ford and Charles Bell.[13] After returning to England, he published drawings of South African wildlife, including 31 colour plates depicting 35 species of marine and freshwater fishes.[14]

Smith left the Cape and returned to England in 1837 taking with him his private collection that had been on loan to the SAM for 12 years, but cared for by the South African Institution since 1830.[15] Soon after his departure, another large private collection, that of C. F. H. von Ludwig, was also reclaimed by its owner.[16] Thus, a significant proportion of the museum's collections was lost by these removals, which also led to the resignation of Jules Verreaux, then the keeper of the museum, in 1838. The South African Institution had no interest in the

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[11] Summers, *A History*, p. 15.

[12] A. Smith, "Descriptions of new, or imperfectly known objects of the animal kingdom, found in the south of Africa," *South African Commercial Advertizer*, Vol. 3, No. 144, 1828, p. 2.

[13] P.H. Greenwood, "Have you seen a Ford Lately?" *Ichthos*, No. 28, 1990, pp. 10-11. Kirby, "Andrew Smith M.D.," p. 15. Summers, *A History*, pp. 22, 28.

[14] A. Smith, *Illustrations of the zoology of South Africa...in the years 1834-36* (London, Smith, Elder and Co., 1838-1849), Vol. 4, Pisces.

[15] Anonymous, "*Annual Report,* 1830," p. 322.

[16] Von Ludwig was a German doctor, originally from Württemberg, who had settled in Cape Town as a pharmacist. He later received a German decoration that entitled him to be called "Baron." As evident from Smith's first list of donations, von Ludwig was an enthusiastic collector. After reclaiming his collection from the SAM, von Ludwig sent it to a natural history museum in Württemberg directed by a German naturalist named Ferdinand Krauss. Visiting the Cape in May 1838, Krauss stayed with von Ludwig and may have persuaded him to give his collection to the museum in Württemberg (see Summers, *A History*, pp. 9, 18).

maintenance of the remaining collections, which started deteriorating, and handed them over to the South African College. The college, established in 1829 and the precursor of UCT, used the collections as a teaching aid.[17] Unfortunately, no one was given the responsibility of maintaining the collections, which still contained important zoological specimens such as type specimens. In 1843 a visitor described the collections as having "birds moth-eaten and often featherless, rare quadrupeds begrimed by dust, lacking both eyes, or reduced to a cyclopean state" and found them "discreditable to the colony".[18]

It took another interested and influential person to reinstate the SAM. Governor Sir George Grey took office at the Cape Colony in 1854 and immediately became involved in museum matters. By the end of that year, he had hired E.L. Layard for museum work. Edgar Leopold Layard was born in Florence, Italy, the fourth son of a senior official of the British East India Company. He studied law in Cambridge and in 1846 entered the Company's service in Ceylon where he developed an interest in nature and collected birds and shells. Failing health forced Layard and his wife to return to England in 1854. Soon afterward he was offered the job at the museum and in December that year the Layards arrived at the Cape. He was employed by the office of the colonial secretary, R.W. Rawson, who chaired the founding committee of the museum.[19] The museum was reinstated through two legal motions. On 23 June 1855 the South African Literary and Scientific Institution, the successor of the South African Institution, passed a resolution transferring the collections of the old museum to the trustees of the new one. Two days later, an official notice appointed two trustees, namely Hon. R.W. Rawson and Dr L. Pappe, the Colonial Botanist. Layard's appointment as curator and the museum's name, the SAM, were also made official in that notice.[20] Layard officially opened the museum through Government Notice No. 153 in which he asked for donations from the public of "...objects illustrative of the

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[17] *Ibid.*, p. 18.

[18] H.H. Methuen, *Life in the Wilderness; or, Wanderings in South Africa*, (London, R. Bentley, 1848), second edition.

[19] Summers, *A History*, p. 22.

[20] Government Notice, No. 125, Cape of Good Hope, Government Gazette, No. 2624, p. 750, 26 June 1855. Summers *A History*, p. 23 citation of Government Notice No. 25 is apparently a *lapsus calami*.

Arts, Manufactures, Natural History, and Productions of South Africa." Among the animal groups desired, both marine and freshwater fishes were listed.[21] Moreover the notice instructed the public in detail about the way to handle and preserve natural history specimens. Collectors were told that "...large fish and reptiles should be skinned. Small fish and reptiles had better be wrapped in linen, and placed in bottles or jars of spirit of any kind...care should, however, be taken to make an incision in the stomach of those which have thick bodies, so as to enable the spirit to reach the viscera, and prevent putrefaction...".[22] This was the first time that collectors were instructed how to handle specimens correctly.

Layard was aware of the importance of collecting data. He wrote that "...it cannot be too strongly urged upon contributors that the value of such [donated specimens] depends entirely upon their being properly labelled, and exact localities stated so clearly, as to enable the spot to be found out. The circumstance under which they occur should also be carefully noted." Layard followed Smith in his pledge to publish lists of donations and donor names periodically in the Government Gazette.[23]

Several days after the opening notice, Layard submitted his first report to the trustees of the museum. The report included his assessment of the state of Smith's collections handed over by the South African Literary and Scientific Institution. About the fish collection he wrote: "Among the *Fish*, forty specimens may probably be useful. I shall be better able to report on them when they are washed and varnished afresh... No specimen, however, should be retained if it can be replaced by a new one."[24] Evidently, more than half the 90 fish in Smith's collection mentioned in the 1830 report of the South African Institution had disappeared. Some were apparently

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[21] Government Notice, No. 153, Cape of Good Hope, Government Gazette, No. 2640, p. 917, 21 August 1855. [Government Notices published in the *Gazette* are numbered sequentially. Searching for Notice 153, an earlier notice with the same number, published on 27 July 1855 and dealing with district surgeons, was discovered. Although the original number, i.e. Notice 153, is used here for citing Layard's advertisement, it is most likely a *lapsus calami*.]

[22] *Ibid.*

[23] *Ibid.* Government Notice, No. 185, Cape of Good Hope, Government Gazette, No. 2638, p. 898, 10 August 1855.

[24] Government Notice, No. 185.

removed by Smith when he returned to England in 1837 because the type specimens of at least two freshwater fishes, i.e. *Barbus marequensis* and *Barbus andrewi*, are in the collection of the Natural History Museum, London.[25] Others were probably lost during the years the collection was used for teaching. Unfortunately, individual lots cannot be accounted for because no copy of the catalogue book for that period is known to exist.[26] In addition, it is difficult to ascertain to what extent Layard's recommendation to replace the old specimens with new ones had been followed.[27]

Layard was the museum's curator until 1872. He was not a scientist and, unlike Smith, did not pursue active collecting beyond his own interest groups.[28] His important contribution to the collections from a scientific point of view was the establishment of proper curation protocol and exchange programs with museums overseas as well as with private collectors.[29] The most notable contribution to the fish collection from such exchanges came from the United States in 1864. Professor Agassiz of the Museum of Comparative Zoology, Harvard University, sent a collection comprising some 400 specimens of about 300 species of American fishes.[30] Another collection, which included reptiles, fishes, and shells, was donated by the governor of the Bahamas in 1870.[31] Roland Trimen, who succeeded Layard as curator and held the post until 1895, did not maintain the exchange initiative of his predecessor. During the 40 years of Layard and Trimen,

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[25] P.H. Greenwood and R. S. Crass, "The status and identity of *Barbus mareguensis* A. Smith, 1841 (Pisces, Cyprinidae)," *Annals and Magazine of Natural History*, Ser. 13, Vol. 1, No. 12, 1958, pp. 810-814. K.H. Barnard, "Note on the identity of the Cape 'white-fish,' *Barbus capensis*," *Annals and Magazine of Natural History*, Ser. 10, Vol. 19, No. 110, 1937, p. 305.

[26] Summers, *A History*, pp. 19, 20.

[27] Government Notice 185. Summers (*A History*, p. 29) maintained that nearly all the old collections were eventually discarded.

[28] See page 22.

[29] Government Notice 153. Report of the Trustees of the South African Museum for the year 1858, pp. 1-4.

[30] Report of the Trustees of the SAM for the year 1863, pp. 1-2.

[31] Report of the Trustees of the SAM for the year 1870, pp. 1-4.

public donations of fish specimens were small, ranging between 0-20 specimens per year.[32] True to the declared purpose of the museum, and in the absence of scientific interest, the fish collection was used only for display. In 1874 Trimen reported that 433 fish specimens were on display.[33]

In the mid-1800s, when the SAM was being resurrected in Cape Town, other museums began to emerge elsewhere in South Africa. Without exception, these museums arose out of a need recognized by private or professional societies that were able to raise the necessary public, official and financial support.

The Albany Museum, Grahamstown

The Albany Museum dates back to 1855. In a meeting held on 3 July that year, four military and civilian doctors founded "The Grahamstown Medical-Chirurgical Society." The founding members, R. M. Armstrong, W. G. Atherstone, W. Edmunds and G. Hutton, agreed that the purpose of the society was "To facilitate intercourse on professional subjects by periodic meetings" and "To collect specimens of various departments of medical science in all its branches, with a view to forming a nucleus of a museum." They also agreed that "Any gentleman in the Eastern Province interested in scientific research might be admitted as a member, on being proposed and approved at a regular meeting." The subscription fee was set at £1 per year. A circular about the new society was sent to members of the medical profession, civil and military, throughout the Eastern Province.[34] The founding members had in mind a society dedicated to scientific research. Indeed, at the third meeting on 14 August 1855, members were invited to present papers on a wide range of scientific subjects, including animal disease, the medical properties of South African plants, the geology of the Eastern Province, the ethnology of local tribes, zoology, palaeontology, and mineralogy in South Africa. It was hoped that these subjects would "Stimulate enquiry into many other subjects connected with scientific enquiry in South

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[32] Data taken from the SAM annual reports for the stated period.

[33] Report of the Trustees of the SAM for the year 1873, p. 13.

[34] *Graham's Town Journal*, Christmas Supplement, 16 December 1897. Fowler, "Albany Museum," pp. 1-2.

Africa."[35] On 11 September 1855 Hutton's resolution proposing "...the establishment of a general museum...solely for the purpose of the prosecution of scientific pursuits...and general education" was accepted.[36] The museum was allocated a room at the house of Edmunds in Bathurst Street, and in October the society purchased an accessioning book. At the meeting of 1 December 1855 the society's name was changed to "The Literary, Scientific and Medical Society," and a subcommittee was formed to carry out curation tasks in the museum.[37] A month later, the Curation Subcommittee reported on the holdings in each of the five collection categories. The natural history collection contained 44 specimens, but no details were provided. At the same meeting, in view of the many duplicates, it was decided to exchange specimens with other institutions.[38] To their credit, the members of the subcommittee established proper museum procedures from the outset by carefully and securely labelling each specimen and by entering its number, donor's name, and a description in an accession book dedicated to the particular type of collection.[39] The museum was opened to the public on 2 February 1856. A month later it had grown so much that new accommodation had to be found. After a short search, the society acquired the upper floor of a building on Hill Street. The collections were moved to the new space and the museum was reopened on 17 March 1856.[40] Following a request by the society, the government of the Cape agreed to support the museum with an annual grant of £150, paid for the first time in 1858.[41] The name Albany Museum first appeared in the first annual report dated 16 May 1859.[42] The report lists the collections cared for by each Curation Subcommittee member

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[35] *Ibid.*, p. 4.

[36] *Ibid.*, p. 5. *Graham's Town Journal*, 16 December 1897.

[37] Fowler, "Albany Museum," p. 7. In later records of the museum the subcommittee became the "Museum Committee."

[38] *Ibid.*, p. 8.

[39] *Ibid.*, p. 9.

[40] *Ibid.*, pp. 10-11.

[41] *Ibid.*, pp. 19-20.

[42] Report on the Albany Museum 1858, p. 1.

and it is evident that at this point there were no fishes in the natural history collection. This was rectified in the following year when Atherstone enriched "the zoological collection by the presentation of several specimens of rare fish."[43] In addition, the report for 1859 noted that a Mr Piers donated "...a valuable collection of Icthyolites, obtained from a large transported block of sandstone, found in the neighbourhood of Fort Beaufort. This collection will throw great light on the nature of fossil fish in South Africa . . . as two or three specimens in the collection show nearly entire individuals."[44]

In 1867 the museum was given a site for a building, but was unable to raise the necessary funds. A request for financial help from the Grahamstown town council was refused, but the town clerk offered to let to the museum part of the premises used by the council. The museum accepted the offer and by 15 March 1868 occupied three rooms at No. 8 Bathurst Street. It stayed there, sharing the rooms with the town council and the library, until it moved to the present city hall in 1881.[45] In 1871 B. J. Glanville, a member of the Curation Subcommittee and past secretary of the society, was appointed honorary curator. He was the most active member of the subcommittee in terms of caring for the collections and carried on with collection work, unpaid and in addition to being Town Clerk, until his death. He was replaced by his daughter, Miss M. Glanville, who was the first paid curator of the Albany Museum.[46]

Miss Glanville died prematurely when she was 27 years old and the museum had difficulty in finding a suitable replacement. As a result of an advertisement in *Nature*, a new director was appointed. Dr Selmar Schonland, the first qualified scientist employed by the Albany Museum, took his position at the museum in July 1889 and immediately proceeded to evaluate the state of the collections.[47] In his report to the museum committee, he made the first specific reference to the fish collection: "The *Reptilia, Amphibia* and *Fishes* are being re-arranged and re-mounted.

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[43] Report of the Trustees of the Albany Museum and the Committee of the Albany Literary and Scientific Society for the Year 1859, p. 2.

[44] *Ibid.*

[45] Fowler, "Albany Museum," pp. 33, 48-49.

[46] *Ibid.*, pp. 36, 49-50.

[47] *Ibid.*, pp. 57, 59-60. *Graham's Town Journal*, 16 December 1897.

Owing to the high price of suitable glass bottles and of spirit in this colony, it was hitherto impossible to make a large collection of these animals...and I shall endeavour to form a good collection of Fishes, which would be of great scientific and practical importance."[48]

In 1894 following a government request, Schonland investigated the fisheries potential of the coast around Port Alfred. He reported to the government that "...there is an abundance of valuable fish within easy distance of the shore."[49] His hope that as a result of a fishing industry in Port Alfred "...our collections of fish and other marine animals would be greatly increased" did not materialize. The museum committee recommended that a sum of £50 should be allocated to increase the fish collection (apparently by purchasing specimens), but the museum was not able to raise this amount.[50] In 1900-01 the museum moved to its present building in Somerset Street, and the opportunity was used to overhaul the collections. Schonland himself worked on the wet collections, including reptiles, amphibians and fishes. He transferred all the specimens "...preserved in fluid for scientific purposes..." into formalin to avoid the problem of evaporation from bottles.[51] Despite the pledge he had made on his arrival at the museum, 12 years earlier, his assessment after the move was that "The collection of fishes is still in an unsatisfactory state, the number of species represented is not very large and many of them are still unnamed."[52]

After settling down in the new building, the museum improved its relationship with its neighbour, RUC, and negotiated with the latter the appointment of the professors of zoology and geology as keepers of the respective collections in the museum. In exchange, Schonland, a botanist, was appointed professor of botany at the college. This agreement, marking the creation

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[48] Report upon the Albany Museum for the Year 1889, p. 3.

[49] G. 61-'95, "Memorandum on the Development of Sea Fisheries," pp. 18-20. [Schonland submitted his "Report regarding sea fisheries at Port Alfred" to the Department of Agriculture on 10 October 1894. It is attached together with the reports of other experts approached by the department to the blue book.]. See also page 40.

[50] Report of the Committee of the Albany Museum for the Year 1895, pp. 1, 4.

[51] Report of the Committee of the Albany Museum for the Year 1901, p. 3.

[52] Report of the Committee of the Albany Museum for the Year 1902, p. 4.

of distinct departments within the museum, came into effect in July 1905.[53] An assessment of the collections was made by the new keeper of zoology, Professor J. E. Duerden, who commented that much remains "...to be accomplished as regards the collection and exhibition of the less showy and conspicuous forms. Particularly is this the case within the marine representatives." He pledged "...to remedy this as time goes on by the acquirement of some of the valuable material collected by the Marine Biological Survey and also by personal collecting."[54] During the next year, Duerden attempted to obtain duplicate specimens from the Marine Biological Survey in Cape Town, but to no avail. He therefore suggested that the museum consider "...plans for collecting its own marine specimens by the institution of marine researches."[55] As for the marine specimens the museum had been receiving infrequently from the public or from members of the society, they were, in his opinion, "...useless for research purposes..." as they were usually dried. Nevertheless this material indicated that a rich marine life existed on the coast of the eastern Cape. He recommended that "A marine Aquarium and Biological Laboratory..." be built at the Kowie River "...for taking up this much needed line of museum work."[56] It took nearly 60 years before Duerden's vision came true. A small research laboratory was established in Port Alfred by the Department of Zoology, RU, in the 1960s. This facility has been used by DIFS since 1984.[57]

In 1910 the Union of South Africa was declared and the new government downgraded the museum to provincial museum status, as compared with the South African and Transvaal museums, which were recognized as national institutions. In addition, the council of RUC unilaterally terminated the arrangement that allowed the zoology and geology professors to be employed as keepers by the museum. Moreover the university's council lured Schonland away to work for the university by offering him the post of professor of botany, with an attractive

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[53] Fowler, "Albany Museum," pp. 146-150. Report of the Committee of the Albany Museum for the Year Ending 31st December, 1905, p. 2.

[54] Report of the Albany Museum for 1905, p. 5.

[55] Report of the Committee of the Albany Museum for the Year Ending 31st December, 1906, p. 3.

[56] *Ibid.*

[57] T. Hecht, personal communication, March 1994.

salary, on condition that he resigned his post as director of the museum. Schonland accepted the offer, but in the final arrangement with the museum, the college agreed that he remain the keeper of the museum's herbarium. As a result of the college's action, the departments of the museum instituted by Schonland ceased to exist. Consequently, when John Hewitt was appointed as the new director later in the year, he was responsible for the maintenance of all collections, except for the botanical one. In due course, Hewitt made his own assessment of the various collections and exhibits of the museum. About the fish collection he said: "Our collection of fresh water fish is a very small one, and more material, especially from the Eastern Province, is urgently desired as this portion of our vertebrate fauna has been little studied."[58] However he too had little interest in fishes and personally did little to build up the collection.

Although all the early curators and directors of the museum were aware of the slow growth of the fish collection, there was little they could do about it. A chronic shortage of funds for collecting trips, or for employing a fish researcher/curator, made public donations and the purchase of specimens the main avenues for the growth of the fish collection. The accession of fish specimens in the period 1870-1910 was of the order of 0-25 specimens per year. The large number of accessions during 1906-1909 (27-50 specimens), was due to the purchase of many stuffed and mounted fishes for exhibition. Schonland's conclusion that the high cost of glass containers and alcohol made it impossible to maintain a large collection of fishes[59] identified only a small part of the problem. A survey of the wet collections of reptiles and amphibians accessioned between 1870-1910 showed that frequently the museum received nearly ten-fold more specimens of these taxa. It is more likely that a lack of interest in fishes by museum staff and the distance of Grahamstown from the coast (60 km to Port Alfred and 130 km to Port Elizabeth) were the prime reasons for the slow growth of the fish collection. Trips to the coast were rare, and the preservation and transport of specimens to Grahamstown was a logistical problem. Consequently, the majority of the fishes received by the museum during the period mentioned above came from Port Alfred. There is little wonder about Duerden's remark that

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[58] Annual Reports of the Albany Museum, Grahamstown, Cape Province, Union of South Africa, for the Years 1910-1913, pp. 31, 42.

[59] Report upon the Albany Museum for 1889, p. 3.

much of the marine material received was dried and useless for research.[60] There are no extant copies of the annual reports for the period 1914-1941.[61] In view of the earlier growth, it is reasonable to assume that there was no significant change in the growth rate of the fish collection until J.L.B. Smith became involved in 1930.

The Port Elizabeth Museum

The PEM started as a small collection of natural history specimens owned by the Athenaeum Club (a literary and scientific society) of Port Elizabeth. The club was established in 1856 and was given several rooms in the new town hall of which one room was set aside for the collection. In the early 1880s, several key members left town and this led to the closure of the club in 1885. The town council took over the collection and moved it to a room over the Wool Market. In 1887 A. Marshall was appointed curator of the collection.[62] The curator obtained specimens, including fishes, from public donations and by purchase. In his 1894 report to the town council, Marshall reported that the fish collection was small, but growing steadily.[63] Growth was slow, however, and in 10 of the ensuing 12 years, additions to the fish collection amounted to less than 20 specimens a year.[64] There were two exceptional years, however: in 1897 50 specimens were added, of which 20 were purchased; and in 1905 another 57 specimens were received from the public.[65] By the end of the 19th century, Port Elizabeth was a well-established town with a developed fishing industry, including several small, locally modified trawlers, and an Angling

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[60] See page 29.

[61] The museum burnt down in 1941 (see page 62).

[62] J.A. Pringle, "A short history of the Port Elizabeth Museum," *South African Museum Association Bulletin*, Vol. 2, No. 14, 1942, pp. 346-347.

[63] Reports upon [sic] the Port Elizabeth Museum, for the Year 1894, p. 3.

[64] Annual reports of the Port Elizabeth Museum for the years 1895-1906.

[65] Report on the Port Elizabeth Museum for 1897, p. 7. Report of the Director of the Port Elizabeth Museum for the Year Ending 31st December, 1905, pp. 4-5.

Association; the latter donated several specimens to the museum in 1898.[66] Despite the availability of fishes, only a few specimens found their way into the collection.

The different local circumstances of each of the Cape museums notwithstanding, the growth of their fish collections in the early days, prior to the beginning of fish research, proceeded at similar rates.

The Natal Museum, Pietermaritzburg

Travelling with their wagons across the Drakensberg Mountains, the voortrekkers[67] arrived in KwaZulu-Natal in 1837. The boers founded Pietermaritzburg in 1838 amidst their bloody territorial dispute with the Zulu king, Dingane. The British annexation of KwaZulu-Natal in May 1843 and continuous conflict with the Zulu, drove most of the voortrekkers out of KwaZulu-Natal. At the same time, British immigration policy encouraged English settlers to come to the territory. By the time the Natal Society was created in 1851 the European inhabitants of KwaZulu-Natal were mostly of English origin.[68]

The Natal Museum, initially named the Natal Government Museum, owes its origin to the Natal Society. The society was inaugurated on 9 May 1851 in Pietermaritzburg and included a Literary Society and a Library.[69] In 1879 the council of the society passed a resolution that "...a collection of specimens should be formed with a view to founding a Museum,"[70] and in 1881 J. F. Quekett was appointed as the curator.[71] The initial collection included snakes, birds and

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[66] Thompson, *The Sea Fisheries*, pp. 26-27. Report on the Port Elizabeth Museum for the Year Ending 31st December, 1898, p. 5.

[67] The term given to Dutch, Huguenot, and German farmers who left the Cape Colony in search of independence from British rule.

[68] J. Selby, *A Short History of South Africa* (London, George Allen & Unwin, 1973), pp. 91-97, 103-105.

[69] First Report of the Natal Government Museum. Year Ending 31st December, 1904, p. 5.

[70] *Ibid.*, p. 6.

[71] J.A. Pringle, *The Natal Museum* (Pietermaritzburg, Board of Trustees, Natal Museum, 1954), p. 3.

various small mammals, and was exhibited in the Public Reading Room of the society.[72] During Quekett's tenure (until 1895), the collection apparently included only two fish specimens.[73] By 1891 the room in the Library was full and another room was rented near the Library to temporarily accommodate new accessions. Meanwhile, the society decided to provide proper housing for the collection and built a museum hall, in the rear of the library, which was completed in 1894. By the turn of the century the hall was filled to capacity. Although many colonists felt that KwaZulu-Natal was worthy of a larger and better equipped institution, building such a facility was beyond the financial means of the society. The society approached the KwaZulu-Natal government and offered to hand over its collections provided that suitable accommodation was found for them. The outcome of the negotiations was that the government decided to create a museum department. On the arrival of the first director, Dr Ernest Warren, in February 1903 a new building for the museum was already complete.[74] Warren was born in Canterbury, Kent. He studied zoology at University College, London, where he received his D.Sc. in 1899 and became assistant professor of zoology in 1900. From 1910 in addition to being the museum's director, he also occupied the Chair of Zoology at the Natal University College.[75]

The museum opened to the public in 1904.[76] By the end of that year the fish collection consisted of 12 specimens of which three were elasmobranch egg cases. An ocean sunfish (*Mola mola*) was obtained through exchange with the SAM in Cape Town. Warren noticed that the fish collection was very small and planned to send the museum collector on trawlers "to obtain a collection of marine fishes and other organisms from a considerable depth."[77] Frederic Toppin, the museum collector, was appointed in September 1904. He was an experienced trapper and as

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[72] Report of Natal Museum, 1904, p. 6.

[73] *Ibid.*, concluded from the 'Catalogue of Fishes' and the 'Anatomical Specimens' listed in the Report.

[74] *Ibid.*, pp. 6-7. Pringle, *The Natal Museum*, pp. 3-5.

[75] Bush, S. F. "Ernest Warren, D.Sc., Director, Natal Museum, 1903-1935. An appreciation," *Annals of the Natal Museum*, Vol. 10, No. 1, 1941, pp. 1-2.

[76] Pringle, *The Natal Museum*, p. 6.

[77] Report of Natal Museum, 1904, p. 19.

such was in a position to contribute significantly to the growth of the natural history collections of the museum.[78] Indeed in 1905 he went to sea twice on local trawlers and collected "a considerable number of specimens." He also spent a substantial part of that year collecting in Zululand and brought back, amongst other things, 70 species of marine and 12 species of freshwater fishes one of which was named after him.[79] A brief look in the museum's catalogue of fishes shows that the museum procured fishes from as far as Algoa Bay in the Cape.[80] Clearly, at least from the point of view of the fish collection, Warren's idea of employing a museum collector paid off handsomely. In its first year, the collection of the Natal Museum obtained more specimens than the other museums did in their first decade. But the museum's honeymoon with the government was short-lived. In 1906 the KwaZulu-Natal government reduced its grant to the museum by 40 percent and as a result Toppin was retrenched.[81] From then the majority of fishes accessioned into the collection were purchased from or donated by sources outside the museum.

The Durban Natural Science Museum

The Durban Natural Science Museum, formerly known as the Durban Museum, has its roots in the Natural History Association of Natal. The association was founded on 4 January 1868 by a group of 12 individuals who had an interest in nature. In this meeting the members reached an understanding that the establishment of a museum in Durban was the ultimate object of the association.[82] However it took nearly 20 years before their idea became reality in 1887. The association was short-lived and disbanded by the middle of 1871. Nevertheless it managed to create enough interest in natural history and to plant the idea of a museum in several persons who

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[78] *Ibid.*, p. 28.

[79] G. A. Boulenger, "Description of a new fish of the genus *Barbus* from Zululand," *Annals of the Durban Museum*, Vol. 1, No. 3, 1916, p. 171 (*Barbus toppini*).

[80] Second Report of the Natal Government Museum. Year ending 31st December, 1905, pp. 10, 13, 65-66.

[81] J.A. Pringle, *The Natal Museum*, p. 6. Third Report of the Natal Government Museum. Year ending 31st December, 1906.

[82] Quickelberge, *Collections & Recollections*, pp. 5-6.

were instrumental in bringing the museum about and in its subsequent success. Foremost among these was J. S. Steele whose collections somehow survived the period following the collapse of the association to become part of the museum. The Durban Museum opened on 23 July 1887 in the Town Hall. Steele was elected the president and honorary curator of the museum. An article about the museum and the opening ceremony that appeared in the *Natal Mercury* listed the kinds of collections housed in the new museum, including fishes, but provided no details.[83] In 1889 the museum holdings, as listed in the *Mayor's Minute*, included "...174 Natal Reptiles, Fishes, &c., in spirits," but there is no record of the actual number of fishes.[84] The museum received many donations from the public, which were listed monthly in the *Natal Mercury*. Some fishes may have come from Steele's collection because marine life was one of his known interests.[85] Steele served as curator until 1895 and was followed by J.F. Quekett, previously the curator of the Natal Museum, Pietermaritzburg. Quekett served for 15 years before retiring due to failing health.[86]

The present fish collection of the museum has none of the specimens received during Steele's and Quekett's periods and nothing is known about their fate. The oldest specimen in the present collection dates back to 1915. In 1909 however the museum was moved from the old Town Hall to the new City Hall.[87] Possibly, they were lost or discarded during the move.

The Transvaal Museum, Pretoria

During the "Great Trek" of the 1830s, many boers migrated from the Cape to the area north of the Orange River. In 1848 following several more years of battling British expansion, the area between the Orange and Vaal rivers came temporarily under British rule. The only remaining free boers were now north of the Vaal River. Continuing conflict with African chieftains in the vast area under their control was more than the thinly spread British forces could cope with. At this

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[83] *Ibid.*, pp. 21-22.

[84] *Ibid.*, p. 28.

[85] *Ibid.*, p. 27.

[86] *Ibid.*, p. 30.

[87] *Ibid.*, p. 35.

stage, the British decided to win the boers to their side and in 1852 granted independence to the community north of the Vaal River, which was named the South African Republic (now the provinces of Gauteng, Limpopo, Mpumalanga and Northwest). Two years later, a second voortrekker republic was formed south of the Vaal River and was called the Orange Free State.[88]

In 1892 the government of the South African Republic decided to found a State Museum in Pretoria and appointed a board of trustees. The prime purposes of the museum were scientific research and education. No public collections of natural history existed at the time in the Republic.[89] At first, the nuclear collection was housed in a small room on the top floor of the government building. Initially, Dr H. G. Breyer, one of the trustees who was appointed honorary curator, was in charge of the collection. The collection expanded fast, and soon qualified personnel had to be hired. The first director, Dr J. W. B. Gunning, was appointed in 1896 and shortly afterwards, entomological and botanical assistants joined the museum. The collection quickly outgrew the small room in the government building and was transferred to the small Market Hall in Market Square.[90] In May 1897 the museum purchased part of the fish collection of the Godeffroy Museum from Robert F. Damon, Weymouth, U.K. The Godeffroy Museum was a private museum established by Cesar Godeffroy, a rich merchant from Hamburg, around 1870. The museum closed down when Godeffroy died and its collections were sold off.[91] This acquisition was probably the most important addition to the museum in its early days. The construction of a new building for the museum started in 1899, but because of the Anglo-Boer War it was not completed until 1902. It was opened to the public on 15 December 1904.[92] During the last years of the Republic, the government grant to the museum amounted to £6,000. Thus, unlike the other museums, the Transvaal Museum did not originate from a penniless professional or amateur society and was on sound financial footing from the beginning. In 1906

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[88] Selby, *History of South Africa*, pp. 112-113.

[89] J.W.B. Gunning, "A short history of the Transvaal Museum," *Annals of the Transvaal Museum*, Vol. 1, No. 1, 1908, pp. 1, 4, 7.

[90] *Ibid.*, p. 7.

[91] W.D. Haacke, personal communication, 22 June 1993.

[92] Gunning, "Transvaal Museum," p. 7.

Dr L. H. Gough was appointed assistant for the collection of lower vertebrates and invertebrates (except insects). By 1908 the fish collection had about 480 specimens of which about 80 were South African.[93] The South African specimens were sent for identification to Gilchrist in Cape Town.[94]

Major political events in South Africa between 1850-1910, including the Anglo-Zulu War (1879) and the two Anglo-Boer wars (1881 and 1899-1902), disrupted the growth of existing museums to some extent when staff members were called for military duty. However fish collections seem to have suffered little, if at all. The slow influx of specimens from the public did not change and, with the exception of the SAM (from 1896) and the expeditions (in 1905) of Toppin of the Natal Museum, no museum did any active fish collecting during these years.

[93] *Ibid.*, pp. 7, 10.

[94] Transvaal Museum, Annual Report for the Year Ended 30th June, 1906, p. 19.

CHAPTER THREE

EARLY ICHTHYOLOGICAL RESEARCH: 1895 - 1945

This period in the growth of fish collections in South Africa is characterized by a general shift to collecting for research rather than display. It is also a period during which aquatic research was recognized by and began to attract funding from the South African government. However with the exception of the Albany Museum's self-trained J.L.B. Smith, no ichthyologists were working in museums either as curators or as researchers.

Until the middle of the 19th century the fishermen of the Cape were able to meet the demand for marine fish in the country. They were mostly of Malay origin, the largest group of free blacks in Cape Town.[1] Fishing was a trade the Cape free blacks took on as early as 1722 and their descendants, the Cape coloured fishermen, are still doing it today.[2] However in the second half of the 19th century, the advent of gold and diamond mining and enhanced infra-structural development inland brought about a rapid growth in the population size and with it higher demand for fishes.[3] In addition, the demand for Cape fish, particularly snoek, to feed Indian workers on Mauritian sugar farms, increased rapidly following the emancipation of slaves in 1838.[4] A series of concurrent economic depressions must have increased the demand for fish, a cheap source of protein, even more.[5] The fledgling fishing industry of the Cape Colony could not cope with this sudden demand. This was partly due to the government's policy of developing agriculture and

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[1] G.C.R. Bosman, *The Industrialization of South Africa* (Rotterdam, G.W. de Boer, 1938), pp. 75-76. J.S. Marais, *The Cape Coloured People 1652-1937* (Johannesburg, Witwatersrand Univesity Press, 1957), pp. 161-162. A. Kirkaldy, *"The Sea is in our Blood" – Community and Craft in Kalk Bay c. 1880-1939* (Pretoria, Archives Year Book for South African History, 1996), p. 6.

[2] R. Elphick and R. Shell, "Intergroup relations: Khoikhoi, settlers, slaves and free blacks, 1652-1795," in Elphick and Giliomee, *South African Society*, p. 223.

[3] Bosman, *Industrialization*, pp. 75-76.

[4] Kirkaldy, *"The Sea is in our Blood,"* pp. 7, 41.

[5] *Ibid.*, p. 7. M.H. de Kock, *The Economic Development of South Africa* (London, P.S. King & Son, 1936), pp. 39, 47, 53.

ignoring other industries, resulting in the absence of capacity for commercial fishing operations.[6] The other factor was a decline in shore fish stocks, especially snoek. By 1890 the snoek trade with Mauritius all but stopped.[7] The drop in the abundance of inshore species, as reported by local fishermen from Table Bay, Hout Bay and Kalk Bay, was apparently the first sign of over-exploitation of these stocks.[8]

The need for studying the biology of South African fishes became apparent through several events that took place in the last quarter of the 19th century:

- In Port Elizabeth, anglers at the Swartkops River estuary, near the town, objected to netting operations in the river, asserting that the nets "...cause great damage to the fishing through the destruction of immature fish and the capture of migratory species that come into the river to spawn;" the net fishermen were adamant that no such damage was done to the fish in this river.[9]
- In the Cape Peninsula, local fishermen were opposed to the operations of the American schooner ALICE in Cape waters. During 1889-1890 the American ship fished around the Peninsula with a large purse seine, catching large quantities of "mackerel" (probably *Scomber japonicus*), "maasbanker" (*Trachurus trachurus*), "harders" (unknown species of mugilids), and other species. The Cape fishermen argued that the use of such purse seine would "...ruin their fishing industry, as the capture of such numbers of small fish would drive away the snoek [*Thyrsites atun*], geelbek [*Atractoscion aeguidens*], and other large varieties that followed the shoals for food;" they believed that "...great numbers of immature fish were also enclosed in the nets and destroyed."[10]

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[6] Bosman, *Industrialization*, pp. 74-76. Kirkaldy, *"The Sea is in our Blood,"* p. 42.

[7] Bosman, *Industrialization*, pp. 74-76. Kirkaldy, *"The Sea is in our Blood,"* p. 41.

[8] Kirkaldy, *"The Sea is in our Blood,"* p. 41. G. 37-'92 – Report of the Fisheries Committee, 1892, pp. vi-vii.

[9] Thompson, *The Sea Fisheries*, p. 24.

[10] *Ibid.*, p. 25.

- The fishing industry failed in their attempts to operate boats on the Agulhas Bank, long believed to be a rich fishing ground.[11]
- J. M. Orpen, a Member of Parliament for Wodehouse,[12] actively promoted the interests of the fishing industry in parliament.[13]

The complaints about the work of the ALICE were brought to the government's attention through a petition from the Cape fishermen in 1890.[14] The petition, Orpen's concerns about the lack of government fishing regulations, and the dearth of knowledge of the Colony's fish resources resulted in the appointment of the government Fisheries Committee to investigate sea fishing in the Cape Colony.[15] R. Trimen of the SAM was apparently the only scientist and the only biologist on the committee. He was not able to participate in many of the hearings and in the writing of the committee's report, but after reading the material at home he wrote to the chairman: "The evidence...tend[s] entirely to confirm my conviction that we possess...no data of sufficient scope and exactness...for legislative enactment." His recommendation, adopted by the committee, for a thorough investigation by experts appointed specifically for that purpose was one of the most significant outcomes of the inquiry.[16] Initial measures taken by the government, restricting netting operations to certain areas and imposing size limits on certain species, only had negative results.[17] The Cape government did not act fast enough for Orpen, so in July 1894 he published a long letter in the *Agricultural Journal* of the *Cape Times* suggesting many ways to advance the Cape fishing industry. The matter was then handed to the Secretary of Agriculture, Pieter Faure, who consulted Fishery Boards in Great Britain and commissioned several reputable South African

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[11] *Ibid.*, pp. 3, 23, 28, 65-66.

[12] W.J. de Kock, ed., *Dictionary of South African Biography* (Cape Town, Nasionale Boekhandel BPK, 1968), Vol. 1, pp. 602-603.

[13] Thompson, *The Sea Fisheries*, p. 27.

[14] Kirkaldy, *"The Sea is in our Blood,"* p. 56.

[15] G. 37-'92 – Fisheries Committee, 1892, pp. v, 3-4.

[16] *Ibid.*, pp. xxiii, 3.

[17] C. von Bonde, *So Great Thy Sea* (Cape Town, A.A. Balkema, 1956), p. 195.

scientists to study fish resources along the Cape coast.[18] The review of the Port Alfred fishery by Schonland of the Albany Museum was done as part of this ministerial study.[19] The government review of the fishing industry culminated in the 1895 presentation to parliament of a blue book on the development of sea fisheries.[20] This document, a cornerstone in the history of marine research in South Africa, made three important recommendations:[21]

Figure 2. John D.F. Gilchrist, director of the Marine Biological Survey, and keeper of Department of Marine Invertebrates and Fishes at the SAM.

- ❑ survey and chart fishing grounds in Cape waters, especially the Agulhas Bank;
- ❑ appoint a marine biologist who would be the fisheries expert of the survey;
- ❑ purchase a fully equipped steam trawler.

The Cape parliament immediately adopted the second recommendation and appointed a British marine biologist, Dr John D. F. Gilchrist (Fig. 2), to take charge of the survey from the beginning of 1896.[22] Gilchrist was born in 1866 in Ansthruther, Scotland. He received a Ph.D. in zoology from the University of Zürich and D.Sc. from the University of Edinburgh. At the latter university

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[18] Thompson, *The Sea Fisheries*, p. 29.

[19] See page 28.

[20] G 61-'95 [this blue book was presented by the governor of the Cape on 5 February 1895 to both houses of parliament. It is followed by Orpen's letter (pp. 11-15) and reports by nine experts, from South Africa as well as abroad, who were requested to give their recommendations on the issue of developing a fishing industry in the Cape.]

[21] Thompson, *The Sea Fisheries*, p. 29.

[22] *Ibid.*, pp. 29-30.

he did research on food fishes and he visited several research stations, including the Marine Biological Laboratory at Naples, Italy. He lived in South Africa for 30 years, during which time he created and headed the Marine Biological Survey (now called MCM), chaired the Department of Zoology at the South African College, and was honorary keeper at the SAM.[23]

At Gilchrist's urging, the Cape government proceeded to purchase the first South African fisheries research vessel. The PIETER FAURE, a 176-gross-ton steel-hulled steam trawler, was designed and built for the rough seas of the Cape. The ship arrived in Cape Town in 1897, fully equipped and with an experienced North Sea Captain and crew, and was put at Gilchrist's disposal.[24] In the years that followed, until Gilchrist resigned from his museum post, the Marine Biological Survey and the marine collections of the SAM were closely associated.

The South African Museum, Cape Town

Gilchrist's arrival at the Cape in 1896 coincided with the appointment of W.L. Sclater, who succeeded R. Trimen as director of the SAM. Sclater was a qualified zoologist educated at Winchester and Keble College, Oxford. As soon as he took office, Sclater had to deal with a move to a new building. While planning the move, he also restructured the museum by creating departments, including the Department of Marine Invertebrates, but was aware of the possible overlap of the latter with the new Marine Biological Survey. The problem was solved when Gilchrist offered his services to the museum and was duly appointed honorary keeper of this department. However he did not do any work in the museum until the move to the new building was completed in 1897.[25]

The PIETER FAURE started a trawl survey of the Cape coast in August 1897. One of the objectives of the survey, outlined by Gilchrist, was to "...make a thorough investigation into what fish are really in the sea, and where they occur...".[26] By the end of that year Gilchrist had already

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[23] De Kock, *Dictionary of Biography*, pp. 309-310. Day, "Marine Biology in South Africa," in Brown, *Scientific Endeavour*, pp. 88-89.

[24] G 41-'97, pp. 9-10. Thompson, *The Sea Fisheries*, pp. 66-67.

[25] Summers, *A History*, pp. 71, 76, 78, 83.

[26] G. 41-'97, p. 10.

discovered good trawling grounds near St. Helena Bay and Dassen Island, and in False Bay.[27] The initial survey of Cape waters, from St. Helena Bay to the area of East London, was completed in 1900, with more trawling grounds being discovered.[28] Most of the trawling and dredging was done at a depth of 40 and 200 metres (m), occasionally in deeper water, but little was done at shallower depths.[29] A large quantity of specimens of marine organisms was collected during this period and Gilchrist enlisted colleagues overseas to help with identification. Georges A. Boulenger of the British Museum helped with the fishes and published several papers describing new species and records from the Cape.[30]

During the survey period, Gilchrist apparently operated from and did his research at the SAM. He had one room on the ground floor of the new building of the museum that he used for storing the collections of the PIETER FAURE and for a laboratory. In 1899 fishes became an important component of the natural history collections. The fish collection was therefore moved from the vertebrate collection, which was the responsibility of the director, to the marine biology collection. The department's name was then changed to the Department of Marine Invertebrates and Fishes.[31] By 1902 space had become a pressing problem. Through Gilchrist, the Marine Biological Survey erected a temporary building (the Marine Biology building) for the department in the museum grounds.[32] However this building proved to be more permanent than anticipated

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[27] G. 53-'98, p. 2.

[28] K.H. Barnard, "The work of the S.S. Pieter Faure in Natal waters, with special reference to the Crustacea and Mollusca, with descriptions of new species of Mollusca from Natal," *Annals of the Natal Mus*eum, Vol. 16, 1964, p. 9.

[29] J.D.F. Gilchrist, "Introduction," *Marine Investigations in South Africa*, Vol. 1, 1902, pp. v-vi.

[30] G.A. Boulenger, "The flatfishes of Cape Colony," *Marine Investigations in South Africa*, No. 1, 1898, pp. 1-4. G.A. Boulenger, "Descriptions of two new gobiiform fishes from the Cape of Good Hope," *Marine Investigations in South Africa*, No. 2, 1898, pp. 3-4. G.A. Boulenger, "Description of a new genus of perciform fishes from the Cape of Good Hope," *Annals of the South African Museum*, Vol. 1, 1899, pp. 379-380. G.A. Boulenger, "Descriptions of new fishes from the Cape of Good Hope," *Marine Investigations in South Africa*, No. 8, 1900, pp. 10-12.

[31] Report of the SAM for the Year Ended 31st December 1899.

[32] Summers, *A History*, p. 83.

and the marine study collections remained there until 1982.[33] At the same time, the Marine Biological Survey was building the first marine biological laboratory of South Africa. The laboratory, located at St. James, Cape Town, and later dubbed "The Aquarium," was designed for studying the reproductive behaviour and the early life stages of fishes.[34]

The operations of the PIETER FAURE were not confined to Cape waters. In 1897 a short trip was made to the "Guano Islands" off the coast of the German colony of South-West Africa (now Namibia).[35] Following the success of the initial survey of the Cape coast, the KwaZulu-Natal government requested the assistance of the Cape government for a similar survey in KwaZulu-Natal waters. The Cape government agreed and in 1901 the ship spent several months fishing between Durban and Cape Vidal. Several stations were also occupied south of Durban, on the way back to the Cape.[36] Soon after the Natal cruise, Gilchrist produced the first, though preliminary, checklist of the fish fauna (marine and freshwater) of South Africa including 55 families, 164 genera, and 336 species.[37]

The years of the Cape coast survey by the PIETER FAURE coincided with the second Anglo-Boer War (1899-1902) and several years of economic depression that followed it. The Cape government was short of funds and the ship had to earn its upkeep. This was done by selling the trawl catch to the public, demonstrating to the fishing industry the potential of trawling. In 1904 financial difficulties forced the Cape government to discontinue the operation of the PIETER FAURE; she was leased to a private fishing company and ferried passengers and goods to Robben Island. Apparently she did continue to operate on an *ad hoc* basis until 1907.[38] In the latter year,

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[33] Annual Report 1982/83, p. 15.

[34] G. 52-'99, p. 12. Anonymous, *Sea Fisheries Panorama* (Cape Town, Sea Fisheries Branch, 1978), p. 2.

[35] Thompson, *The Sea Fisheries*, p. 72.

[36] *Ibid.* Barnard, "Pieter Faure in Natal waters," pp. 9-11.

[37] J.D.F. Gilchrist, "Catalogue of fishes recorded from South Africa," *Marine Investigations in South Africa*, Vol. 1, 1902, pp. 105-179.

[38] Thompson, *The Sea Fisheries*, pp. 70-72. Barnard, "Pieter Faure in Natal waters," p. 9 (footnote). Report of the SAM for 1899.

the financial constraints forced the closure of the Marine Biological Survey.[39] Gilchrist, however, did not remain jobless. In 1905 he started teaching marine biology at the South African College, became professor of zoology on 1 July 1906 and was appointed Head of the Department of Zoology from 1 October 1907.[40]

Gilchrist's final years at the museum were marred by a dispute over the ownership of the PIETER FAURE collections. Gilchrist's storing of the Marine Biological Survey collections on museum premises led the director, W. L. Sclater, to assume that this material would eventually become museum property. Gilchrist, however, still regarded it as his own. Sclater resigned in 1906, but the conflict with Gilchrist was continued by his successor, L. A. Péringuey. The latter apparently never forgave Gilchrist for forgetting a dinner engagement with him.[41] After the formation of the Union in 1910 a new Board of Fisheries (Gilchrist was a member) inherited the control of the fishing industry from the Department of Agriculture of the old Cape government. The museum then laid claim to the PIETER FAURE collections. It took the intervention of the Prime Minister and the Minister of Interior to settle this dispute. The minister decided that the museum was where the collections should be and the transfer was officially authorized in September 1910. Consequently Gilchrist, who did not get along with Péringuey, resigned his post as honorary keeper at the museum in December 1910.[42]

The PIETER FAURE material was by far the largest component of the collection's growth during Gilchrist's tenure as keeper at the museum, but it was not the only one. Public donations and the purchase and exchange of specimens continued as before. Public donations ranged between 1-35 specimens per year. Several of the marine acquisitions are worth mentioning. In

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[39] Thompson, *The Sea Fisheries*, p. 79.

[40] Summers, *A History*, p. 113. Day, "Marine Biology," in Brown, *Scientific Endeavour*, p. 89. W. Ritchie, *The History of the South African College 1829-1918* (Cape Town, T. Maskew Miller, 1918), pp. 488, 517.

[41] Records of the JLBSI, file M/70, John E McCosker, "The influence of the coelacanth on African Ichthyology," draft article attached to letter of 24 January 1978 from M.M. Smith.

[42] Summers, *A History*, pp. 83, 112-113.

1901 the museum obtained, through exchange, eight species (14 specimens) of Arctic fishes;[43] in 1906 R. Robinson from KwaZulu-Natal[44] sent about 100 specimens, of which 25 were new species, and 20 donated by a collector in East London also included new species;[45] in 1907 Gilchrist himself collected in KwaZulu-Natal;[46] and in 1908 a Mr Bayly donated a collection of fishes from Delagoa Bay (now Maputo Bay), Mozambique.[47] After the Marine Biological Survey closed down, Gilchrist turned his attention to freshwater fishes.

Gilchrist's last year at the SAM (1910) was apparently a difficult one (at this time the dispute over the PIETER FAURE collections was nearing its climax). His 1909 report to the trustees of the museum was somewhat confusing and repetitious as the collections from KwaZulu-Natal and Delagoa Bay were reported again. New marine specimens were apparently received from Robinson in KwaZulu-Natal.[48] He did not write a report for 1910 even though he did not resign until December that year. In a way, despite the acrimonious relationship between Gilchrist and Péringuey, the museum acknowledged the importance and dominance of fish research in the department by changing its name in 1908 to the Department of Fish and Marine Invertebrates.[49] Strangely, although the department lost Gilchrist as a result of the PIETER FAURE dispute, it also gained from the latter. When Gilchrist resigned, the fish collection again came under the responsibility of the director who was also in charge of the bird and reptile collections. Probably

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[43] Report of the SAM for the Year Ended 31st December 1901.

[44] Robinson was a well-known Natal businessman and angler (see page 67).

[45] Report of the SAM for the Year Ended 31st December 1906.

[46] Report of the SAM for the Year Ended 31st December 1907.

[47] Report of the SAM for the Year Ended 31st December 1908.

[48] Report of the SAM for the Year Ended 31st December 1909.

[49] *Ibid.*

to ease the director's burden, the museum created a post for an assistant in the department, and in 1911 K.H. Barnard was hired for the job.[50]

Figure 3. Dr Keppel H. Barnard, keeper of the Department of Fishes and Marine Invertebrates, and director of the SAM.

Keppel Harcourt Barnard (Fig. 3) was born in London on 31 March 1887. In 1905 he enrolled at Christ's College, Cambridge, taking natural sciences as his major, and also attending lectures on anthropology, ethnology and geography. He graduated in 1908 and chose to study law rather than carry on with science, joining the bar in 1911. In 1909 he became honorary assistant at the Marine Biological Laboratory, Plymouth, whose director recommended Barnard to the trustees of the SAM. Barnard received his D.Sc. from UCT in 1924 for his work on the distribution of crustaceans in South African waters. In 1956 he received an honorary D.Sc. from the University of Stellenbosch. He had a long association with the museum until his death in 1964. In addition to his work in the department he performed various other duties, including assistant director (1921-1942), librarian (1926-1953), and director (1942-1956). He was the sole staff member in the department for 45 years. Dr Barnard was a keen mountaineer and joined the Mountain Club of South Africa in 1913; he served as honorary secretary between 1918-1945. His interest in the mountains influenced his scientific work, including fish research.[51]

When he started working at the museum Barnard took charge of the PIETER FAURE collections and began sorting and identifying the material. Naturally he had to consult with Gilchrist on matters concerning this material. However Péringuey, who was still director and

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[50] Report of the SAM for the Years Ended 31st December 1910, 1911, 1912.

[51] S. Moor, *The Published Works of Keppel Harcourt Barnard* (Cape Town, University of Cape Town, 1964). Summers, *A History*, pp. 97-98, 158-159.

greatly disliked Gilchrist, told Barnard never to speak to Gilchrist or he would lose his job. At that time Gilchrist was next door, at the South African College, which bordered on the property of the museum. As the story goes, Barnard, who was a small man, cut an opening in the fence between the two institutions and used to sneak out and talk to Gilchrist.[52] Although Barnard's research in his early years at the museum focussed on crustaceans, he collected marine organisms of all groups.

The fish collection remained the director's responsibility until 1913. From that year Barnard was in charge of the department, including the fish collection, and wrote the department's annual report. It appears, though, that freshwater fishes were kept as a separate collection because Péringuey continued to report on freshwater fishes until 1916.[53] The separation of the marine and freshwater collections must have been instituted by Gilchrist for his monograph on the latter fauna.[54]

In October 1912 Barnard went on his first collecting trip for the museum, spending four months in Mozambique and KwaZulu-Natal. The trip was successful and most of the 336 specimens (102 species) of marine and freshwater fishes added to the collection in 1913 were probably Barnard's contribution. At the end of that year he reported that the fishes of the PIETER FAURE collection, except the soles, had been sorted and incorporated into the museum collection. In the same annual report Péringuey stated, most likely based on data provided by Barnard, that the number of described South African marine fishes was 670 species, and that of freshwater species 130. At that time the museum had 467 marine and 95 freshwater fish species.[55] Two years later, the figures were 718 marine species known from South Africa of which 497 (or 63 percent) were represented in the SAM collection.[56] The distinguished South African naturalist

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[52] P. A. Hulley, personal communication, December 1992.

[53] Report of the SAM for the Year Ended 31st December, 1916.

[54] Gilchrist did this work with W.W. Thompson and published it in two parts (see Gilchrist and Thompson 1913 and 1917 in the Bibliography).

[55] Report of the SAM for the Year Ended 31st December, 1913.

[56] Report of the SAM for the Year Ended 31st December, 1915.

H.W. Bell-Marley appears first in museum records as a donor of specimens in 1914.[57] After that he became one of the most important private donors to the fish collection, regularly sending specimens from KwaZulu-Natal until 1939. During 1917-1919 over 100 specimens of fishes were added to the collection annually. In 1920 Barnard spent seven months in England and the number of fishes obtained for the collection dropped sharply to 41 specimens.[58] When he returned to Cape Town the monograph on the marine fishes occupied most of his time.

The monograph apparently crystallized in Barnard's mind when he was working on the flatfishes of the PIETER FAURE collection. When he completed incorporating this group into the main museum collection (in 1919) he wrote:

> ...the Soles collected by the s.s. 'PIETER FAURE' have been sorted, classified and incorporated. I have completed a short descriptive account of S. A. representatives of this family, which it is hoped will eventually form part of a more comprehensive work embracing the whole of S. A. Marine Fishes. Part of my time has been spent, with this object in view, in the examination of the unidentified material in the Museum.[59]

A spurt of field activity followed Barnard's return from England, including two 1922 trawler trips that contributed more material to his marine fish research. The renewed field work did not last long. Following the death of Péringuey in 1924 Barnard was appointed acting director of the SAM. Consequently, no field trips took place in 1924 and a good part of Barnard's time had to be devoted to museum administration.[60] In 1925 a new director, Dr E. L. Gill, was appointed, but Barnard remained involved in museum administration in the role of assistant director, a post he had held since 1921.[61] Now, having more time for research, he published the first part of the

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[57] Report of the SAM for the Year Ended 31st December, 1914. See page 69 for more details on Bell-Marley.

[58] Annual reports of the SAM for 1917-1919.

[59] Report of the SAM for the Years Ended 31st December, 1918, 1919.

[60] Report of the SAM for the Year Ended 31st December, 1924.

[61] Moor, *Keppel Harcourt Barnard*, p. viii. Summers, *A History*, p. 122.

marine fish monograph and continued with his research on the remaining marine fish groups for the second and last part.[62] Space in the Marine Biology building, now (1925) also housing the wet collections of other vertebrate groups, had become a problem again. It took five years before Barnard's repeated requests for extra space could be answered. The new construction included the extension of the main storage room and the addition of three offices of which two were for staff members and one reserved for visiting scientists.[63] Following the completion and publication of the marine fish monograph, Barnard turned to the freshwater fauna of the Cape mountains.[64] When this project ended in 1941 the Second World War was having its effect on the South African economy. Diminished staff and petrol rationing brought field collecting by staff almost to a stand-still.[65]

During the 1920s and early 1930s, accessions to the fish collection fluctuated between 22 and 234 specimens a year. Donations of specimens continued to arrive from various sources. Names that consistently appear on the list of donors include H. W. Bell-Marley, J.L.B. Smith, and C. L. Biden, an enthusiastic angler who had good knowledge of local angling fishes. Occasionally specimens were also received from commercial fishermen.[66] In 1936 Barnard made an arrangement with Irvin & Johnson, a Cape Town based commercial trawling company, that their skippers keep unusual fishes for the museum. The enthusiasm and cooperation of the skippers is reflected in the number of accessions per year that rocketed into the thousands and remained at that level for several years.[67] This arrangement is still in force today. From 1941 Barnard's scientific interest shifted away from fishes. Although he still worked on fishes occasionally, there

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[62] Report of the SAM for the Year Ended 31st December, 1925. Report of the SAM for the Year Ended 31st December, 1926. See K.H. Barnard 1925 and 1927 in the Bibliography for the references of these publications.

[63] Report of the SAM for 1925. Report of the SAM for the Year Ended 31st December, 1930.

[64] Between 1934 and 1948 he did publish several papers reporting on new additions to the marine fish collection of the SAM, including descriptions of new species.

[65] Report of the SAM for the Year Ended 31st December, 1942.

[66] Annual reports of the SAM for the period 1920-1934.

[67] Annual reports of the SAM for the period 1937-1940.

was no defined project as such. Fishes were received mostly from sources outside the museum and several donations are worth mentioning. An unusual donation was received in 1942, including 25 watercolour paintings of edible marine fishes of the Cape by the artist H. Mosrstatt.[68] Specimens of *Notothenia* from the Sub-Antarctic Marion Island were donated in 1948 by an officer of the South African Navy, presumably caught during the annexation of the Prince Edward Islands to South Africa.[69]

After a long and distinguished career, Barnard retired from the post of director of the SAM in March 1956. He remained associated with the museum in the capacity of honorary keeper of the department, which later became the Department of Marine Biology, until his death in 1964.[70]

The Collection of the S.S. PICKLE

Another important development, indeed a milestone in the history of South African ichthyology, took place during Barnard's years at the SAM. In 1920 following a motivation by Gilchrist and an investigation of the fishing industry by the Government Research Grant Board, the South African government reinstated the old Marine Biological Survey. It was renamed the Fisheries and Marine Biological Survey, under the control of the newly appointed Fisheries Survey Committee and the part-time directorship of Gilchrist.[71] A whaler, S.S. PICKLE (Fig. 4), was loaned from the British Admiralty to replace the old PIETER FAURE. The ship, 102-foot long, was modified for trawling and equipped with a 40-foot otter trawl, a 15-foot reversible trawl and a 16-foot beam trawl. Because the revived Survey was a national fisheries research facility funded by the government, by the Cape and KwaZulu-Natal administrations, and by the fishing industry, the

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[68] Report of the SAM for 1942.

[69] Report of the SAM for the Year Ended 31st December, 1948.

[70] Summers, *A History*, p. 231.

[71] C.P. 3-1918, pp. 178-182. Fisheries and Marine Biological Survey, Report No. 1 for the year 1920, pp. 1-4. Fisheries and Marine Biological Survey, Report No. 6 for the year ending June 1928, p. 6.

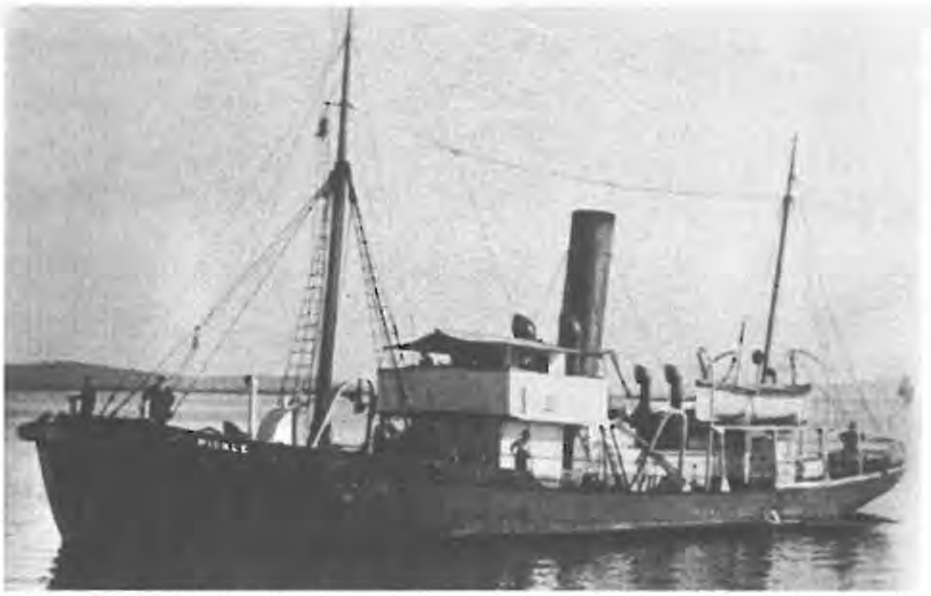

Figure 4. The S.S. PICKLE, the research vessel of the Fisheries and Marine Biological Survey during the 1920s.

ship's time was divided more or less equally for surveys of KwaZulu-Natal and Cape waters.[72] Surveys started immediately, but once again lack of funds caused the operations to be discontinued at the end of 1921.[73] Gilchrist, however, kept urging the government to resume funding and was able to send the ship back to sea from the beginning of 1925 onwards. He surveyed with the PICKLE as far as Lourenço Marques (now Maputo) on the east coast, and Walvis Bay on the west coast.[74] Gilchrist was director of the new Survey until his death in 1926 and was succeeded by his student, Dr Cecil von Bonde who continued with the surveys.[75] Discoveries of new fishing grounds and of more species suitable for commercial exploitation highlighted the importance of fisheries research in South Africa. Consequently in 1928 the Fisheries and Marine Biological Survey gained the status of a permanent research institute with an annual budget of £20,000. Von Bonde became the first full-time director. Two years later,

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[72] Fisheries and Marine Biological Survey, Report No. 1, pp. 1-4.

[73] Fisheries and Marine Biological Survey, Report No. 2 for the year 1921, Cape Times, Government Printers, Cape Town (1922), p. i.

[74] Day, "Marine Biology," in Brown, *Scientific Endeavour*, p. 90.

[75] *Ibid.*, pp. 90, 92. Fisheries and Marine Biological Survey, Report No. 6, p. 8.

the PICKLE was replaced by a larger vessel, the AFRICANA, a 136-foot steam trawler specially designed for marine investigations.[76]

The surveys of the PICKLE in the 1920s covered a large part of the coast from KwaZulu-Natal to South West Africa to a depth of 540 m. Occasionally nets were dropped deeper, down to 1,800 m. As might be expected, a large amount of material was collected during this period, including many new species.[77] However the fate of the majority of these specimens has long been a mystery because they are not at MCM, the recent successor of the Survey. Neither are they at the SAM, and only a fraction of the original collection found its way to the JLBSI. The SAM was probably not considered for housing this collection as long as Gilchrist and Péringuey were alive. Strangely, before Smith showed an interest in the collection, neither Von Bonde nor Barnard apparently had attempted to approach each other with regard to the future of the PICKLE collection. Judging from Barnard's annual reports of the Department of Fishes and Marine Invertebrates of the SAM, it seems that no relationship existed between the museum and the Survey for many years. The latter was never mentioned or acknowledged for donations of specimens, except for a joint description by Barnard and Von Bonde of a deep-sea fish that Von Bonde donated to the museum.[78] In addition, Von Bonde told J.L.B. Smith that he had not been approached by the SAM "with regard to the housing of our collection" in that museum.[79] From Smith's correspondence with Von Bonde it is evident that the PICKLE collection was stored in a

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[76] Anonymous, *Sea Fisheries*, p. 2.

[77] J.D.F. Gilchrist, "Deep-sea fishes procured by the S. S. 'Pickle' (Part I)," *Fisheries and Marine Biological Survey, Report No. 2, Special Report No. 3*, 1922, pp. 41-79. J.D.F. Gilchrist and C. von Bonde, "Deep-sea fishes procured by the S. S. 'Pickle' (Part II)," *Fisheries and Marine Biological Survey, Report No.3, Special Report No. 7*, 1924, pp. 1-24. C. von Bonde, "The Heterosomata (flatfishes) collected by the S. S. 'Pickle,'" *Fisheries and Marine Biological Survey, Report No. 2, Special Report No. 1*, 1921, pp. 3-29. C. von Bonde and D. B. Swart, "The Platostomia (skates and rays) collected by the S. S. 'Pickle,'" *Fisheries and Marine Biological Survey, Report No. 2, Special Report No. 5*, 1924, pp. 1-22.

[78] Annual reports of the SAM for the years 1927-1943. K.H. Barnard and C. von Bonde, "An adult specimen of *Ditremus* (Berycomorphi)," *Annals and Magazine of Natural History*, Vol. 11, No. 2, 1944, pp. 236-240.

[79] Records of the JLBSI, file V/11, Von Bonde, letter of 2 April 1931 to J.L.B. Smith.

Survey facility at the Cape Town harbour that Smith and Von Bonde referred to as the "Docks."[80] In a 1931 trip to Cape Town, Smith visited the Survey to study certain fishes. He then received permission from Von Bonde to take any specimens he wanted as a donation to the Albany Museum.[81] Apparently it was common practice to allow selected visiting scientists to remove specimens from the collection, but no records of the removals were kept.[82] It appears that Von Bonde continued to donate fish specimens, probably following Smith's requests, for about two years. Then, for no apparent reason, the relationship between the two men cooled. Replying to a letter from Smith Von Bonde said that "...for the present I shall not be able to let you have any more specimens as I have earmarked them for another purpose."[83] Soon afterward the breach between them grew deeper. Planning his next visit to Cape Town in January 1933 Smith wrote to Von Bonde asking to examine specimens at the Docks. However when Smith arrived at the Survey he discovered that Von Bonde was in Luderitz, South West Africa, and he was not given access to the collection.[84] Smith took the issue to the Minister of Mines and Industry, a move that Von Bonde regarded as an insult. Smith apologized in 1934 and Von Bonde replied: "I am quite prepared to resume the *status quo ante bellum*! and we can start afresh."[85] Unfortunately the archives of the J.L.B. Smith Institute hold no record of their correspondence between 1936 and 1946. Therefore it is difficult to ascertain whether Smith received any more specimen donations from Von Bonde. In April 1947 following a meeting with Von Bonde, Smith raised the issue of

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[80] *Ibid.*, letters of 27 January 1933 and 28 April 1947 from J.L.B. Smith.

[81] *Ibid.*, letter of 21 January 1933 from J.L.B. Smith to the Secretary of Mines and Industry.

[82] R. Winterbottom, "Rediscovery of certain type specimens of fishes from the collections of the Government Marine Survey made by J. D. F. Gilchrist & the S.S. 'Pickle.'" *J. L. B. Smith Institute of Ichthyology, Special Publication* No. 12, 1974, p. 1.

[83] Records of the JLBSI, file V/11, letter of 4 January 1933 to J.L.B. Smith. [This letter is in reply to Smith's of 27 December 1932; unfortunately the file contains no copy of that and several other letters Smith wrote at the time; see footnote 62 in the Introduction.]

[84] *Ibid.*, letter of 21 January 1933 from J.L.B. Smith to the Secretary of Mines and Industry.

[85] *Ibid.*, letter of 8 May 1934 to J.L.B. Smith.

the PICKLE collection once again and proposed that Von Bonde donate them to RUC Department of Ichthyology headed by Smith himself.[86] Von Bonde's official offer was accepted by the council of the college in May 1947. The council also agreed to finance Smith's travel to Cape Town later in the year to supervise the packing of the specimens.[87] Smith's request for an estimate of the number received the vague answer from Von Bonde that "...it is difficult to estimate the number of specimens available in our collection."[88] Smith then arranged for a friend, H.J. Koch, to estimate the size of the collections. Koch and his wife visited the Docks, estimated the number of specimens at about 300 and reported the following: "We were frankly rather staggered at the state of chaos in the shed where the bottles are stored & when Charters [a Survey employee] told us that he had sorted the specimens not long ago & had to dump many because they had dried out through lack of formalin. Anne & I just about collapsed - what you would have done we shudder to think...From what I could see no one is scientifically interested in systematics there otherwise these valuable specimens would have been better cared for."[89] To this Smith replied: "Your news is one the greatest shocks I have ever had. When I think of those thousands of valuable specimens that have been lost I could weep, or alternatively cut a few throats. It is one of the greatest scientific crimes I have ever heard of."[90] Distressed, but still hoping it was all a mistake, he wrote to Von Bonde: "I'm rather puzzled by the report sent by Koch. He was surely not shown the collection I worked over in 1933 which contained many thousands of specimens including numerous type specimens. Perhaps you can give me more information as Koch estimated there to be not more than five hundred fish in all." To this, Von Bonde replied: "Mr Koch was shown the same collection...but owing to our having to use the containers...it was necessary to get rid

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[86] *Ibid.*, correspondence of the period 28 April and 27 May 1947 between J.L.B. Smith and C. von Bonde.

[87] RUC Council, meeting held at 2:15 p.m. on Friday 16th May, 1947, p. 11. Records of the JLBSI, file C/27, Rhodes Registrar & Council, letter of 23 May 1947 from the RUC registrar to Von Bonde.

[88] Records of the JLBSI, file V/11, letter of 3 June 1947 to J.L.B. Smith.

[89] *Ibid.*, file K/12, Koch H.J., Anne & Robert, letter of 20 July 1947 to J.L.B. Smith.

[90] *Ibid.*, letter of 1 September 1947 from J.L.B. Smith.

of many duplicates...only about 500 left now."[91] If Smith needed another confirmation of the loss, it came in reply to his request for Von Bonde's holotype of *Bathybatrachus albolineatus* to which Von Bonde answered that it could not be found.[92] He then abandoned the planned trip to Cape Town and immersed himself in working on his book. Consequently the promised donation arrived in Grahamstown only early in 1950. It contained more disappointment for Smith because there were no more than 276 specimens in the boxes. The material included only two type specimens of Gilchrist's and none of Von Bonde's own new species descriptions.[93] Smith wrote to Von Bonde asking about these type specimens, but apparently received no reply. The letter also gives an indication about the state of the material that arrived in Grahamstown. As Smith noted, several bottles contained "...only decomposed mush."[94] Two decades later, several more type specimens of species described in papers by Gilchrist, and Gilchrist and Von Bonde were discovered at the JLBSI among the PICKLE specimens salvaged from the Docks by Smith.[95]

The loss of the PICKLE collections was an unfortunate event in the history of South African ichthyology. Evidently, Von Bonde had little appreciation for the value of type specimens, including those of new species he himself described. Gilchrist was apparently not much better. Writing to J.L.B. Smith about the type of the circular seabat, *Halieutaea fitzsimoni*, described by Gilchrist and Thompson in 1916 Barnard said: "...knowing Gilchrist's habitual indifference to the fate of type specimens, I should very much doubt if the specimens would have been returned...".[96] Gilchrist may have kept his own type specimens at UCT but, in an earlier unfortunate event, the university's collection was discarded by Professor Lancelot Hogben, Gilchrist's successor as HOD

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[91] Records of the JLBSI, file V/11, letter of 13 September 1947 from Smith and Von Bonde's reply on the 18th of that month.

[92] *Ibid.*, letter of 10 October 1947 from Smith and telegram of the 14th of that month from Von Bonde.

[93] *Ibid.*, letter of 17 April 1950 from Smith.

[94] *Ibid.*

[95] Winterbottom, "Rediscovery of fishes from the 'Pickle,'" pp. 2-9.

[96] Records of the JLBSI, file B/4, K.H. Barnard, letter of 8 December 1930 to J.L.B. Smith.

of the Department of Zoology, who believed that systematics was not zoology.[97] Von Bonde is credited with removing Gilchrist's type specimens from under Hogben's nose.[98] If he did, it made no difference because the end result was the same; he did not look after them and most were lost with the rest of the collections at the Docks. Seeing the state of the material during his 1931 visit to Cape Town, and having been told by Von Bonde that he and his staff had no time to attend to it, Smith foresaw the fate of the PICKLE collection.[99] Because he understood the importance of the collection, it is not surprising that he decided to take the issue to the Minister of Mines and Industry, the government office then in charge of the Fisheries and Marine Biological Survey.[100] However he antagonized Von Bonde early in their relationship only to discover that he was facing a man as strong-willed as he. It seems that Smith and Von Bonde disliked each other intensely. Von Bonde was apparently an arrogant person who did not like his authority questioned; he may have also felt threatened by Smith.[101] Soon after the affair he approached Barnard at the SAM and suggested the museum take possession of the PICKLE collection, without telling Smith. Evidently the SAM declined, apparently due to lack of space.[102] Von Bonde's lack of appreciation for systematics and/or his dislike of Smith resurfaced some 20 years later. In 1952 Smith tried to raise funds for his work from the fishing industry in Cape Town. The Fisheries Development Corporation, then headed by Von Bonde, refused to contribute saying that Smith's work is "...of little value to the Fishing Industry."[103] In addition, Smith suspected Von Bonde's integrity as a

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[97] Winterbottom, "Rediscovery of fishes from the 'Pickle,'" p. 1. Day, "Marine Biology," in Brown, *Scientific Endeavour*, pp. 90, 92.

[98] Day, "Marine Biology," in Brown, *Scientific Endeavour*, p. 90.

[99] Records of the JLBSI, file V/11, letter of 27 January 1933 from J.L.B. Smith.

[100] *Ibid.*, letter of 21 January 1933 from J.L.B. Smith to the Minister of Mines and Industry.

[101] *Ibid.*, letter of 20 January 1933 to J.L.B. Smith.

[102] *Ibid.*, file V/11, letter of 11 February 1933 from K.H. Barnard.

[103] *Ibid.*, file M/69, Marine Oil Refiners of South Africa, letter of 27 May 1952 from F.J.H. Le Riche to J.L.B. Smith.

reviewer of at least one of his papers.[104] The fate of the collections made during the surveys of the PIETER FAURE and the PICKLE provides unequivocal proof of the inter-dependence of systematic research and natural history collections. In the case of the former vessel, the bulk of the collection ended up in the care of the SAM where Barnard curated it and used it for his research. The PICKLE collection, however, was left to rot because no one at the Fisheries and Marine Biological Survey worked on it and had any interest in maintaining it. A case can also be made for the responsibility of higher authority in such matters. The ministerial decision to leave the collection of the PIETER FAURE in the care of the SAM, presumably born from grasping the importance of the collection as a national asset, was the correct one.[105] There is little doubt that if this collection had been returned to the Survey when Gilchrist left the museum it would have suffered the same fate as the collection of the PICKLE. Conversely, from a historical point of view, the ministerial decision to support Von Bonde in denying Smith access to the collection of the PICKLE was a strategic error.[106] With the demise of the latter collection South Africa lost important baseline information on the state of its fish diversity and stocks before the commencement of heavy commercial exploitation. The affair probably tarnished the reputation of South African marine science overseas. American and British ichthyologists looking for type specimens of species described by Gilchrist and Von Bonde approached the curators at the SAM who in turn called on the director of the Survey and on J.L.B. Smith, but no one could provide reliable information on the fate of these specimens.[107]

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[104] *Ibid.*, file B/4, K.H. Barnard, letter of 20 April 1934 from J.L.B. Smith. See also page 127.

[105] See page 45.

[106] Records of the JLBSI, file V/11, letter of 2 February 1933 from the Minister of Mines and Industry to J.L.B. Smith.

[107] *Ibid.*, letter of 21 January 1955 from K.H. Barnard to J. Marchand, letter of 24 January 1955 from Marchand to Barnard, letter of 23 February 1955 from D.M. Cohen to K.H. Barnard and letter of 8 July 1955 from Barnard to Cohen, and file P/150, Dr M.L. Penrith and Mr M.J. Penrith, letters of 7 and 29 December 1962 from and to M.J. Penrith, respectively.

Figure 5. Professor J.L.B. Smith and his wife Margaret M. Smith in the early 1960s.

The Albany Museum, Grahamstown

Ichthyology at the Albany Museum began some 30 years after it had started at the SAM and the Marine Biological Survey of Cape Town. The Albany Museum differs from all other South African museums in that it entered the research period with a person who had a specific interest in studying fishes. This was Dr J.L.B. Smith.

James L.B. Smith (Fig. 5) was born on 26 September 1897 in Graaff-Reinet, eastern Cape. He studied for a B.A. and M.Sc. at Victoria College, Stellenbosch, a college of the University of the Cape of Good Hope. He remained a staff member of this college for several years during which he started his research career in chemistry. In 1919 he went overseas to study at Cambridge University and received his Ph.D. in 1922.[108] Returning to South Africa in 1923 he took a post as a lecturer in the Department of Chemistry at RUC and later became head of Organic Chemistry.[109] Smith was a keen angler from childhood and had an incurable passion for

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[108] M.M. Smith, "J.L.B. Smith his life, work, bibliography and list of new species," *Occasional Papers, Department of Ichthyology, Rhodes University,* No. 16, 1969, J.L.B. Smith, 'His life and work.' [This publication has two parts of which the first, a brief biography of Smith, has no page numbers; citations within this part are given as the subheading/s under which the subject referred to can be found.]

[109] *Ibid.*, 'Permanent Appointment.'

fishes.[110] He pursued this interest to the point where he eventually abandoned chemistry.[111] Smith became involved in the fish collection of the Albany Museum in the late 1920s, though in an informal way. He was soon a familiar figure at the museum and in November 1930 he was appointed to the Board of Trustees.[112] Although he was not employed by the museum, Smith started working on the fish collection immediately and soon published his first ichthyological paper, including descriptions of several new species.[113] He methodically went about rearranging and naming the marine fishes. He collected more material in various localities of the eastern Cape, and obtained valuable specimens from the Fisheries and Marine Biological Survey in Cape Town.[114]

Smith was a self-taught ichthyologist and much of his learning took place during the early 1930s. It was not without difficulty though. There was little ichthyological literature in Grahamstown; he had no one to show him how to examine fish specimens; and RUC apparently frowned upon and discouraged his deviation from chemistry.[115] Nevertheless Smith learned fast and by 1937 he was already an authority on eastern Cape fishes.[116] Barnard of the SAM acted as his 'long-distance' mentor during these years and boosted Smith's confidence. Smith corresponded extensively with Barnard requesting literature, illustrations and advice, sometimes on a daily basis; he also had Barnard read and comment on most, if not all his manuscripts before

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[110] Records of the JLBSI, file M/33, Prof. G.S. Myers, letter of 15 March 1968 from M.M. Smith and file R/97, P.J. Rose, letter of 18 July 1967 from J.L.B. Smith.

[111] See pages 83, 85.

[112] Fowler, "Albany Museum," p. 269.

[113] J.L.B. Smith, "New and little known fishes from the south and east coasts of Africa," *Records of the Albany Museum,* Vol. 4, No. 1, 1931, pp. 145-160.

[114] Fowler, "Albany Museum," pp. 269-270. See also page 53.

[115] Records of the JLBSI, file B/4, letters of 20 April 1934 and 10 June 1940 from J.L.B. Smith. J.L.B. Smith, "'The Sea Fishes of Southern Africa' was an experiment," *The Rhodian*, Vol. 28, No. 2, 1949, p. 29.

[116] P.B.N. Jackson, "Variations on a theme: The three directors of the first fifty years of the J.L.B. Smith Institute of Ichthyology," *Transactions of the Royal Society of South Africa*, Vol. 51, 1996, p. 33.

sending them to journals. He must have taken a lot of Barnard's time as is evident from the numerous letters that contain hand-written copies of species descriptions and pencil tracings of illustrations from publications that were not available to Smith.[117] Indeed, Barnard must have been a very patient person and very willing to help younger scientists.[118] Smith greatly appreciated Barnard's assistance and jokingly told Barnard that "My papers should really all appear as by 'Barnard (with Smith).'"[119] He sincerely expected Barnard to be his co-author in a paper on the South African halfbeaks of the genus *Hemirhamphus*.[120] Smith held Barnard in high esteem and once wrote to him that he had "...admiration for your intellect which I rank second to none in your field in the Southern Hemisphere."[121] Moreover the two men frequently added notes on personal matters to their letters implying that they were friendly with each other.[122] I have found only one allusion suggesting an unresolved issue between the two men regarding work on South African klipfishes (family Clinidae),[123] but that alone is not enough to support the allegation that Smith had "...a hostility..." toward Barnard.[124]

The year 1938 was a milestone in the life and work of Smith, and in the history of South African ichthyology. In April that year, Smith married Margaret Mary McDonald (Figs. 5, 8), his

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[117] Records of the JLBSI, file B/4, correspondence during the years 1930-1937.

[118] Meiring Naudé and Brown, "Scientific institutions," in Brown, *Scientific Endeavour*, p. 63.

[119] Records of the JLBSI, file B/4, letter of 20 April 1934 from Smith.

[120] *Ibid.*, letter of 26 February 1931. [Barnard obviously declined because Smith is the sole author of this paper.]

[121] *Ibid.*, letter of 25 July 1945 from J.L.B. Smith.

[122] *Ibid.*, correspondence during the years 1930-1937.

[123] In the mid-1930s Barnard described two new species of klipfish (see K.H. Barnard, "Notes on South African marine fishes," *Annals of the South African Museum*, Vol. 30, 1935, p. 645; K.H. Barnard, "Further notes on South African marine fishes," *Annals of the South African Museum*, Vol. 32, 1937, p. 63).

[124] Records of the JLBSI, file K/12, letter of 29 May 1947. Jackson, "Variations on a theme," p. 39.

student and assistant at the Department of Chemistry.[125] Together they produced work that influenced ichthyology all over the world. Soon after they married, the Smiths left on their first expedition to Mozambique and collected in Beira and Inhaca Island off Lourenço Marques (now Maputo). As a result of this expedition Smith realized that many of the species found on the east coast of South Africa originated from tropical East Africa. From the material collected on this expedition Smith described several new species (Smith 1939b, 1940b) and created a new family, Pentapodidae (Smith 1941).[126] In December 1938 Smith received notice of the first coelacanth, which was caught by a trawler off the Chalumna River near East London and saved for science by Miss M. Courtenay-Latimer, the curator of the East London Museum.[127] Smith spent six months on the description of the coelacanth, which earned him international recognition. This specimen, however, is still the property of and on display at the East London Museum.

On the afternoon of Saturday 6 September 1941 the main building of the Albany Museum was gutted by a fire.[128] Practically all the exhibited collections, including many fishes, were lost. Fortunately, the two newer wings of the building, in which the wet collections were housed, were largely unaffected.[129] The fire brigade effectively isolated these areas while RU students and townspeople formed a human chain to quickly remove the wet collections from endangered areas. Among the fishes destroyed by the fire (mostly casts, and stuffed specimens) were several type specimens.[130]

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[125] Smith, "J.L.B. Smith," 'Ichthyology.'

[126] J.L.B. Smith, "New records and descriptions of marine fishes from Portuguese East Africa," *Transactions of the Royal Society of South Africa*, Vol. 27, No. 3, 1939, pp. 215-222. J.L.B. Smith, "Sparid fishes from Portuguese East Africa, with notes on the genus *Gymnocranius* Klunzinger," *Transactions of the Royal Society of South Africa*, Vol. 28, No. 2, 1940, pp. 175-182. J.L.B. Smith, "The genus *Gymnocranius* Klunzinger, with notes on certain rare fishes from Portuguese East Africa," *Transactions of the Royal Society of South Africa*, Vol. 28, No. 5, 1941, pp. 441-452.

[127] See page 66.

[128] *Grocott's Daily Mail*, 8 September 1941.

[129] *Ibid.*, 9 September 1941.

[130] In the type card catalogue of Smith at the JLBSI the cards of the lost species were annotated by M.M. Smith.

The Second World War and an increasing teaching load at the Department of Chemistry prevented Smith from embarking on new expeditions. Nevertheless he continued with dual careers, publishing in both organic chemistry and ichthyology. In 1946 departments were reintroduced in the Albany Museum and curators appointed to the different collections. Smith was made honorary curator of the fish collection and at the same time became chairman of the Board of Trustees.[131]

In 1946 Smith went on his second expedition to Mozambique, for his SFSA project. He collected in Delagoa Bay. Shortly after returning to Grahamstown, he joined a Port Elizabeth-based Irvin & Johnson trawler to collect deep-sea fishes. All told, these two expeditions contributed over 1,000 specimens to the fish collection, including 93 species new to the museum and 17 new to science.[132] By the end of that year, the Albany Museum had one of the better, if not the best, collections of East African fishes in the world. In a way, 1946 was also Smith's last year with the Albany Museum. Although he remained honorary curator until 1967 his research and, later on, his collection moved to the newly opened RU Department of Ichthyology.[133]

The Port Elizabeth Museum

F. W. Fitzsimons, a qualified zoologist, was appointed director of the PEM in 1906.[134] He was the first scientist employed by the museum and reptiles were the subject of his research. Fitzsimons found the collections at the museum in an unsatisfactory condition and that "...no real attempt at systematic classification, arrangement or adequate labelling..." had been made. Following his recommendation, the museum was closed to the public for five months and overhauled. He assessed the fish collection of the museum and found it "very poor." In his report to the trustees of the museum he said: "...it is, I consider, essential that we have a representative

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[131] Smith, "J.L.B. Smith," 'Sport.' Fowler, "Albany Museum," pp. 338, 345-346. Albany Museum Report for the Year, 1945, pp. 2, 17.

[132] Albany Museum report for the Year,1946, p. 15.

[133] See page 109.

[134] Report of the Director of the Port Elizabeth Museum for the Year Ended 31st December, 1906, p. 1.

collection of the fish of Algoa Bay...".[135] However the number of accessions over the next few years was still small, the highest being 45 specimens in 1907.[136] Nevertheless in 1910 Fitzsimons reported that "The fish department now contains nearly all the species of fish occurring in Algoa Bay. The specimens are mostly mounted and tinted, the smaller ones only being bottled".[137] J.D.F. Gilchrist of the SAM assisted the museum with identifications.[138] Specimens not used for display constituted the study collection, but no ichthyologist was on the staff.

The growth of the collection continued to be slow for many years. Occasionally, specimens were used for research by scientists such as J.D.F. Gilchrist and K.H. Barnard. The annual accessions rarely went over 30 specimens. Exceptional years included 1915 in which 169 were received, mostly from a project of the director entailing experimental netting at the Swartkops River; 46 specimens were donated by the Albany Museum and RUC in 1916. A break in the reports on accessions occurred from 1923-1934. In 1935 the director arranged with the Port Elizabeth office of Irvin & Johnson, the Cape Town based fishing company, for donations of specimens for a "reserve collection" of marine fishes. In the years that followed, this company was regularly acknowledged in the annual reports for donations, but the actual number of specimens was not specified. Because many of these fishes could not be identified by the museum's staff, they asked for J.L.B. Smith's help. Frequently, specimens not required for display were given to Smith for his rapidly growing collection in Grahamstown, and in 1948 he was made honorary curator of fishes at the museum.

In 1951 the director recommended to the trustees of the museum that due to a lack of proper storage facilities and a shortage of staff, future collecting for the study collections be limited to reptiles and molluscs. He suggested that specimens brought in or collected in any other group of animals and not required for display would be sent to interested institutions.

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[135] *Ibid.*, pp. 26-27.

[136] Report of the Director of the Port Elizabeth Museum for the Year Ended 31st December, 1907, p. 22.

[137] Report of the Director of the Port Elizabeth Museum for the Year Ending 31st December, 1910, p. 1.

[138] Report of the SAM for 1909, p. 9.

Consequently, in 1952 the study collection of marine fishes, comprising about 250 specimens, was handed over to J.L.B. Smith in Grahamstown. Smith described a new species of shark from a specimen he found among these fishes.[139]

The East London Museum

The East London Museum owes its origin to a museum society founded on 19 July 1921 in East London. Initially, the collections of the society were kept in the house of a committee member. Eventually, a proper land site was located and purchased, and a museum building erected on it. The East London Museum officially opened on 23 September 1931. The museum had cultural and natural history collections and displays, including marine animals.[140] However it never had an active study collection of fishes. All the fish specimens received by the museum and not required for displays were given to J.L.B. Smith at the Albany Museum, Grahamstown. The marine collections included sponges, corals, echinoderms, shells and crustaceans.[141] Like the older museums in the country, it struggled financially in its early days, receiving only a small grant from the government and little support from the local community.[142]

In an unusual move for that time, the museum appointed a young woman, Miss Marjorie Courtenay-Latimer, as its first full-time paid curator. Courtenay-Latimer was born in 1907 in East London and attended school at the Holy Cross Convent in Aliwal North. From an early age, she developed an interest in zoology, botany, archaeology and ethnology. Her experience in these fields contributed to her appointment as curator in August 1931. When the museum opened in September, there was so little to display that she transferred private collections from her home to the museum. Her collections included marine shells, dried and mounted sea weed, birds' eggs, eastern Cape butterflies and other insects, as well as historical, archaeological and ethnological

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[139] J.L.B. Smith, "Two chondrichthyan fishes new to South Africa," *Annals and Magazine of Natural History*, Ser. 12, Vol. 5, No. 56, 1952, pp. 761-764.

[140] Du Preez, H. M. J. (ed.) *Museums of the Cape* (Cape Town, Department of Nature and Environmental Conservation, 1981), p. 30.

[141] H. Fransen. *Guide to the Museums of Southern Africa* (Cape Town, Galvin and Sales, 1978), p. 42.

[142] J.L.B. Smith, *Old Fourlegs* (London, Longmans, Green, 1956), p. 23.

material – all catalogued and in excellent condition. As curator of the museum, she continued with studies in these fields. She started bird-banding in South Africa and excavated the fossil skeleton of a large Karoo[143] reptile. In 1971 Courtenay-Latimer received an honorary doctorate from RU, and at the end of that year she retired as director of the museum.

Courtenay-Latimer was an energetic curator and she immediately set about building exhibits depicting life in the area served by the museum. On the marine side, she cultivated good relationships with the local commercial fishing companies, especially the East London branch of the fishing company Irvin & Johnson. She knew the officers and crews of the trawlers in person and convinced them to keep unusual specimens for her.[144] It was on one of her routine trips to the harbour that she discovered the fish that changed the history of ichthyology in South Africa.

Late in the morning of 22 December 1938 Courtenay-Latimer received a call from the East London Manager of Irvin & Johnson to say that a trawler had brought fishes for her to examine. A deckhand took her to a pile of fishes, mostly sharks, among which she found a large blue fish she had never seen before. The skipper and crew of the trawler told her it was a first for them as well. She followed her instinct and decided to take the fish to the museum. Unable to identify it, Courtenay-Latimer made a rough sketch of the fish and sent it to J.L.B. Smith in Grahamstown.[145] Smith identified the specimen as a coelacanth, an ancient group of fishes previously known only from fossils.[146] The news of the capture of the first coelacanth brought instantaneous fame to the East London Museum, Courtenay-Latimer, Smith, and South African ichthyology. Acknowledging the importance of her discovery, Smith named the fish *Latimeria chalumnae*.[147]

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[143] The Karoo is a large, semi-desert area in the interior of the Cape. It extends from the Orange River in the north to the Cape Fold Mountains in the South, bordered by the eastern Cape on the east and the Cedarberg Mountains in the west. Typical Karoo vegetation includes succulents, some grasses and small bushes.

[144] Smith, *Old Fourlegs*, pp. 23-24.

[145] *Ibid.*, pp. 24-26. M. Courtenay-Latimer, "My story of the first coelacanth," *Occasional Papers of the California Academy of Sciences,* No. 134, 1979, pp. 7-8.

[146] J.L.B. Smith, "A living fish of Mesozoic type," *Nature*, London, Vol. 143, No. 3620, 1939, pp. 445-456.

[147] *Ibid.*, p. 456.

The Natal Museum, Pietermaritzburg

The 1906 reduction in the government grant to the Natal Museum and the dismissal of Toppin, the museum collector, slowed down the activities of the whole museum.[148] For the next 50 years, the museum operated with a staff of four people, excluding Warren who was the director and only resident scientist. As far as curation was concerned, Warren depended on the able help of the technical assistant and accountant, A. W. Cullingworth, who was appointed in 1904.[149]

Although the Natal Museum never had a resident ichthyologist, its fish collection was used actively by ichthyologists overseas and later in South Africa. Warren, previously assistant professor of zoology at London University, had good ties with the scientists at the British Museum, London. Thus, the fishes collected by Toppin were sent to the British Museum, London, for identification. They were returned in 1907 and were followed by descriptions of two new freshwater and at least six new marine species by G. A. Boulenger (1908) and C. T. Regan (1906, 1908), respectively, which were published in the first volume of the new *Annals of the Natal Museum*.[150]

Warren, who had no scientific interest in fishes, wanted to have the fishes of KwaZulu-Natal on display and as a study collection. He was fortunate to have the services of two remarkable collectors residing in KwaZulu-Natal, J.B. Romer Robinson and H.W. Bell-Marley. J.B. Romer Robinson, son of KwaZulu-Natal Prime Minister Sir John Robinson, was born to a family that arrived in KwaZulu-Natal with the 1850 'Byrne Settlers' from England. Educated in England, he became an attorney and businessman, and from 1932 was the managing director of the *Natal Mercury* newspaper owned by his family. Robinson had a great interest in natural history, especially fishes, and loved angling. He wrote articles on angling under the pen-name

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[148] See page 34.

[149] Report of the Natal Museum, 1904, p. 28.

[150] G.A. Boulenger, "On a collection of fresh-water fishes, batrachians, and reptiles from Natal and Zululand, with descriptions of new species," *Annals of the Natal Museum*, Vol. 1, No. 3, 1908, pp. 219-236. C.T. Regan. "Description of new or little-known fishes from the coast of Natal," *Annals of the Natal Museum*, Vol. 1, No. 1, 1906, pp. 1-6. Regan, C. T. "A collection of fishes from the coasts of Natal, Zululand and Cape Colony," *Annals of the Natal Museum*, Vol. 1, No. 3, 1908, pp. 241-256.

'John Dory,' served as the president of the Natal Coast Angling Association and was a Durban City Councillor. He recognised the importance of research and collected and donated many specimens to museums in South Africa and abroad at his own expense.[151] C. T. Regan, the well known British Museum ichthyologist, named several new species after Robinson. After donating an eagle ray in 1909 Robinson offered to collect and buy fishes for the Natal Museum. Warren accepted his offer and agreed to pay up to £2 per species. Warren also instructed Robinson on how to preserve fishes and provided him with formalin. Moreover the museum offered to refund Robinson's out-of-pocket expenses and arranged for the free transport of specimens with the railway company.[152] Robinson was the first experienced collector to offer his services to the museum since Toppin had left. Warren was very hopeful that the relationship with Robinson would be fruitful for the museum and reported the following to the trustees:

> The Museum is indebted to Mr R. Robinson of Durban for a considerable number of named specimens of local coast fishes. The determinations have been made by Dr Gilchrist, and with the kind of assistance of Mr Robinson it is expected that the Museum collection of marine fishes will be greatly extended and improved. Mr. Robinson has an extensive knowledge of the local fishes, and for years past he has made a special study of them. He has photographed about 100 species, and has been good enough to allow the Museum to acquire a complete series of photographic prints, all of which are duly identified.[153]

Unfortunately, the relationship with Robinson was short-lived. Following a donation of 20 specimens in 1911 Robinson's name was not mentioned any more in the museum reports and there was no further correspondence with him. Moreover I was not able to find any of his fish photographs at the museum and there is no record of such a purchase in the correspondence of the two men.

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[151] P. B. N. Jackson, personal communication, March 1993.

[152] Natal Museum Archives, correspondence between E. Warren and R. Robinson in the period 1909-1911.

[153] Sixth Report of the Natal Museum, Period Ended March 31, 1911.

Warren's saviour, H.W. Bell-Marley, appeared on the scene four years later. Harold Walter Bell-Marley was born in London and came to South Africa on active service during the Anglo-Boer War (1899-1902). Shortly after his return to England, he came back to South Africa and settled in Durban where he was employed in the office of a shipping company. He was a loner, apparently despised publicity and never married. He was an ardent naturalist, and a talented and enthusiastic collector.[154] J.L.B. Smith once described him as having an aptitude for collecting bordering on the genius.[155] Indeed he collected extensively among several groups of animals and plants, and generously donated his specimens to museums in South Africa as well as overseas. Many new species were named in his honour. His most well-known collections were of insects, especially beetles, and birds' eggs of South Africa.[156] Bell-Marley was also an accomplished artist and in his spare time he painted KwaZulu-Natal fishes in colour.[157]

Bell-Marley approached Warren in September 1915 offering to collect for the museum. Warren replied positively offering essentially the same working relationship he had with Robinson; in addition, he agreed to pay a sixpence for each specimen the museum received.[158] Over the years the two men apparently became good friends and Warren was one of the few people Bell-Marley trusted with personal matters.[159] The relationship with Bell-Marley developed into a great success and he contributed to the growth of many of the museum's natural history collections.[160] The first shipments were somewhat problematic and several specimens were damaged due to inadequate fixation, until the correct methods for fixation, preservation, and packing were established. Part

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[154] *Natal Daily News*, 28 January 1946. *Natal Mercury*, 29 January 1946. L.S. Whicher, "Obituary," *Entomologist's Monthly Mag*azine, Vol. 85, No. 1017, 1949, p. 49.

[155] P.B.N. Jackson, "Some southern African ichthyologists I have known," *Ichthos*, No. 37, 1993, p 5.

[156] Whicher, "Obituary," p. 49.

[157] *Natal Daily News*, 28 January 1946.

[158] Eleventh Report of the Natal Museum, Period Ended 31 March 1916.

[159] Natal Museum archives, correspondence between E. Warren and H.W. Bell-Marley in the period 1915-1935.

[160] Annual reports of the Natal Museum for the period 1915-1940.

of the problem was the director's desire to receive the fishes with as much of their natural colour as possible so that they could be painted and displayed accurately. The idea of painting fish specimens was Warren's. Following the receipt of a collection from Robinson, which the museum wanted to put on display, he proposed that the specimens be painted under the collector's guidance. Cullingworth, who was "an artist in water-colours and oils," did the painting.[161] This practice continued for many years with Bell-Marley's fishes. The resulting colour pattern, which was not always correct, misled at least one scientist (J.L.B. Smith) who studied Bell-Marley's fishes.[162]

In 1918 Bell-Marley wrote to Warren that he was applying for the post of Principal Fisheries Officer with the Natal Fisheries Board. Warren immediately dispatched a warm letter of recommendation to the provincial secretary describing Bell-Marley as having "...a thorough knowledge of the local fishes...and he is one of the finest observers of natural things I have ever met." Bell-Marley was appointed to the post in August 1918 despite stiff competition from candidates from outside KwaZulu-Natal, including a person trained by Gilchrist in Cape Town.[163] He remained the Principal Fisheries Officer for 19 years during which he travelled and collected extensively in KwaZulu-Natal and northward up to the Zambezi River.[164] The specimens he obtained for the museum numbered many hundreds, including freshwater species. Consequently, the collection grew quickly and it did not take long before the topping up and resealing of jars required constant attention. This heavily taxed the museum's limited resources of manpower. In addition starting in 1919 the museum had to face a three-year hiatus, caused by the First World War, in the supply of the rectangular glass jars used for displaying wet specimens.[165]

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[161] Natal Museum Archives, correspondence between Warren and Robinson.

[162] O. Gon, "The taxonomic status of *Apogon enigmaticus* Smith, 1961 (Teleostei, Apogonidae)," *South African Journal of Zoology*, Vol. 28, No. 1, 1993, pp. 58.

[163] Natal Museum archives, correspondence between Warren and Bell-Marley in 1918.

[164] Whicher, "Obituary," p. 49.

[165] Fourteenth Report of the Natal Museum for the Financial Year 1st April 1918 - 31st March 1919.

In the absence of qualified ichthyologists in KwaZulu-Natal, identifications were usually done by Bell-Marley himself who over the years obtained many ichthyological papers and books pertinent to the fauna of the KwaZulu-Natal coast. He also sent specimens to scientists abroad, starting with Regan of the British Museum and later on to H.W. Fowler at the Philadelphia Academy of Sciences, U.S.A. The switch to Fowler apparently came because of his disappointment with the handling of his specimens by the personnel of the British Museum. In response to a question by Warren about unidentified fishes collected between 1915-1923 Bell-Marley wrote:

> ...these fish sent to you many years ago were never identified by the British Museum... As I may have told you, it was the careless method in dealing with these early consignments and mixing up names that compelled me to send these records to America instead of London. I am very well satisfied with the treatment received from Dr Fowler.[166]

Strangely, very few specimens were sent to the SAM or the Marine Biological Survey for identification, possibly an indication of rivalry between museums.

Bell-Marley retired from the Natal Fisheries Board in April 1937, over a year after Warren had retired from the museum.[167] Although he apparently stopped collecting fishes for the museum, he carried on with other groups, especially insects. He had a cordial relationship with the new director, Dr R.F. Lawrence, and early in 1939 donated to the museum his collection of scientific literature. In his letter of thanks, the director remarked that "...our series of works on fishes has been almost doubled and we have now a really good library in respect of this group."[168] At the same time, Bell-Marley offered to sell his fish paintings to the museum, but the offer was declined

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[166] Natal Museum archives, correspondence between Warren and Bell-Marley.

[167] *Natal Mercury*, 29 January 1946.

[168] Natal Museum archives, correspondence between R.F. Lawrence and H.W. Bell-Marley in the period 1939-40.

due to a lack of funds.[169] Later in the year, the museum's finances apparently improved and the paintings were purchased from Bell-Marley after all. Twenty-five of these were framed by Cullingworth and were put on display.[170] Several others were framed later on, and J.L.B. Smith used a few in his SFSA book.[171] Bell-Marley died on 27 January 1946 from malaria, which he had contracted a year before while on an expedition to northern Zululand on behalf of several South African museums.[172]

Following Bell-Marley's retirement, the growth of the Natal Museum fish collection slowed down dramatically. Judging from the annual reports of the next decade, no marine fishes were added to the collection. On the freshwater side, specimens were donated, although infrequently, by the Inland Fisheries Office. In 1952 the museum mounted an expedition to the Ngoye Forest, Zululand, during which freshwater fishes were collected.[173] In the years that followed, the collection remained largely inactive. Three decades later, the trustees of the Natal Museum agreed to donate the marine fish collection to the JLBSI, "where it can be put to use for research purposes".[174]

Late in 1949 the Natal Museum nearly changed the path of the history of South African ichthyology. In search of a new director, the museum trustees persuaded a reluctant J.L.B. Smith to take the post. However Smith withdrew a week before he was due in Pietermaritzburg.[175]

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[169] *Ibid.*

[170] Thirty-fifth Report of the Natal Museum for the Financial Year 1st April 1939-31st March 1940, p. 6.

[171] Records of the JLBSI, file L/5, Natal Museum (to 1967), list attached to letter of 29 October 1945 from R.F. Lawrence to J.L.B. Smith. J.L.B. Smith, *The Sea Fishes of Southern Africa* (South Africa, Central News Agency, 1949), pp. 2, 4.

[172] Anonymous, "Obituary," *South African Museum Association Bulletin*, Vol. 3, 1946, p. 397. *Natal Mercury*, 29 January 1946.

[173] See annual reports of the Natal Museum for the period 1937-1953.

[174] Natal Museum, Pietermaritzburg. Report of the Year 1st April 1981 - 31st March 1982.

[175] See page 100.

The Transvaal Museum, Pretoria

The Transvaal Museum has never employed an ichthyologist and the development of the collection was therefore in the hands of the specialist for "lower vertebrates," who in the case of this institution, has always been a herpetologist. Consequently, the interest and involvement in the fish collection and fish research by personnel of the institution itself was always relatively minor. Staff members produced only two scientific papers on fishes in the museum's collection;[176] all other published research on the collection was made by outside researchers.

Scrutiny of the Transvaal Museum fish collection catalogue provides a good indication of the main contributors and periods of interest or growth. Several staff members and other well-known naturalists or collectors made significant contributions over the years. The marine fish collection, with few exceptions, dates from the period 1908-1921 and derives from a few substantial donations. These include Madagascan fishes collected by P. A. Methuen in 1911; fishes from Inhaca Island and Delagoa Bay, Mozambique, collected by H.G. Breyer and A. Adendorf in 1919; collections from KwaZulu-Natal waters, especially Durban Bay, made by H.W. Bell-Marley from 1915 to 1921; and a collection from Lourenço Marques made by H.A.J. Hunter in 1920. In addition, V. Fitzsimons donated a small collection from the Cape Agulhas area in 1940.[177] The freshwater fish collection was much more sustained and supported by a wide range of collectors. Growth of the collection during 1936-1950 was usually up to about 100 specimens per year. In 1938, 1949 and 1950 the collection received 321, 379 and 437 specimens, mostly freshwater fishes.[178] J.L.B. Smith visited the collection in the late 1940s and identified the marine

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[176] P.A. Methuen, "Description of a new Transvaal fish of the family Cyprinidae," *Annals of the Transvaal Museum*, Vol. 2, No. 4, 1911, pp. 251-252. V. Fitzsimons, "Description of a new species of yellowfish (*Barbus*) from the Vaal river, South Africa," *Annals of the Transvaal Museum*, Vol. 21, No. 2, 1949, pp. 195-196.

[177] Gon and Skelton, "Fish collections of South Africa," in Pietsch and Anderson, *Collection building*, p. 153.

[178] Annual reports of the Transvaal Museum for the period 1935-1950.

fishes.[179] The marine fish collection of the museum was handed over to the SAM in 1972,[180] but some specimens were donated to J.L.B. Smith in the 1930s and 1940s.[181] Contributions to the collection all but ceased from about 1950 onwards, with only a few minor donations being catalogued. Some of the latter collections supported the research and descriptions of new species of freshwater fishes. The remaining collection, mostly of freshwater fishes, was transferred to the JLBSI in 1988.[182]

In the first half of the 20th century, South Africa experienced the fast growth of the fishing industry, the development of academic and applied research in marine biology, and the thriving of sport fishing. These developments created a demand for well-trained professional marine fish systematists. This need was demonstrated through the work of the self-trained J.L.B. Smith, who was the first to fill this professional gap. The discovery of the first living coelacanth placed South African ichthyology and J.L.B. Smith on the international stage. The identification of this fish, made by a relatively inexperienced Smith and against the advice of the director and a senior scientist at the Albany Museum,[183] changed the way ichthyology has been viewed in South Africa.

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[179] Transvaal Museum, Report for the Year Ended 31st March, 1948, report for Lower Vertebrate and Invertebrates.

[180] Report of the SAM for the Year Ending 31st March, 1972, p. 7.

[181] J.L.B. Smith, "Brief revisions and new records of South African marine fishes," *Annals and Magazine of Natural History*, Ser. 11, Vol. 14, No. 113, 1948, p. 335.

[182] Transvaal Museum Annual Report 1987-1988, pp. 2, 36. Transvaal Museum Annual report 1988/89, p. 42.

[183] Records of JLBSI, file M/70, "The influence of the coelacanth" and file M/173, Michigan State Univ. Libraries, letter of 20 August 1982 from M.M. Smith to R. Westrum.

CHAPTER FOUR

MODERN ICHTHYOLOGICAL RESEARCH: 1945 - 1999

In the years following the Second World War, largely due to the establishment of the CSIR,[1] science in South Africa underwent a process of reorganization. As funding became more available, for example through national programmes funded by the CSIR, museums were able to enlarge their research staffs. Natural history museums hired qualified experts to conduct research and manage collections of specific groups of organisms. For the first time, trained ichthyologists started working in museums and initiated research projects that were the main contributors to the growth of fish collections around the country. Furthermore it was a period of consolidation and fish collections were moved from one institution to another. This period also witnessed the establishment of the JLBSI, a research institute dedicated to the study of fishes, and its rise to international prominence.

The South African Museum, Cape Town

After the Second World War, K.H. Barnard, then director of the museum and sole member of staff in the Department of Marine Biology, focussed his research on molluscs. In March 1956 Barnard retired as director and became honorary keeper of the department. The museum created a post for a professional officer in the department and hired F.H. Talbot for the job.[2]

Talbot received his B.Sc. from the University of the Witwatersrand, Johannesburg, and his M.Sc. and Ph.D. in the field of marine ecology at UCT. He took charge of the department in November 1957;[3] in April 1958 he was joined by S. Kannemeyer who was appointed a laboratory assistant in the department. Kannemeyer still remembers the poor state of the marine collections when he arrived at the museum; shelves were covered in a thick layer of dust and the level of preservative (formalin) in many bottles was low. With the help of two student assistants, who

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[1] See page 8.

[2] Summers, *A History*, p. 180.

[3] *Ibid.* J.E. McCosker, "The Academy changes Directors," *Pacific Discovery*, Vol. 35, No. 2, 1982, p. 19. Report of the SAM for the Year Ended 31st March, 1958, p. 12.

worked during university breaks, Talbot and Kannemeyer overhauled the marine collections. In the process, which took more than a year, they cleaned, topped up bottles, re-labeled and reclassified the marine and freshwater fish collections. The freshwater fish collection, however, remained separated from the marine fishes until it was sent in the mid-1970s to the Albany Museum on indefinite loan. Type specimens were left together with ordinary specimens of their families, but had a metal tag attached to them, and their bottles were coded for easy retrieval. A card index of the freshwater and marine type specimens had also been prepared.[4]

Talbot brought in money for research programmes and with it came more assistants and students. The South African Marlin and Tuna Club approached the museum in 1958 for help with the identification of tunny species caught along the Cape coast.[5] The club's request led to the initiation of several tuna-related programmes that lasted for several years. They included a study of the taxonomy, biology and distribution of South African tunas; a midwater trawling programme to investigate food organisms of tunas; and a long-line survey to estimate the tuna resources along the Cape coast. Talbot persuaded the trawling company Irvin & Johnson to sponsor the latter project and to let him use one of their vessels, CAPE POINT, for the survey. As a result of this project, a marine long-line fishery was established in Cape Town.[6] Being a graduate of UCT, Talbot was able to join the university research vessel, JOHN D. GILCHRIST, on several research cruises during 1959-1960 and collected fishes in False Bay as well as various stations between Durban and Cape Town.[7] University collections of intertidal and estuarine fishes, made during the ecological survey of Professor J. H. Day of the university's Department of Zoology , were identified by Talbot, and species not represented in the collection were donated to the museum.[8]

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[4] Report of the SAM for the Year Ended 31st March, 1958, p. 12. Report of the SAM for the Year Ended 31st March, 1959, p. 10. S.X. Kannemeyer, personal communication, December 1992.

[5] Report of the SAM for 1958, p. 12.

[6] Report of the SAM for 1959, p. 11. Report of the SAM for the Year Ended 31st March, 1960, p. 15. Hulley, personal communication. Kannemeyer, personal communication.

[7] Report of the SAM for 1959, p. 11. Report of the SAM for 1960, p. 15.

[8] Hulley, personal communication.

Talbot also reinstated the relationship between the museum and the government's Division of Sea Fisheries (ex-Fisheries and Marine Biological Survey), apparently for the first time since the PIETER FAURE affair, and joined a Division's cruise to collect deep-sea material. During 1959-1960 the collection received two donations of interesting fishes from Tristan da Cunha and Gough islands, and Queen Maud Land, Antarctica, respectively.[9]

Talbot appreciated the need to involve the public in the department's work and gave several public lectures a year.[10] His managerial and public relations skills were noticed by the museum administration and in January 1960 he was appointed assistant director.[11] Consequently, two more staff members joined the department in 1960. Michael J. Penrith from the CSIR's Oceanographic Unit at UCT was seconded to the museum as Talbot's assistant for the long-line project.[12] Dr John R. Grindley was appointed professional officer in charge of the marine invertebrate collections, except for the molluscs, which were still Barnard's domain.[13] The appointment of Grindley effectively marked the beginning of the separation in the department of collection management between fishes and invertebrates. It was formalized when Talbot went overseas on study leave and Penrith was appointed acting "Curator of Fishes."[14] Talbot's long-line programme added much material to the collection, including skeletons, jaws, and organ samples (i.e. livers and gill arches), billfishes and sharks.[15] Miss M.-L. Wapenaar (later Mrs. M. J. Penrith) joined the ichthyology section of the department in 1962 as a CSIR-funded research assistant, to study South African klipfishes (family Clinidae).[16] She collected intertidal fishes in

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[9] Report of the SAM for 1960, pp. 14-15.

[10] Report of the SAM for 1959, p. 11. Report of the SAM for the Period 1st April 1960 - 31st March 1961, p. 20.

[11] Summers, *A History*, p. 180.

[12] Report of the SAM for 1960, p. 15.

[13] Report of the SAM for 1960-61, p. 19.

[14] Report of the SAM for the Period 1April 1961 - 31 March 1963, p. 8.

[15] Report of the SAM for 1960-61, p. 19.

[16] Report of the SAM for 1961-63, p. 9.

several localities between Namaqualand (Atlantic coast) and KwaZulu-Natal in a series of field trips during 1962-1964. Consequently, about 1,700 specimens were added to the collection.[17] Talbot left the museum on 21 August 1964 to take a post at the Australian Museum, Sydney, and Grindley took charge of the department. A month after Talbot left, Barnard died. He served the museum for 53 years and was one of South Africa's greatest zoologists.[18]

The sound research infrastructure Talbot created allowed his well-trained assistants to carry on with their research and the department continued to develop. The renewed ties with the Division of Sea Fisheries developed into a long-lasting relationship. Donations of specimens from various surveys and fisheries research projects have since continued to come to the collection on a regular basis. By the mid-1960s, Penrith completed a study of the fish fauna of Tristan da Cunha and Gough islands, and the Vema Seamount. He then conducted a preliminary study of the biology of common sublittoral fishes of the Cape. In June 1967 his work at the museum was terminated and he was recalled to the CSIR Oceanographic Unit at UCT.[19]

Mrs. Penrith extended her studies of intertidal fishes to include South West Africa (now Namibia) and made collections in Luderitz, Swakopmund and Hondeklip Bay. She also joined two expeditions of the Department of Zoology of UCT to St. Lucia, KwaZulu-Natal, and brought back many interesting specimens.[20] A further extension of the shore-fish study took place in 1966 when the Penriths spent two months collecting in Angola and brought back about 450 specimens representing 93 species, as well as many specimens of crustaceans.[21] For her study of the South African klipfishes, Mrs. Penrith was awarded a Ph.D. from UCT in 1966. In the next five years she concentrated mainly on the rocky shore fauna of South West Africa and went on several expeditions to that area. She performed research on South African gobies (Gobiidae), clingfishes

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[17] Report of the SAM for the Period 1 April 1963 - 31 March 1964, p. 16.

[18] Report of the SAM for the Year Ending 31st March, 1965, p. 16. Summers, *A History*, p. 200.

[19] Report of the SAM for the Year Ending 31st March, 1966, pp. 19-20. Report of the SAM for the Year Ending 31st March, 1968, p. 16.

[20] Report of the SAM for 1965, p. 17.

[21] Report of the SAM for the Year Ending 31st March, 1967, p. 16.

(Gobiesocidae) and blennies (Blenniidae).[22] Penrith resigned in June 1970 to join her husband who was hired by the State Museum, Windhoek, South West Africa.[23]

Another project initiated by Talbot was the study of the systematics and distribution of South African skates (Rajidae), and he recruited P.A. Hulley to do the research. Hulley joined the staff in January 1965.[24] He was born in 1941 in Salisbury, Rhodesia (now Harare, Zimbabwe), where he also attended high school. He completed all his academic degrees at UCT from which he received a Ph.D. in 1971 for his work on skates.[25] Naturally, he contributed significantly to the family Rajidae as well as other elasmobranch families in the collection.[26] Soon afterwards Hulley's research interest shifted to deep-sea fishes (demersal and midwater). In 1968 he became familiar with the midwater fishes of the seas around South Africa while sorting and identifying the collection's holdings of these fishes, as well as specimens donated from ongoing surveys of the Division of Sea Fisheries along South Africa's Atlantic coast.[27] The German government awarded Hulley a postdoctoral fellowship in 1973 which he spent working with Dr G. Krefft at the Institut für Seefischerei, Hamburg. He worked on the lanternfishes (Myctophidae) collected by the German research vessel WALTHER HERWIG in the Atlantic Ocean. Since then, myctophids have constituted his main research group and he has worked on material from all oceans.[28] Hulley has participated in many research cruises, local as well as international. During these expeditions he collected on Vema Seamount (1966), the Southern Ocean (1974, 1975, 1985), the Sargasso Sea

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[22] Report of the SAM for the Year Ending 31st March, 1968, p. 16. Report of the SAM for the Year Ending 31st March, 1969, pp. 4, 12-13. Report of the SAM for the Year Ending 31st March, 1970, pp. 8-10.

[23] Report of the Trustees of the SAM for the Year Ending 31st March, 1971.

[24] Report of the SAM for 1965, p. 16.

[25] Hulley, personal communication.

[26] Report of the SAM for 1966, pp. 20-21. Report of the SAM for 1967, p. 14. Report of the SAM for 1971, p. 10.

[27] Report of the SAM for 1969, p. 12. Report of the SAM for 1972, p. 12. Report of the SAM for the Year Ending 31st March, 1973, p. 14.

[28] Hulley, personal communication. Report of the SAM 1973/74, p. 15. Report of the SAM 1974/75, pp. 14-15. Report of the SAM 1976/77, pp. 15-16.

(1979), along the South African east coast (1975-1981), the Mid-Atlantic Ridge (1982), Rockall Trough (1983), St. Paul and Amsterdam Islands (1986), and Columbine Canyon (1988).[29] Following in the foot-steps of Barnard and Talbot before him, Hulley took charge of the department in 1977, was appointed assistant director of the museum in 1985 and deputy director in 1988.[30]

In January 1966 the department started a larval fish project with a view to studying the development and to producing a key to the larvae of commercial fishes of the southwestern Cape. The Division of Sea Fisheries financed the cost of personnel, and the South African Fisheries Development Corporation sponsored the purchase of a microscope and a portable X-ray machine for the project.[31] The project employed three temporary researchers in succession: Mrs. E. Cluver from 1966 to 1968, Mrs. E. H. Haigh from 1968 to 1971 and Ms. A. E. Louw from 1971 to 1978.[32] In 1978 Louw became a museum staff member and carried the project to its end in 1983.[33] The Division of Sea Fisheries donated to the museum its entire larval fish collection for the project, including collections made during a monitoring programme, started in the 1950s, of the eggs and larvae of anchovy.[34] In 1975 the larval work was extended to the KwaZulu-Natal coast and the eastern Cape coast as a part of a multi-disciplinary study of the marine fauna of these areas. The project, initiated by the senior scientists of the department and funded by the CSIR, rose from the realization that the benthic and benthopelagic fauna of the east coast is not nearly as well known as that of the southwest coast.[35] Sampling was done in a series of five cruises (1975-1979) aboard the CSIR research vessel, the RV MEIRING NAUDÉ, during which a

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[29] Hulley, personal communication.

[30] *Ibid.* Report of the SAM 1977-78-79, p. iv.

[31] Report of the SAM for 1965, pp. 3-4. Report of the SAM for 1966, p. 21.

[32] Report of the SAM for 1966, p. 21. Report of the SAM for 1968, p. 16. Report of the SAM for 1972.

[33] A. E. Louw, personal communication, December 1992.

[34] *Ibid.* Report of the SAM for 1966, p. 21.

[35] E. Louw, "The South African Museum's *Meiring Naude* cruises Part 1. Station data 1975, 1976," *Annals of the South African Museum*, Vol. 72, No. 8, 1977, p. 147.

total of 256 stations were occupied. Most of the sampling was in 600 m or deeper; the maximum depth sampled was 2,880 m. Several types of nets were used to sample ichthyoplankton, midwater, and benthic fishes.[36] Scientists from other institutions, including W. Holleman of the JLBSI, participated in some of the cruises. Fishes collected during the project were lodged in the collection of the SAM and duplicated material was given to the JLBSI.[37]

After Penrith had left the department in 1970 Hulley remained the only ichthyologist on the permanent staff until 1989. The amount of material collected during the active research programmes of the 1960s and 1970s and the work it generated in the collection were more than he could cope with by himself. Consequently, M. Bougaardt and C. Goliath were employed in 1973 and 1983, respectively, as technical assistants in the fish collection.[38] Space in the marine biology building became a pressing problem fairly early.[39] The large specimen tanks purchased in 1966 were stocked, but had to remain outside. The type specimens and other important specimens of freshwater fishes were given to the Albany Museum on an indefinite loan and the remaining specimens were packed into a cupboard.[40] An innovative solution was devised to aid in retrieving specimens out of the large tanks. Specimens were placed in large punched plastic bags hanging from plastic coat hangers suspended from a rail across the top of the tank.[41] Some relief to the overcrowded collection came when more shelves were added and the large collection of stuffed fishes was transferred for storage in the building of the old South African Training College nearby.[42] An important improvement of the collection took place in 1970 when the type

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[36] *Ibid.*, pp. 149-158. E. Louw, "The South African Museum's *Meiring Naude* cruises Part 10. Station data 1977, 1978, 1979," *Annals of the South African Museum*, Vol. 81, No. 5, 1980, pp. 187-189.

[37] E. Louw, "*Meiring Naude* cruises Part 1," p. 149. Report of the SAM 1975/76, p. 12. Report of the SAM 1976/77, p. 14.

[38] Hulley, personal communication.

[39] See pages 43, 50.

[40] Report of the SAM for 1965, p. 4. Report of the SAM for 1966, p. 20.

[41] Report of the SAM for 1972, p. 7.

[42] Report of the SAM 1973/74, p. 16.

specimens were put on separate shelves from the rest of the collection and were transferred from formalin to ethanol.[43]

Although the bulk of specimen accessions during the 1960s, 1970s and 1980s came from the department's numerous research projects, donations from the public, the Division of Sea Fisheries, the fishing industry, and other museums have continued. Some of the more significant donations of the 1960s and 1970s included a valuable collection of fishes trawled in deep water, presented by a former mate of an Irvin & Johnson trawler, and a large collection of fishes trawled in shallow water from the Division of Sea Fisheries;[44] benthopelagic fishes from the Division of Sea Fisheries;[45] a small collection of myctophids from the University of Southern California;[46] a specimen of the rare oarfish, *Regalecus glesne*, donated in 1968;[47] the marine fish collection of the Transvaal Museum;[48] and a large collection of Antarctic and sub-Antarctic myctophids from the Institut für Seefischerei, Hamburg.[49] The Transvaal Museum collection included fishes from two sources, namely part of the collection of the German merchant Godeffroy from the South Seas and fishes collected by the University of the Witwatersrand, Johannesburg, mostly in KwaZulu-Natal.[50]

The most recent ichthyologist to join the staff of the department was L.J.V. Compagno. In 1989, after several years with the JLBSI, Compagno moved his Shark Research Centre to the SAM where he has continued with projects started at the former institution, and initiated a study on the ecological behaviour of the great white shark (*Carcharodon carcharias*).[51] Since his arrival

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[43] Report of the SAM for 1970, p. 8.

[44] Report of the SAM for 1964, p. 16.

[45] Report of the SAM for 1965, p. 17.

[46] Report of the SAM for 1967, p. 15.

[47] Report of the SAM for 1968, p. 17.

[48] Report of the SAM for 1972, p. 7.

[49] Report of the SAM 1976/77, p. 15.

[50] Hulley, personal communication. See also page 36.

[51] Annual Report of the SAM for the Year April 1989 to March 1990, p. 11.

at the department, the shark component of the collection has about doubled. Compagno is currently in charge of the fish collection.[52]

The Department of Ichthyology, Rhodes University

Within a year of its establishment,[53] the CSIR initiated a study of government grants to museums. Its preliminary review of museum research in natural sciences concluded that "...if fundamental systematic research is to be carried on most efficiently, there should be centralisation of specific activities." It also proposed that dedicated research institutions similar to the South African Geological and Botanical Surveys be created for the major groups of organisms, e.g. insects, marine animals.[54] The CSIR asked museums to respond to these ideas. J.L.B. Smith, then honorary curator of fishes at the Albany Museum, prepared a draft document motivating for the establishment of a fish research institute at the museum.[55] The CSIR review, the stress from his dual career in chemistry and ichthyology, his deteriorating health and the beginning of the SFSA book project helped crystallize his thoughts about leaving the Department of Chemistry and starting a Department of Ichthyology at RUC.[56]

There seems to be some uncertainty regarding the date for the establishment of the Department of Ichthyology at RUC. The most commonly cited date is 1946,[57] probably taken

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[52] L.J.V. Compagno, personal communication, December 1992.

[53] See page 8.

[54] S.H. Haughton, "Research in Museums," *South African Museum Association Bulletin*, Vol. 4, No. 1, 1946, pp. 1, 3.

[55] Records of the JLBSI, file A/5, Albany Museum, "Research work on fishes in the Eastern Cape," hand-written undated and unsigned draft document.

[56] Smith, "J.L.B. Smith," 'Ichthyology,' 'The coelacanth' and 'Birth of the research department of ichthyology.'

[57] M.N. Bruton, "Rhodes University's role," *Ichthos*, No. 12, 1986, p. 13. M.N. Bruton, "A passion for fishes," *South African Journal of Science*, Vol. 82, 1986, p. 622. JLBSI, Annual Report 1995/1996, p. 13. M.N. Bruton and P.C. Heemstra, "The life and work of Margaret M. Smith," *Ichthos*, No. 49, 1996, p. 9. J. Pote, "Historical highlights: The J.L.B. Smith Institute of Ichthyology and the Department of Ichthyology and Fisheries Science 1946-1996," *Transactions of the Royal Society of South Africa*, Vol. 51, 1996, p. 7. P.H. Skelton, "Fifty years of ichthyology in Grahamstown," *South African Journal of Science*, Vol. 92, 1996, p. 404.

from Margaret Smith's publications on the life of her husband and the JLBSI. In these articles she did not give a specific date for the creation of the department, but related it to the establishment of the CSIR in 1946, thus leading the reader to infer that this date also applied to the department.[58] However her use of 1946 in two other documents indicates that she did believe this was the year that the department had been created.[59] The sequence of events leading to the establishment of the department is as follows:

- The RUC Council approves the recommendation by the college Senate to make J.L.B. Smith associate professor in recognition of his "meritorious work in the college and outstanding achievement in the world of science" (21 June 1946).[60]
- The RUC Council takes note of the fellowship Smith received from the CSIR (26 August 1946).[61]
- The RUC Council: (1) approves a period of nine months leave for Smith from 1 January 1947 of which three months are with full pay, three on half pay and three with no pay, (2) accepts Smith's resignation from the Department of Chemistry as of 30 September 1947, and (3) appoints Smith a research officer in the Department of Zoology as from 1 October 1947 (20 September 1946).[62]

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[58] Smith, "J.L.B. Smith," 'Birth of the Department of Ichthyology.' M.M. Smith, "The JLB Smith Institute," p. 19. The CSIR was founded in 1945 and Smith was actually referring to the introduction of the university research grants system in 1946 (see page 8).

[59] Records of the JLBSI, file N/83, National Bureau of Educational and Social Research, biography of J.L.B. Smith attached to letter of 18 November 1975 from M. Smith to J.P. Brits and file O/5, Oceans Magazine, a biography dated 2 September 1970 accompanying draft article on the search for the world's oldest fish.

[60] RUC Council Minutes , Vol. 10, meeting held at 4 p.m. on Friday, 21st June, 1946, p. 3. Records of the JLBSI, file C/27, CSIR correspondence with Registrar, letter of 25 June 1946 from the registrar to J.L.B. Smith.

[61] RUC Council, adjourned meeting held at 2.30 p.m. on Monday, 26th August, 1946, p. 2.

[62] *Ibid.*, adjourned meeting held at 8 p.m. on Friday, 20th September, 1946, p. 2.

- J.L.B. Smith submits to the RUC Council a motivation for the establishment of an independent Department of Ichthyology and a school of post-graduate research in ichthyology (9 May 1947).[63]
- The RUC Council approves that "though working in the Department of Zoology, Dr Smith be independent of the Professor of Zoology." It also accepts the motion by the master of the college to amend the resolution of 20 September 1946 making Smith a research officer, now appointing him as "Professor in Ichthyology" (16 May 1947).[64]

To understand this series of council decisions it is necessary to view them in the larger context of Smith's work and of RUC itself. In the early 1940s, following the successful 1938 expedition to Mozambique and the finding of the first coelacanth, Smith was thinking of abandoning organic chemistry and devoting all his time to ichthyology.[65] Two important events helped tip the balance to ichthyology. The first, and to my mind the most important, was the SFSA book project.[66] When he was approached in 1945 to undertake this project it was like a dream come true.[67] He had been thinking about such a project for a while, but was deterred by its apparent cost.[68] The second was his successful application for a CSIR fellowship.[69] Armed with a long-term project and long-term funding, both from government and from the sponsors of SFSA, he felt he could take the plunge and leave chemistry. The decisions taken by the RUC Council reflect what he

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[63] Records of the JLBSI, file C/27, Rhodes Registrar, letters of 9 May and 25 June 1947 from J.L.B. Smith to the RUC registrar.

[64] RUC Council, meeting of 16th May, 1947, pp. 5, 13. Records of the JLBSI, file C/27, Rhodes Registrar, letter of 2 June 1947 from the RUC registrar to J.L.B. Smith.

[65] Records of the JLBSI, file L/11, Hugh Le May, letter of 24 November 1947 from Smith. Smith, *Old Fourlegs*, p. 67.

[66] See pages 88 to 89.

[67] Records of the JLBSI, file L/11, letter of 26 September 1945 from B.A. Key to J.L.B. Smith.

[68] Smith, *The Sea Fishes*, p. 1.

[69] RUC Council, adjourned meeting of 26th August 1946, p. 2. Smith, *The Sea Fishes*, pp. xiii, 3. Smith, "The JLB Smith Institute," p. 19. Skelton, "Fifty years of ichthyology," p. 404.

achieved through negotiations with the administration of the college. Being the determined person he was, Smith most likely wanted to work full-time on fishes immediately, but had to complete his teaching and other commitments in the Department of Chemistry for 1946. He was not prepared, however, to wait for the implementation of his fellowship and opted to take leave so he could be free to work only on fishes from the beginning of 1947. Consequently, one could regard 1 January 1947 as the de facto beginning of the Department of Ichthyology. However as indicated by the council decisions of 20 September 1946 above, at that point in time Smith was officially on leave and was still regarded as a staff member of the Department of Chemistry. The earliest official date for the establishment of the Department of Ichthyology is the appointment of Smith as professor of ichthyology on 16 May 1947. The first time the department is officially referred to as an academic entity by the RUC administration is in a May 1947 report to the council,[70] but it was rubber-stamped by the council in August that year.[71]

The question of how the department came into being relates to the period 1945-1947. To most people ichthyology in Grahamstown is synonymous with the coelacanth. Indeed, the coelacanth was a tremendous discovery that catapulted J.L.B. Smith to world fame, and there is little doubt that it was a factor in the RUC decision to establish the Department of Ichthyology. By 1945 coelacanth excitement had subsided and there were other factors at play which were even more important for the birth and the survival of the new department. The background issues – the serious financial difficulties the RUC experienced during 1946-1950 and the founding of the CSIR in 1946 – are described in detail elsewhere.[72] When Smith was appointed professor of ichthyology in 1947 RUC was on the verge of bankruptcy[73] and it could not afford to ignore

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[70] RUC Council, Vol. 10, "Memorandum on the progress of the Rhodes University College 1937-1947," attached to letter of 26 May 1947 from the master of the college to the chairman of the council, pp. 7, 12, 13 refer to the "new Chair of Ichthyology."

[71] *Ibid.*, meeting held at 2:15 p.m. on Friday, 15th August, 1947, pp. 4-5. Records of the JLBSI, file C/27, Rhodes Registrar, letter of 19 August 1947 from the RUC registrar to J.L.B. Smith.

[72] Kingwill *The CSIR* (but see also page 8). R.F. Currey, *Rhodes University 1904-1970, a Chronicle* (Grahamstown, 1970).

[73] Records of the JLBSI, file L/11, undated and unsigned copy of a letter from the master of the college to H. Le May [reference made in the letter to "special powers" to handle the RUC

Smith's fund raising skills. He had already secured public funding for the SFSA project,[74] and his published body of research on fishes (29 scientific papers by the end of 1945)[75] and coelacanth fame had won him one of the first four CSIR research fellowships awarded to South African scientists. At the end of 1947 he played a role in a large donation RUC received from the main SFSA sponsor, H. Le May,[76] and was negotiating with the latter the building of a new ichthyological laboratory.[77]

Though a little known aspect of the history of the Department of Ichthyology and the JLBSI, the relationship between the Smiths and the Le May family played a major role in the history of South African ichthyology through the Le Mays' support of the Smiths' work. Hugh Le May, born in 1881 in Westerham, Kent, U.K., came to South Africa during the Anglo-Boer War. He made his wealth in the mining industry and settled in Lourenço Marques (now Maputo), Mozambique.[78] Although Le May was familiar with RUC through his youngest son, Godfrey, who studied and later taught there,[79] he was apparently not aware of J.L.B. Smith and his work on southern African fishes. A keen angler, he was frustrated, as Smith initially was, with the inadequate references available to the layman about southern African fishes.[80] While fish were the

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financial emergency implies that the letter was written by Dr T. Alty who became master in October 1948 and received the special powers following a special council meeting on 2nd December 1948] and file M/69, letter of 29 January 1952 to Mr F.J.H. le Riche.

[74] *Ibid.*, file L/11, letter of 15 November 1947 from J.L.B. Smith to the RUC registrar.

[75] Smith, "J.L.B. Smith," pp. 186-187.

[76] Records of the JLBSI, file L/11, Smith's hand-written comments on his meetings with H. Le May on 12 November 1947. RUC Council, meeting held at 2.15 p.m. on Friday, 21st November, 1947, p. 7.

[77] Cross-reference to the Le May lab.

[78] Le May, Hugh, in K. Donaldson, ed., *South African Who's Who* (Johannesburg, 1947-1948), p. 439. RU, Letters, Deputy Registrar, J.C.S. Lancaster, undated memo to the vice-principal on the Hugh Le May Fellowship.

[79] RU, Letters, memo from Lancaster to the vice-principal. Records of the JLBSI, file L/11, undated and unsigned copy of a letter from the master of the college to H. Le May. RU, Cory Library, MS 16,534, Public Oration - Le May 1953, p. 2.

[80] Smith, *The Sea Fishes*, p. 1.

reason for the partnership between J.L.B. Smith and H. Le May, what brought them together in the first place was birds. In 1940 the publication of a new book on South African birds introduced the natural history guide book format to South Africa.[81] This book inspired Le May into thinking about producing a similar book about fishes, but he needed a scientist to do the work. He discussed the matter with his Johannesburg accountant B.A. Key, also a person with a keen interest in the natural history of southern Africa, and told him that he would sponsor such a book if there was someone to write it.[82] Key, who was an amateur botanist particularly knowledgeable about South African aloes,[83] mentioned Le May's proposition to Dr R.A. Dyer, the then director of the Botanical Research Institute in Pretoria.[84] Following Dyer's advice, Key wrote to Smith on 26 September 1945 thereby initiating the relationship with Le May.[85] On behalf of Le May, he offered to contribute £1,000 towards the production of the book and loosely described Le May's concept of the book, including its appeal to the layman, many colour illustrations and the provision of "...the different names that a fish was known by..." [referring to common names]. He also suggested that Smith should visit H. Le May in Lourenço Marques.[86] When Smith accepted the offer, Key contacted John Voelcker, the General Manager of African Explosives and Chemical Industries, amateur ornithologist and angler who was involved in the production of Roberts' bird book, and convinced him to join the fish book venture. They created a trust, the Sea Fishes of Southern Africa Book Fund, chaired by Voelcker and with Key as honorary secretary.[87] Like Le May and Voelcker, the other trustees were also prominent business people in South

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[81] A. Roberts, *The Birds of South Africa* (Johannesburg, 1940).

[82] Records of the JLBSI, file L/11, letter of 26 September 1945 from B.A. Key to J.L.B. Smith. Smith, *The Sea Fishes*, pp. xiii, 1.

[83] Records of the JLBSI, file K/20, B.A. Key, letter of 5 November 1948 from Smith.

[84] Brown, *Scientific Endeavours*, pp. 261, 494.

[85] Records of the JLBSI, file L/11, letter of 26 September 1945 from Key to Smith and letter of 29 March 1948 from B. Le May to Smith.

[86] *Ibid.*

[87] Smith, *The Sea Fishes*, p. xiii. Voelcker, John, in Donaldson, *Who's Who* (1946), p. 439.

Africa at the time. They were Guy Carlton Jones, the resident director of New Consolidated Gold Fields, also a keen angler, and James H. Crosby, then joint general manager of the Johannesburg Consolidated Investment Company, chairman of mines managed by the Barnato Group and chairman of the Central News Agency (CNA) which later published SFSA.[88] Unfortunately Key and Carlton Jones never saw the fruit of their work as they passed away before the book was published.[89] Following the costing of the book by the trustees, Le May raised his contribution to £5,000, by far the largest donation of all the subscribers to the book fund, without which it would have been impossible to produce SFSA. Subscription to the book fund was by invitation. In late 1947, as part of the SFSA fund-raising effort, Smith staged an exhibition of the SFSA colour plates for the trustees and the subscribers at the Johannesburg City Library. A public exhibition followed at the Transvaal Museum, Pretoria. These were successful events at the end of which the book fund had nearly £9,000, and Smith and his book project gained a high public profile.[90] By March 1949 contributions made by nearly 200 subscribers recruited throughout the project increased the book fund to about £10,000.[91]

Le May apparently added his own weight to the establishment of the Department of Ichthyology, though he must have done it quietly and behind the scenes because there seems to be no official record of his involvement. The evidence for it surfaced over 20 years later in the correspondence between M.M. Smith and Le May's son, Basil. Basil Le May had a special relationship with the Smiths. He joined them on their second expedition to Mozambique in June-July 1946 and proved to be not only a good worker but also an entertainer. Shortly after returning to Grahamstown, J.L.B. Smith wrote to the young Le May praising him for the work he had done during the expedition and suggested that he should consider pursuing an acting career in Hollywood! Three years later he told Le May that he was naming a moray eel, *Lycodontis lemayi,*

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[88] Donaldson, *Who's Who* (1946), pp. 139, 281.

[89] Records of the JLBSI, file K/20, letter of 3 December 1948 to J.L.B. Smith and file L/11, letter of 28 March 1949 to the RUC registrar [hand-written note at the bottom of the page.]

[90] *Ibid.*, file L/11, letter of 15 November 1947 from J.L.B. Smith to the RUC registrar.

[91] *Ibid.*, file K/23, H. Kohlberg, letter of 14 March 1949 from J.L.B. Smith.

for his appearance in a certain party dress at the Smiths' residence in Lourenço Marques.[92] Later on Le May took over his father's place in the SFSA book fund and eventually became the chairman of that book fund. It was in this capacity that M.M. Smith wrote to him early in 1969 soon after she had become director of the JLBSI. She told him that it was his father, H. Le May, who "pushed" for the establishment of the Department of Ichthyology in the 1940s.[93] She asked B. Le May to give her the same support for the newly established JLBSI that his father had given her husband for the department. She got what she asked for. Le May remained involved in Institute affairs. He represented the SFSA book fund on the editorial board for the revision of the book;[94] in 1975 and 1976 he donated R5,000 and R2,000, respectively, for the Basil Le May Scholarship for ichthyology students;[95] he was with Smith on her first visit to the Department of National Education (DNE), lobbying successfully for a national museum status for the JLBSI;[96] and in 1980 he donated R5,000 for the revision of SFSA.[97] Unfortunately Le May did not see the revised book published as he died on 17 January 1984.[98]

For the SFSA project J.L.B. Smith went on two more expeditions to Mozambique. The first one (June-July 1946) was a very successful expedition which benefited from the contacts he had established with the Portuguese authorities at Lourenço Marques during his 1938 visit. The colonial government in Mozambique was obviously interested in Smith's work as they provided

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[92] Records of the JLBSI, file L/9, Basil Le May, letters of 5 August 1946 and 21 January 1949 from Smith.

[93] *Ibid.*, letter of 12 March 1969 from M.M. Smith.

[94] JLBSI, Twelfth Annual Report, p. 12 and Sixteenth Annual Report for the period 1st April 1983 - 31st March 1984, p. 8.

[95] JLBSI, Annual Report 1975-1976, p. 10. "Director's Report" attached to minutes of Board meeting of 19th September 1977, p. 3. Records of the JLBSI, file L/9, letters of 3 November 1975 and 5 January 1977 from M.M. Smith.

[96] Records of the JLBSI, file L/9, letter of 1 February 1980 from M.M. Smith.

[97] *Ibid.*, letter of 21 August 1980 from D.S. Henderson. See also page 143.

[98] JLBSI, Sixteenth Annual Report, pp. 8, 12.

him with various facilities, including transport, boats, and personnel to help with the work.[99] The authorities also supplied and permitted the use of explosives for collecting fishes.[100] Smith used explosives and poison to collect tropical reef fishes because nets proved useless, and many species were not attracted to bait. He collected in Delagoa Bay, including Inhaca Island, but received several specimens from as far north as Inhambane. The material Smith obtained during this expedition contained 13 new species (including three new genera) and 52 new records to southern Africa.[101] The second expedition, in 1948, was as well organised and as successful as the first one. The Smiths collected along the coast of Mozambique, from Inhaca Island to just south of Beira. The material included five new species and 27 species previously unknown from southern Africa.[102] Between the two expeditions J.L.B. Smith received a donation of fishes collected in and around Delagoa Bay by Professor C.J. van der Horst from the University of the Witwatersrand. In this material Smith found a new species and 10 records new to southern Africa.[103] Preparing the text and illustrations for SFSA was a monumental task. In fact, when he received Le May's proposal to do the book, Smith did not think it could be done because of the amount of work that the species illustrations would require. His wife convinced him that it could be done by using students of the RUC Art School as illustrators.[104] One of the most important objectives of the 1946 expedition was to take photographs and colour notes of the various species so that they could be illustrated for the upcoming book. The Smiths assembled a team of four artists and a photographer who joined the expedition. The process of preparing an illustration was long. Each illustration was drawn first in pencil then checked by one or both Smiths, and once approved inked

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[99] J.L.B. Smith, "New species and new records of fishes from South Africa," *Annals and Magazine of Natural History*, Ser. 11, Vol. 13, No. 108, 1947, p. 793-794. Smith, "Forty-two fishes new to South Africa, with notes on others," *Annals and Magazine of Natural History*, Ser. 12, Vol. 2, No. 14, 1949, p. 97. Smith, *The Sea Fishes*, p. 3.

[100] Smith, "New species and new records," p. 793.

[101] *Ibid.*, pp. 797-817.

[102] Smith, "Forty-two fishes," pp. 97-111.

[103] J.L.B. Smith, "Brief revisions," pp. 335-346.

[104] M.M. Smith, "The history of the Sea Fishes book," *Ichthos*, No. 12, 1986, p. 4.

and coloured in. A difficult fish could take up to 68 hours to complete.[105] The students left their employment at the end of 1946, but by then M.M. Smith, who had drawn fishes before, was already skilled enough to take over the job and do all the remaining illustrations.[106] To cope with the huge load of work J.L.B. Smith strived for the ultimate efficiency. "He cut music out of his life...Practical efficiency was all-important...and all non-essentials ruthlessly trimmed away."[107] The Smiths worked well together. He was able to proceed rapidly with the scientific work because his wife handled all other aspects. "She held the whole project together...was always cheerful, meeting needs, coping with crises, foreseeing difficulties, explaining arrangements, smoothing ruffles, never ruffled herself, her special charm pervading all."[108] SFSA was published in June 1949 and was an immediate best seller. Stocks in coastal towns were sold out within a week and all 5,000 books of the first edition were disposed of within 3-4 weeks.[109] The book fund made a modest profit of £350 and decided on a second print run of 500 books.[110] J.L.B. Smith and SFSA received much praise from scientists in South Africa and abroad, including statements such as "...you have attained a permanent position in South African history as one of our great men...";[111] "...the finest piece of work I have seen for a long time...invaluable to all workers in the field of ichthyology;"[112] and "...a monumental work that assures you a permanent place among the few who have contributed much to the furtherance of the knowledge of our fauna."[113] The

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[105] *Ibid.* D.M. Davis, "1946 and all that," *Ichthos,* No. 12, 1986, p. 6.

[106] Smith, "The history," p. 4.

[107] Davis, "1946 and all that," p. 6.

[108] *Ibid.*

[109] Records of the JLBSI, file L/11, letter 29 August 1949 from J.L.B. Smith to H. Le May and letter of 12 August 1949 from J. Voelcker to H. Le May and file M/22, University of Michigan, letter of 30 November 1949 from J.L.B. Smith to R. Miller.

[110] *Ibid.*, file L/11, letters of 12 August and 14 September 1949 from J. Voelcker to H. Le May.

[111] *Ibid.*, file S/37, Dr S.G. Shuttleworth, letter of 24 June 1949 to J.L.B. Smith.

[112] *Ibid.*, file M/27, T.C. Marshall, letter of 26 May 1950.

[113] *Ibid.*, file S/39, Dr & Mrs S.H. Skaife, letter of 18 July 1949.

success of SFSA was followed by requests and offers of financial support for a similar book on the freshwater fish fauna of South Africa, but Smith had already made up his mind to produce a book on the fishes of the western Indian Ocean (WIO).[114] Although Smith accepted the hardship of three and a half years of unrelenting scientific effort, he was bitter about his battles with the trustees of the book fund. Writing to a colleague in the U.K. he said:

> The whole thing, from before the actual start, has been one long desperate and grim battle, right to the very end. The money was not just provided...Behind the pleasant words in the introduction lies a whole series of desperate engagements with people whose outlook on life are not yours and mine...I suppose I have become exceedingly ruthless because I was determined to see this work published...I have emerged unscathed, but with few illusions about the princes of commerce and very much tougher than I ever expected I could become...I have had to fight with tooth and claw for all this.[115]

One battle Smith lost to the trustees had to do with a dedication page for H. Le May that he wanted to have at the beginning of the book. The trustees did not like what he prepared.[116] Le May himself did not want the dedication page at all, but in the face of a relentless Smith he eventually prescribed his own text to Smith.[117]

Le May and Smith were both keen anglers and their shared interest in fishes provided the initial bond in their relationship. Smith trusted Le May to the extent that he considered him his ally in battles with the trustees of SFSA over various aspect of the production of the book.[118] Le May visited Grahamstown in mid-November 1947.[119] He was apparently appalled by the working

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[114] *Ibid.*, N/17, Nuffield Foundation, letter of 16 March 1951 (Appendix A) from J.L.B. Smith to the Liaison Committee of the Nuffield Foundation.

[115] *Ibid.*, file S/24, Prof. T.A. Stephenson, letter of 22 September 1949.

[116] *Ibid.*, file K/20, minutes of the tenth meeting of the trustees of the Sea Fishes of Southern Africa Book Fund held on 29 September 1948.

[117] *Ibid.*, letter of 5 November 1948 from B.A. Key to J.L.B. Smith. See also page 99.

[118] Records of the JLBSI, file L/11, letter of 21 October 1947 from Smith.

[119] *Ibid.*, letter of 15 November 1947 from Smith to the RUC registrar.

conditions at the Department of Ichthyology he had helped create.[120] At that time Smith occupied the study of Professor J. Omer-Cooper, then head of the Department of Zoology, and was promised the use of a garage on campus to store his collection.[121] He frequently asked for more space and often complained to the RUC authorities about the poor state of repair of the building and how this affected his work.[122] Smith summarised what transpired during Le May's visit in the following cryptic hand-written note:[123]

> Le May Phoned on 10:30 – Swore about lab and having to have sec with me. Asked about circs and prospects. Eventually offered new lab – asked how much – said £5000. Said had not the money at the moment, would pay by Jan. Told about Fellowship (really to smooth things here for the Copper nob!). Offered to pay ½ fellowship at once to me for lab – refused. Worried, reassured often he could afford. Said family well provided for (& be d-d to them). Gave me prom. note on his card. Went to Carlton – he wanted whisky – had to have pink gin.
> 12 noon. Boet. Showed card, said no good, get proper note. Drafted.
> 3 pm. H Le M again. Again offered to split Fellowship. Refused. Asked for proper [promissory] note, agreed – fixed. Urged me to start fund for family – rather vague. Offered to send details from JB. Said he had told S-T [Dr J. Smeath Thomas, then master of the RUC] about £5000 over lunch hour.
> Didn't want name on laboratory. Refused permission to say anything to papers.

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[120] See page 89 and footnote 93

[121] Records of the JLBSI, file C/27, Rhodes Registrar, note of 3 December 1946 from J. Omer-Cooper to J.L.B. Smith and letter of 24 October 1947 from the RUC registrar to J.L.B. Smith.

[122] RUC Council, meeting held at 2.15 p.m. on Friday 17th October, 1947, p. 10. Records of the JLBSI, file R/3, Registrar 1947-1952, letters of 26 May 1948, 13 October 1949 and 11 March 1950 from Smith to the registrar and file M/15, Vice Chancellor, "Note of position in this College," an undated and unsigned confidential note to the master of the college [obviously written by Smith, this summary of the history of ichthyological work at the college, most likely, was prepared for the report on the college Smeath-Thomas presented to council at the end of his term; see footnote 70 and Currey, *Rhodes University*, p. 100.]

[123] Records of the JLBSI, file L/11, J.L.B. Smith's handwritten abbreviated account of his meetings with Le May on 12 November 1947.

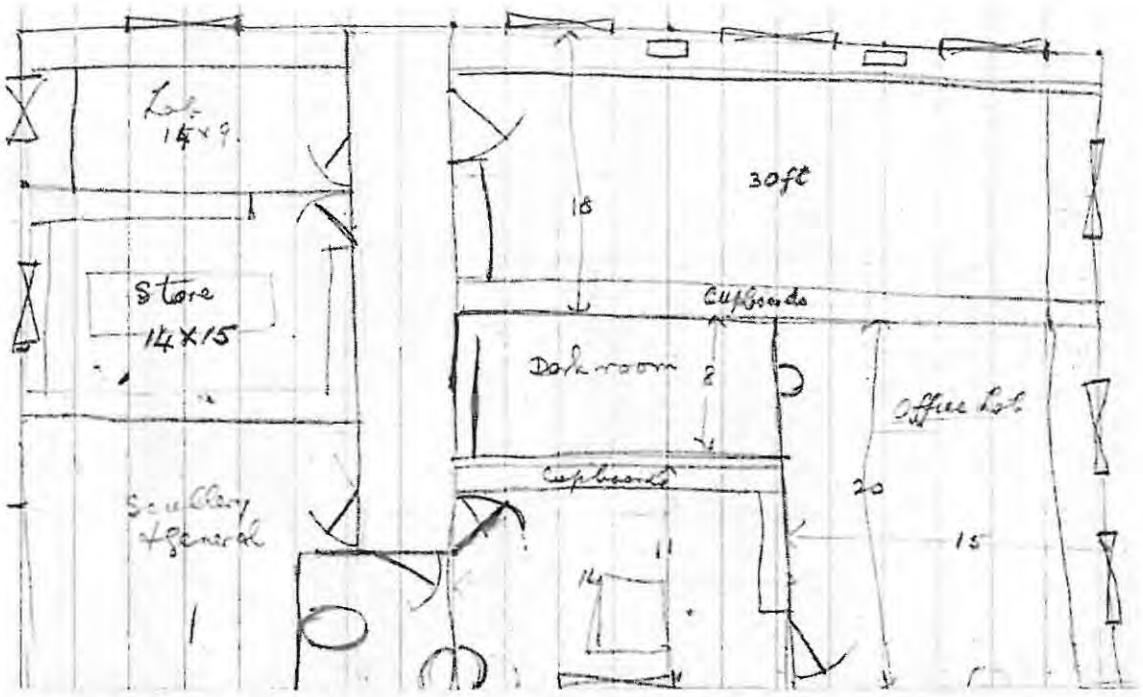

Figure 6. A floor diagram of the new ichthyological laboratory found in J.L.B. Smith's correspondence with H. Le May.

The reference to the new laboratory indicates that the phone call from Le May came following his visit to the Department of Ichthyology. Obviously, he commiserated with Smith's poor working conditions, but the use of the word "Eventually" suggests that Smith may have guided him into offering a donation for a new laboratory. They may have even discussed a tentative floor plan for the new laboratory (Fig. 6).[124] The "Fellowship" Smith refers to is the £10,000 Le May donated to RUC for the Hugh Le May Fellowship,[125] and the comment in parentheses implies that it was done to help his redhead son Godfrey, also known as 'Copper', who was a RUC student during the 1940s.[126] It seems that Le May could not make the laboratory donation immediately, so he offered to split the fellowship donation to give Smith the money he needed. Smith refused and

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[124] *Ibid.*, undated sketch of laboratory floor plan.

[125] RUC Council, meeting of 21st November, 1947, p. 7.

[126] Records of the JLBSI, file L/11, undated and unsigned copy of a letter from the master of the college to H. Le May. RU, Letters, memo from Lancaster to the vice-principal. P.R. Maylam, personal communication, 22 July 2002.

Le May made a commitment on a card to pay him later. Le May then went to have lunch with Smeath-Thomas at the Carlton Hotel (now Checkers supermarket) and told him of his promise to donate £5,000 for a new ichthyology laboratory. Meanwhile, Smith showed Le May's card to a friend ("Boet"), presumably a lawyer, who said the card had no legal standing and they drafted a proper promissory note.

Smith wasted no time. He informed the senate and council of RUC of Le May's promise to pay for a new laboratory for the Department of Ichthyology,[127] got them to approve a building site and set about designing the building with the college's architect.[128] He was so confident about Le May's promise that soon after their meeting he told many people about it. To the director of the Natal Museum he wrote: "I just received a donation of £5000 which...will enable me to build a really decent...Department, something I have dreamt of for some time."[129] A seemingly minor hitch developed in January 1948 when Le May re-scheduled his fellowship donation to the RUC due to the tightening of exchange controls in colonial Mozambique. He assured Smith that these changes would not affect SFSA because his donation to that project had already been transferred to the book fund, but he did not mention the laboratory.[130] Responding to a query by Smith, Le May offered to pay towards the laboratory using income he was expecting in South Africa in July 1948 and January 1949, but warned that unless the world economy improved the money would not be available until July 1949.[131] In February 1948 Le May reassured Smith that he had made arrangements for the transfer of the fellowship and the laboratory donations to RUC. The grateful Smith wrote back that it "...means a tremendous amount to me. I have never had a decent place

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[127] Records of the JLBSI, file L/11, letter of 15 November 1947 from Smith to the registrar.

[128] RUC Council, Vol. 10, executive committee, meeting held at 2.30 p.m. on Friday, 5th December, 1947, p. 3 and Vol.11, executive committee, meeting held at 4 p.m. on Wednesday, 3rd March, 1948, p. 2.

[129] Records of the JLBSI, file L/5, Natal Museum (to 1967), letter of 20 November from J.L.B. Smith to R.F. Lawrence.

[130] *Ibid.*, file L/11, letters of 17 January 1948 from Le May to Dr Smeath Thomas and Smith.

[131] *Ibid.*, letter of 22 January 1948 from Smith to Le May and letter of 28 January 1948 from Le May to Smith.

to work in...always had to manage in corners...".[132] Le May visited Grahamstown again in April 1948 and met Smith. Subsequent to this meeting a serious misunderstanding started developing between the two men. The meeting must have been informal as there is no written record of it, but references to the meeting in later correspondence show that each of the men interpreted it in a different way. While Le May was under the impression that Smith agreed to trade the laboratory donation with money for equipment,[133] Smith expected Le May to deliver the donation.[134] Smith's correspondence with Le May's accountant in Johannesburg, B.A. Key, about the contentious donation annoyed Le May.[135] The sour atmosphere between the two men is evident from Le May's business-like typed letter (all previous letters had been hand-written) telling Smith that he had withdrawn the laboratory donation, and from Smith's response: "Please don't [sic] send me any more unpleasant letters. I think you have been misunderstanding me. I am not chasing after you for money."[136]

Key saved the relationship from total collapse. Acting as a mediator between Smith and Le May during late 1948 he gained a good understanding of the affair.[137] He realised that it was all due to a misunderstanding and convinced Le May to revive the laboratory offer under clearly set conditions that Smith accepted. He also sent Smith a letter offering his interpretation of the events that led to the crisis. Smith then wrote a letter of apology to Le May and took

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[132] *Ibid.*, letter of 18 February 1948 from Le May to Smith, but no dates for payments [the 'arrangement' is most likely the power of Attorney given to his Johannesburg accountant, B.A. Key, mentioned in the letter of 6 April to Smith] and letter of 4 March 1948 from Smith to Le May.

[133] *Ibid.*, letters of 5 September and 22 October 1948 from Le May to Smith.

[134] *Ibid.*, letter of 31 August 1948 from Smith to Le May and letter of 14 October 1948 from Smith to B.A. Key.

[135] *Ibid.*, letters of 14-29 October.

[136] *Ibid.*, letter of 1 November 1948 from Le May to Smith and letter of 16 November from Smith to Le May.

[137] *Ibid.*, correspondence of August-December 1948.

responsibility for the whole affair.[138] Key died unexpectedly soon after he had notified RUC of the revival of the donation.[139] RUC then enquired and received confirmation of the offer from Key's associates who reiterated the conditions for the donation, including a government grant of a similar amount.[140] RUC apparently applied for a government subsidy to complement Le May's donation and even received unofficial confirmation that it would very likely be granted.[141] Nevertheless the donation never came to fruition and apparently drifted into oblivion when Smith resigned from the college in November 1949 to take up the position of director at the Natal Museum, Pietermariztburg.[142]

Although Smith and Le May shared an interest in fish and worked together on SFSA they had very different personalities. Living in Mozambique and owning businesses and investments in more than one country, Le May had to be careful in the way in which he handled his finances. In addition, Le May was a modest man who shied away from publicity and disliked flattery. On the other hand, for Smith, who made constant use of the media, flattery was essential to his fund-raising strategy and, I am convinced, an integral part of his personality. He simply liked to please people and could not help himself doing it to Le May throughout the affair, even after Key had clearly told him that Le May disliked it.[143] Smith breached Le May's confidence twice even though he was well aware of Le May's wish for anonymity. Informing the RUC management of Le May's laboratory donation he said: "This I accepted on condition that the structure should be named the

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[138] *Ibid.*, letter of 13 January 1949 from Key to Smith and letters of 19 January 1948 from Smith to Key and to Le May. See also page 125.

[139] Records of the JLBSI, file L/11, letter of 28 March 1949 from Key to the registrar. RUC Council, Vol. 11, finance committee meeting held at 2.15 p.m. on Friday 8 April, 1949, p. 2.

[140] Records of the JLBSI, file L/11, letter of 19 May 1949 from Vaughan, Key & Payne, accountants to the registrar.

[141] *Ibid.*, file M/15, letter of 25 February from Alty to Smith.

[142] RUC Council, finance committee meeting held at 2.15 p.m. on Friday 11 November, 1949, p. 5.

[143] Records of the JLBSI, file L/11, letter of 13 January 1949 from Key to Smith and letter of 19 January 1948 from Smith to Le May. See also page 112.

'HUGH LE MAY ICHTHYOLOGICAL RESEARCH LABORATORY.'"[144] A newspaper article announcing the laboratory donation did appear even though Le May adamantly rejected Smith's persuasion.[145] Although he seemed to have taken it in his stride, he did give Smith a subtle warning that not all was well, saying that he hoped none of his Portuguese friends would read the article, and that it could "make me hang my head and give me indigestion."[146] At the same time Smith repeatedly asked Le May to provide him with a photograph which he planned to include in the dedication page for Le May in SFSA. He went as far as asking Le May's family to help him obtain the photo. He also tried to flatter Le May into making a donation for the marine biological research station, to be named for him, planned for Inhaca Island, Mozambique.[147] Smith failed to understand that Le May was a true philanthropist who needed no recognition beyond his own conviction that he was donating for a good cause. He could not fathom Le May's refusal to have the laboratory named after him and a dedication page with his photograph in SFSA.[148] As Key told Smith, Le May simply got annoyed by his pressing flattery[149] to the point that he did not want to be associated with the laboratory any more. Smith was a master of public relations and fund raising and the Hugh Le May Ichthyological Research Laboratory fiasco was his most spectacular failure. It was his one and only attempt to get a proper laboratory for fish research built at RU. For the rest of his life he regarded it a low priority not worthy of his time.[150] He eventually took over the old zoology building, frequently referred to as the Military Building (Fig. 7), when the Department of Zoology moved to new accommodation at about 1950. The department remained

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[144] Records of the JLBSI, file L/11, letter of 15 November 1947 from Smith to the registrar. RUC Council, Vol. 10, meeting of 21 November 1947, p. 7.

[145] Records of the JLBSI, file L/11, letter of 18 November from Smith to Le May and letter of 26 November from Le May to Smith.

[146] *Ibid.*, letter of 3 December 1947 from Le May to Smith.

[147] *Ibid.*, letters of 24 November 1947 (private) and of 12 January 1948 from Smith to Le May, and letter of 29 March 1948 from B. Le May to J.L.B. Smith. See also page 129.

[148] Records of the JLBSI, file L/11, letter of 24 November 1947 from Smith to Le May.

[149] *Ibid.*, letter of 24 November from Smith to Le May.

[150] *Ibid*, file S/11, Dr R. Shuttleworth, letter of 5 August 1968 from M.M. Smith.

Figure 7. The Department of Ichthyology at RUC.

in this building until the new building of the JLBSI was completed in 1975.[151] We will never know exactly why Smith rejected Le May's idea of splitting the fellowship donation to pay for the laboratory.[152] From the narrow point of view of the needs of the Department of Ichthyology at that time it was a decision with historical consequences.

In December 1949 the Department of Ichthyology came within a few days of becoming history. Looking for a new director, the Natal Museum, Pietermaritzburg, approached Smith for the job.[153] Smith was already aware of the difficulties the museum experienced in finding a successor to R.F. Lawrence from his correspondence with the latter, and even made a few suggestions for suitable candidates in 1947.[154] Despite his strong desire to be in KwaZulu-Natal he initially declined the museum's offer believing that having no qualification or experience in

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[151] M.M. Smith, "It all started this way," *Ichthos*, No. 15, 1987, pp. 1-2.

[152] See page 94.

[153] Records of the JLBSI, file L/5, Natal Museum (to 1967), telegram of 5 September 1949 from the Natal Museum to J.L.B. Smith in Mozambique and file N/28, Natal Museum, letters of 15 and 21 July 1949 from and to O.L. Shearer, respectively.

[154] *Ibid.*, file L/5, Natal Museum (to 1967), letters of 25 July and 25 August 1947 from J.L.B. Smith to R.F. Lawrence.

exhibition and education he was not suitable for the job.[155] He told one of the museum trustees that it was the most difficult decision in his life.[156] Smith handled the negotiations in a very uncompromising way. He made it clear to the trustees that he would accept the post only if his "...research work could go on virtually unhampered." To that end, he required that the museum would provide him with "...a senior responsible assistant to relieve me of the less important routine details which would interfere with my researches."[157] He also required a personal assistant for his scientific work and essentially forced the Board of Trustees to appoint his wife to this position arguing that she was the best person for the job. Her appointment also involved the issue of his salary. Because the museum could not afford to pay the salary he wanted he suggested that the difference could make his wife's salary.[158] In addition, to make the position more attractive to Smith the Board of Trustees and the acting director suggested arranging an honorary appointment with the University of Natal for Smith and negotiated with the Natal Parks Board a possible appointment as an advisor on inland fishes.[159] Satisfied that the Board of Trustees accepted all his demands Smith accepted the museum's appointment and duly released the news, through the South African Press Association, to local and regional media.[160] He resigned from the Department of Ichthyoloy and obtained permission from RUC and the Albany Museum to take to KwaZulu-Natal a selection of fish specimens and his library on a long-term loan.[161] However

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[155] *Ibid.*, file N/28, letter of 27 September 1949 to the chairman of the Board of Trustees.

[156] *Ibid.*, file S/36, O.L. Shearer, letter of 27 September 1949.

[157] *Ibid.*, file N/28, "Record of negotiations between the Natal Museum & Professor J.L.B. Smith 16th September - 1st December, 1949," p. 1. [attached to letter of 5 December 1949 to the chairman of the Board of Trustees.]

[158] *Ibid.*, and letter of 4 November 1949 to the acting director.

[159] *Ibid.*, letters of 1 and 22 October 1949 from A.W. Bayer to J.L.B. Smith.

[160] *Ibid.*, letter 29 October 1949 from the acting director to J.L.B. Smith, and letter of 4 November 1949 from J.L.B. Smith to the acting director and file H/45, R. Nesbitt Horne, letters of 29 October and 3 November 1949.

[161] RUC Council, finance committee, meeting of 11th November, 1949, p. 5. Records of the JLBSI, file A/5, letter of 29 November 1949 from J.L.B. Smith to the chairman of the Board of Trustees and file M/15, undated letter from J.L.B. Smith to the master of the college and letter of 14 November 1949 in reply.

one issue in the negotiations with the Natal Museum that was crucial to Smith remained unresolved. The board of trustees had promised to retire Mr Cullingworth, who had been employed by the museum since 1904, to allow Smith to hire new staff, but failed to do it. Early in the negotiations Smith had been told that Cullingworth had agreed to retire when the new director arrived at the museum.[162] Correspondence on the issue following Smith's appointment indicates that he apparently did not want to leave before he was 65 and that the Board did not do much about it.[163] Smith reiterated the importance of the issue from his point of view, and when nothing was done he withdrew from the appointment.[164] He then asked RUC if he could resume his work at the Department of Ichthyology.[165] It seems that Smith acted impetuously and that his ultimatum, demanding a solution within a day, left the Board with little choice in the matter.[166] Indeed, his fellow academics in KwaZulu-Natal, some of whom were members of the Board, told him the Board could not accept his ultimatum.[167] Although the Board told Smith that legally Cullingworth could not be retrenched,[168] they probably found it morally and emotionally difficult to unceremoniously dump the last member of the original museum staff.[169] I believe that the real reason for Smith's change of mind was deep concern for a conflict between administrative duties

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[162] Records of the JLBSI, file N/28, letter of 1 October 1949 from A.W. Bayer to J.L.B. Smith.

[163] *Ibid.*, letters of 11 and 25 November 1949 from A.W. Bayer to J.L.B. Smith.

[164] *Ibid.*, letters of 22 and 29 November from J.L.B. Smith to A.W. Bayer.

[165] *Ibid.*, file M/15, letters of 3 December 1949 and 5 January 1950. RUC Council, special meeting held at 3 p.m. on Thursday 5th January, 1950, p. 2.

[166] Records of the JLBSI, file N/28, transcript of telephone call of 30 November 1949 from J.L.B. Smith to A.W. Bayer.

[167] *Ibid*, letter of 30 November 1949 from A.W. Bayer to J.L.B. Smith and letter of 4 December 1949 from E.G. Malherbe to J.L.B. Smith.

[168] *Ibid.*, letter of 1 December 1949 from the vice-chairman of the Board to J.L.B. Smith.

[169] *Ibid.*, letter of 11 November 1949 from A.W. Bayer to J.L.B. Smith and letter of 4 December 1949 from E.G. Malherbe to J.L.B. Smith. See page 67 for the beginning of Cullingworth's service.

and his research.[170] In this regard, the Board apparently did not fully understand the importance of the staffing issue to him. Thinking that getting the new staff he wanted would be a long struggle that would cost him research time, Smith used the ultimatum over Cullingworth to pull the plug on the deal.

For Smith the publication of SFSA constituted the end of an era – about 20 years dedicated to studying South African fishes. Now he could turn his full attention to an ambition he had been developing while working on SFSA. This was to write a similar work on the fishes of the WIO. This ambition was so great that he was prepared to leave Grahamstown to be closer to the places where he wanted to collect fishes. He had entered the negotiations with the Natal Museum seeing the post at the Natal Museum as a spring-board to East Africa. As he had confidentially told a trustee of the museum, he was planning to write a major treatise on the fishes of the WIO, which would be "at least 4 times the size of my current volume [SFSA] and would probably occupy 6-10 years."[171] However it took five years before he publicised his intention to carry out this project. In a note included in the introductory pages to the 1953 edition of SFSA he wrote:[172]

> A vast collection of East African fishes and many hundreds of valuable photographs and colour sketches have been assembled. There is at present in preparation a COMPANION EAST AFRICAN VOLUME, on the same scale as this, and as fully illustrated, so as to cover the fishes of the whole Western Indian Ocean.

The project officially started in 1950 with a grant of £1,800 from the CSIR. He estimated that it would take 8-10 years to complete and that the resulting book would be 4-5 times larger than

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[170] Records of the JLBSI, file K/7, letter of 27 September 1949.

[171] *Ibid.*, file N/28, letter of 21 July 1949 to O.L. Shearer.

[172] J.L.B. Smith, *The Sea Fishes of Southern Africa* (South Africa, Central News Agency, 1953), 3rd edition, p. viii.

SFSA, and rated it as "...unquestionably...one of the major biological works of the world."[173] In 1955 Smith applied for another CSIR grant for the publication of the WIO book. The £5,000 he received was probably used for the production of his bulletin series.[174]

As soon as SFSA was published the Smiths wasted no time and went back to the field. Between 1949 and 1956 they undertook the following expeditions:[175]

1949 – A short expedition to Inhaca Island, Mozambique.
1950 – The first expedition north of 20°S, covering the area from Beira to the Lurio River, with Pinda Reef (14°10'S, 40°40'E) being the main target.
1951 – Northern Mozambique, including Ibo and Cape Delgado and islands between the latter and Porto Amelia; also visited Mozambique and Pinda islands again.
1952 – Collecting in Zanzibar, Pemba Island and Kenya.
1953 – Another visit to the area between Inhaca and Bazaruto islands in southern Mozambique.
1954 – Extensive expedition to Kenya (Shimoni) and Seychelles. At the end of the work in the Seychelles proper Smith, who had his wife and son with him, hired a small motorised fishing vessel and spent a month collecting in the islands between the Seychelles and the African coast, ending the trip at Dar-es-Salaam.
1956 – The last expedition was to Pinda in Mozambique.

While on these expeditions J.L.B. Smith worked hard, sometimes in trying conditions, risking his health, but he apparently thrived on hard work. In 1951 a lighthouse in Pinda was both living quarters and a lab for a long period of time, and during this expedition he survived a stonefish sting.[176] Smith used his connections to government ministers in South Africa to arrange for

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[173] Records of the JLBSI, file M/15, letter of 11 April 1950 and file P/45, Natal Parks Board, letter of 31 October 1949 from J.L.B. Smith to the chairman.

[174] *Ibid.*, file N/36, Dr Meiring Naudé, letter of 28 September 1955 to J.L.B. Smith. See also page 107.

[175] Smith, "J.L.B. Smith," 'Expeditions outside South Africa,' 'The second coelacanth' and 'Final expeditions.' Pote, "Historical highlights," pp. 8-11.

[176] J.L.B. Smith, "A case of poisoning by the stonefish, *Synanceja verrucosa*," *Copeia* 1951, No. 3, pp. 207-210.

official support in Kenya and Zanzibar for his first expedition to these colonies in 1952.[177] In Zanzibar Smith was asked to investigate a rumour of a "large water snake" in an unused enclosed reservoir only to discover an eel, *Anguilla mossambica*, for which he claimed the first reliable record from the island.[178] At Shimoni, Kenya, Smith joined local fishermen in a dug-out outrigger canoe for a day of deep-water fishing in treacherous water. The experience revealed several deep-water snappers previously unknown from the African coast.[179] Following these findings, the colonial government of Mozambique invited Smith to conduct experimental fishing using the hand line method he observed in Shimoni. Smith used the opportunity, and the vessel provided by the authorities, to also collect in shallow water reefs.[180]

Of all these expeditions, the most rewarding experience for Smith was undoubtedly the expedition to the Amirantes and Aldabra Islands, Seychelles. His own words describe it eloquently and also provide an insight into the way he operated on expeditions:[181]

> Probably because of the remoteness and difficulty of this region, Aldabra has received little attention from the marine biologist, indeed less than twenty species of marine fishes have been recorded from there. Three days were spent at Aldabra and we employed every possible moment in intensive collecting of fishes by every possible means, including explosives, poison, nets, spears and lines, by which means we obtained at least ten thousand specimens of numerous species and

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[177] Records of the JLBSI, file L/39, E. Louw, letters of 18 February and 5 April 1952 to and from E. Louw, respectively.

[178] J.L.B. Smith, "A freshwater eel on Zanzibar Island," *Nature*, Vol. 171, 1953, p. 129.

[179] Records of the JLBSI, file C/27, CSIR reports, "Special report to his excellency the Governor General of Mozambique, on investigations in deep line fishery in northern Mozambique, August-September 1956," p. 4. J.L.B. Smith, "Fishes new to Africa obtained by deep line fishing in Kenya waters, with a revision of the east African species of the genus *Pristipomoides* Bleeker 1852," *Annals and Magazine of Natural History*, Ser. 12, Vol. 7, No. 79, 1954, pp. 481-492.

[180] Records of the JLBSI, file C/27, CSIR reports, "Special report on deep line fishery in northern Mozambique," p. 5. J.L.B. Smith, "Deep-line fishing in northern Mozambique, with the description of a new pentapodid fish," *Annals and Magazine of Natural History*, Ser. 12, Vol. 10, No. 110, 1957, pp. 121-124.

[181] Smith, J.L.B. "The fishes of Aldabra Part 1," *Annals and Magazine of Natural History*, Ser. 12, Vol. 8, No. 88, 1955, p. 304.

acquired a fairly comprehensive knowledge of the fish life of that area at the time of our visit.

The results of the Aldabra expedition were published in a series of 10 papers. By the end of 1956 Smith had amassed a huge collection of WIO fishes. Despite the large number of publications he produced during these years, there was still a lot of material to be studied. Already over the age of 60, he realized that he had underestimated the enormity of the project and expressed doubts that he would live long enough to finish it.[182] He decided to stop all expeditionary work outside the borders of South Africa and put his energy into the existing collections. By 1960 he thought he would need another six years to work his way through the material and that the book would have 50% more species than SFSA.[183] With these issues in mind, Smith's strategy was to process his material family by family and then publish the results as an illustrated review of each family in the WIO. In fact, he had already started doing that in the early 1950s,[184] but many groups had to be redone in view of new collections. He maintained that even if he did not live to see the book completed, the scientific results published with the colour illustrations drawn by his wife would serve the same purpose.[185]

Before SFSA the majority of Smith's ichthyological papers were published in the journal *Transactions of the Royal Society of South Africa.* In the mid-1940s he started publishing in the London-based journal *Annals and Magazine of Natural History* and abandoned the former journal in 1947.[186] The family reviews of the early 1950s were published in the *Annals.* The speed of publication and the inclusion of colour illustrations were central to his publication strategy. The best way to achieve these goals was to publish locally. In 1954 when Smith was finishing a revision of WIO parrotfishes with colour illustrations, he raised the issue with Dr S.H. Skaife, then

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[182] Records of the JLBSI, file P/144, Aaron Pearl, letter of 13 July 1957 and file R/24, Rand Daily Mail, letter of 14 November 1960 from J.L.B. Smith to R.W. Terry.

[183] *Ibid.*, file R/24, letter of 14 November 1960. Smith, "J.L.B. Smith," 'Post expedition years.'

[184] Smith, "J.L.B. Smith," pp. 188-189, publications 44, 46, 51, 52, 54, 62, 70, 73.

[185] Records of the JLBSI, file R/24, letter of 14 November 1960.

[186] Smith, "J.L.B. Smith," pp. 186-187.

president of the Royal Society of South Africa and a personal friend. The correspondence between the two men reveals that Smith had stopped publishing in the society's journal because he had not liked its publication policy, particularly the mandatory review by two referees. He claimed that the referees were slow and often made illogical demands that "...at times bordered on the ridiculous."[187] Moreover he accused the editor of double standards because he was less demanding with an overseas scientist of the same stature. With Skaife's encouragement, Smith eventually submitted the parrotfish revision to the society's journal, but later withdrew it because the editor required changes to the colour plates that he could not afford.[188] He then decided to start his own serial publication, the *Ichthyological Bulletin of Rhodes University*, and raised financial support from the CSIR for it.[189] The parrotfish paper was the first of the 32 bulletins of Smith's own work published in this series in the years 1956-1966. While Smith's desire to publish large papers with colour illustrations quickly was a legitimate reason to start his *Ichthyological Bulletin* series, the correspondence with Skaife gives the impression that he was also trying to elude the peer review stage of the scientific publication process, a corner-stone of modern science. He suggested to Skaife that when dealing with a scientist of his reputation, reviewers should be told to submit their report within two weeks and that they should be limited to rejecting the work or accepting it without any changes.[190] This was an unreasonable demand considering that there were no other practising marine fish systematists in South Africa at the time who could review his work. His attempt to interfere with the objectivity of the scientific publication process raises the suspicion that Smith's self-published papers were not peer-reviewed and casts a shadow of doubt on much of his work published between 1955 and his death. The bulletins, however, were scientific publications not designed for use by laymen. Identifying the urgent need for a book covering the shore fishes of the tropical WIO Smith, with his wife as co-author and illustrator,

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[187] Records of the JLBSI, file S/39, correspondence from 5 July 1954 to 21 May 1955.

[188] *Ibid.*, letter of 11 November 1955 from J.L.B. Smith to S.H. Skaife.

[189] *Ibid.*, letter of 28 February 1956 from J.L.B. Smith to S.H. Skaife; file C/28, CSIR 1948-1960, letter of 28 February 1956 from J.L.B. Smith to the secretary of the CSIR; and file R/29, Adv. A.A. Roberts, letter of 28 February 1956 from J.L.B. Smith. See also page 104.

[190] Records of the JLBSI, file S/39, correspondence from 5 July 1954 to 21 May 1955.

published the *Fishes of Seychelles*. This book was "...designed to be of optimum value to anglers, skindivers, and other naturalists as well as scientists..." and covers 880 species of which about 95% are found in other areas of the tropical WIO.[191] However the book is of limited use for ichthyologists as it is no more than an illustrated checklist. Several months before his death Smith, still hoping to "...live long enough to complete [the project] as it is likely to be the biggest work of all," referred to it as the *Sea Fishes of Mozambique*.[192] This name implies that he may have scaled down his ambition for a work encompassing the whole of the WIO.

Although Smith regarded the coelacanth as a diversion from his investigation of the fishes of the WIO,[193] there were unresolved issues that occupied his mind since the finding of the first coelacanth in South Africa. Exciting as the discovery was, he was disappointed "...in learning that all the soft parts of the fish had been lost." Moreover convinced that there was "...overwhelming evidence that the fish was a stray..." and that coelacanths probably exist in more than one place, he kept trying to find their whereabouts and wanted to collect more specimens.[194] To that end Smith prepared a leaflet describing and showing a photo of the coelacanth, and offering a reward of £100 for a specimen, which he distributed wherever he went on the coast and islands of the WIO.[195] While collecting in Zanzibar in September 1952 the Smiths met Captain Eric Hunt who was to play an important role in the coelacanth story. Hunt was a sailor, trader, fisherman and aquarist, who lived in Zanzibar and sailed regularly to the Comoro Islands and Madagascar.[196] They gave Hunt coelacanth leaflets to distribute in these islands. Returning to

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[191] J.L.B. Smith and M.M. Smith, *Fishes of Seychelles* (Grahamstown, Department of Ichthyology, Rhodes University, 1963), p. 2.

[192] Records of the JLBSI, file N/36, letter of 12 June 1967 from J.L.B. Smith to Meiring Naudé.

[193] *Ibid.*, file P/144, letter of 13 July 1957.

[194] *Ibid.* Smith, *Old Fourlegs*, pp. 60-66. J.L.B. Smith, "The second coelacanth," *Nature*, Vol. 171, 1953, pp. 99-101.

[195] Smith, *Old Fourlegs*, plate 3.

[196] R.E. Stobbs, "Hiariako – The broken thread," *Ichthos*, No. 49, 1996, p. 17.

South Africa on 24 December that year, J.L.B. Smith received a cable from Hunt that a coelacanth had been caught off Anjouan Island in the Comoro Islands.[197] Hunt was on Anjouan when the fish was caught and obtained it for Smith.[198] The capture of the 'second' coelacanth and its transport to South Africa aboard a military plane must have been the highlight of Smith's life in the post-SFSA period. His book, *Old Fourlegs*, the full story of this episode, remains one of the great classics of scientific adventure.[199] However Smith was too hasty in describing this coelacanth specimen as a new genus and species, *Malania anjouanae*, even though he pointed out that the fish was deformed and was damaged during capture and preservation. *M. anjouanae* was later re-identified as *Latimeria chalumnae*.

After the publication of SFSA and the expeditions that immediately followed, Smith, who was still a trustee of the Albany Museum, offered to relieve the overcrowded conditions in the collections of the museum at the time by taking over the marine fish collection. The museum gave it to him on an indefinite loan and it was moved to his department at RUC in July 1952.[200] It is currently lodged within the JLBSI. The Smiths had an intimate knowledge of their fish collection and could tell the history of almost every specimen from memory, thus paying little attention to properly recording collection data.[201] This has resulted in many specimens being of limited use after the Smiths' deaths. It will takes years of tracing these specimens in J.L.B. Smith's publications to retrieve the missing data. Despite the frequent expeditions to East Africa Smith managed to continue his work on the southern African fish fauna. By 1965 the fifth edition of SFSA had been published. Numerous species found in South Africa and southern Mozambique since 1949 were appended, as lists, to editions 2-4.

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[197] Smith, *Old Fourlegs*, pp. 80, 83, 85, 101.

[198] R.E. Stobbs, personal communication, 23 November 2001.

[199] See Bibliography for full reference.

[200] Records of the JLBSI, file A/5, letter of 18 June 1952 to the chairman of the Board of Trustees, follow-up correspondence of July that year and list of 'Fishes on loan from the Albany Museum as at July, 1952.'

[201] Proper cataloguing started only in 1970 by T.H. Fraser (see JLBSI, Progress Report: 1st December 1969 - 31st October 1970, pp. 2-3).

The long years of hard work exacerbated Smith's weak health. In 1959 he was told by his doctors to reduce his work load and the president of the CSIR wrote to him that his "...work is of such inestimable value to the country that you owe it to South Africa to take good care of yourself."[202] For the last two years of his life, Smith's health deteriorated to the extent that his eyes were failing and he felt that he was losing his mental powers.[203] This was apparently a result of two medical setbacks that must have influenced his thinking on how his life should end. In 1966 he suffered a minor stroke.[204] In August 1967 he took part in a Commission of Inquiry that investigated problems at the Oceanographic Research Institute (ORI), Durban, and his wife accompanied him.[205] Two days after their return to Grahamstown the Smiths fell extremely ill and, as he described it, "...were carried off to hospital...in a comatose condition, mine a deep coma...".[206] The symptoms indicated food poisoning caused by ingesting an insecticide like Parathion and J.L.B. Smith nearly died from it.[207] Although he was able to return to work within days, he never recovered completely. His blood pressure was unstable and he suffered severe mental depression.[208] Shortly after the incident he wrote to friends at the Durban Undersea Club advising them to "...keep off getting on to 70, it is quite a terrifying age." Unwilling to risk losing control over his life and becoming a "useless hulk," he ended his own life on 8 January 1968.[209]

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[202] Records of the JLBSI, file N/36, letter of 1 December 1959 from Meiring Naudé to J.L.B. Smith.

[203] Smith, "J.L.B. Smith," 'Honours.'

[204] W. Smith, "My parents," *Ichthos*, No. 49, 1996, pp. 28-29.

[205] Records of the JLBSI, file L/35, R.E. Levitt, letter of 18 July 1967 and follow up correspondence.

[206] *Ibid.*, letter of 7 August 1967 and file P/141, Parkes - Knysna, letter of 4 September 1967 from E. Parkes.

[207] *Ibid.*, file C/27A, CSIR reports on research work 1963 & 1965-68, "Report on Research Work for the Period Ending May 31, 1968," attachment on the 'Death of Professor J.L.B. Smith' and file R/9, Frank Robb, letters 30 August and 7 September 1967.

[208] *Ibid.*, file L/35, letter of 2 October 1967 and file C/27A, "Report for May 31, 1968," attachment on 'Death of Professor Smith.'

[209] *Ibid.* Smith, "J.L.B. Smith," 'Honours.'

The assessment of Smith's contribution to ichthyology must be done in the context of the period, the conditions he worked under and his personality. Prior to the establishment of the Department of Ichthyology in 1947 systematic ichthyology as a scientific discipline did not exist in South Africa. Smith had to build a fish collection and a library at a time when his peers in many parts of the world were working at established institutions. Moreover the remoteness of South Africa made communication with ichthyologists and museums in the northern hemisphere difficult. However Smith was a single-minded person and once he committed himself to the study of fishes he did not let go. His choice to work in East Africa made the logistics of expeditions difficult, but the effort was hugely rewarded by tapping a little known fish fauna. Considering that he became a full-time ichthyologist when he was already 50 years old, his achievements in ichthyology were phenomenal.

To fully appreciate Smith's achievements it is necessary to understand his personality and his *modus operandi* as both were essential contributors to his immense productivity. When Smith married his second wife, Margaret Mary Smith, in 1938 his health was failing and he was given five years to live. Although he was passionate about fish from childhood, this prognosis must have made him even more motivated and intensely focussed on his fish work.[210] Consequently, he upheld a highly regimented lifestyle. Because time was of the essence, Smith did not suffer fools easily. He expected his staff to be as dedicated as he and his wife were and went through many secretaries to find the ones he could work with.[211] No wonder, therefore, that Smith had the reputation of being a strict, difficult and hard-to-please person impossible to work with, and who had "a lack of liking for people."[212] The fact that he did not like large social gatherings and

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[210] *Ibid.*, 'Ichthyology.' *Eastern Province Herald*, 9 January 1968. Records of the JLBSI, file B/4, letter of 20 April 1934 from J.L.B. Smith and file R/97, letter of 18 July 1967 from J.L.B. Smith.

[211] Records of the JLBSI, file L/6, D. Lazarus, letter of 21 July 1977 from M.M. Smith and file V/3, Van der Horst, letter of 4 December 1947 from J.L.B. Smith. J. Pote, personal communication, October 2000.

[212] P.B.N. Jackson, "Variations on a theme," p. 34. Records of the JLBSI, file L/6, letter of 5 July 1977 and file N/17, letter of 16 July 1952 from Smith to the secretary of the Nuffield Foundation.

kept to himself in such situations reinforced this impression.[213] It seems, however, that this reputation originated, at least partially, from people who disagreed with his points of view, the tenacity applied by his assistant wife to preventing interruptions to his work, and colleagues labelling him eccentric for the single-mindedness with which he approached his work.[214] But to his students Smith was a kind, helpful and inspiring teacher, and they stayed in touch with him throughout his life.[215] He appreciated those who helped him with his work; he named several species after such people, most notably the second coelacanth, *Malania anjouanae*, after Prime Minister Dr D.F. Malan, and presented them with copies of his books.[216] His expansive way of expressing his gratitude was more than just good manners, it was part of his personality; indeed, it often went into the realm of flattery.[217] While most times it was accepted, it was counter-productive at least once.[218] The following examples serve to illustrate Smith's personality:

- On the 1952 flight to fetch the second coelacanth from the Comoro Islands Smith kept the crew of the Dakota (Douglas C-47) well fed with provisions supplied by his hosts in Durban even though he had been told that the plane was stocked with air force rations.[219]

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[213] Records of the JLBSI, file L/6, letter of 21 July 1977 from M.M. Smith.

[214] *Ibid.* Jackson, "Variations on a theme," p. 34.

[215] Jackson, "Variations on a theme," pp. 34-35. Records of the JLBSI, file S/37, correspondence with J.L.B. Smith. D. Rivett, "JLB Smith, the chemist, as I knew him," *Ichthos*, No. 48, 1996, pp. 6-7.

[216] Records of the JLBSI, file C/28, letter of 25 June 1956 from S.M. Naudé to J.L.B. Smith; file H/45, general correspondence and draft message to SAPA of 16 January 1953 on the naming of the second coelacanth; and file J/2, W.G.H. Jackson, letter of 20 January 1949. Smith, "New species and new records," p. 794. Smith, "Forty-two fishes," pp. 105, 109-110.

[217] Records of the JLBSI, file B/4, letter of 25 July 1945 from Smith; file H/45, letters of 31 March 1958 from J.L.B. Smith; file K/20, letter of 5 November 1948 from Smith; file L/11, letters of 24 November and 8 December 1947 from Smith and letter of 13 January 1949 from B.A. Key to Smith; and file V/3, letter of 7 July 1947 from Smith. *Aqua-Focus*, Vol. 4, No. 11, 1961, editorial note on p. 4.

[218] See pages 98 to 99.

[219] Smith, *Old Fourlegs*, pp. 131, 162.

- He bought more supplies on a refuelling stop in Mozambique, and even tried to make hot coffee for the crew during the flight using his small primus stove, but the captain did not allow it.[220]
- Back in South Africa, before leaving on the flight from Durban to Grahamstown he phoned his wife and asked her to prepare four SFSA copies with dedication and to bring breakfast for the crew to the Grahamstown airport. The books were given to the crew when they returned from Cape Town and dropped the Smiths and *Malania* in Grahamstown.[221]
- He wrote a letter of consolation to skipper Frank Robb whose boat GOOD GIRL was wrecked on the Wild Coast. Smith's letter was the only one that was not from threatening creditors that Robb received in the weeks following the disaster. The fact that a famous man like Smith would take the time to write to a total stranger whom he had never met before made a great impact on Robb and he did the same thing years later when another skipper, unknown to him, lost his boat.[222]
- Smith wrote a get-well letter to the Mayor of East London that was one of only a few he received after being injured in a car accident.[223]
- When Smith's secretary was sick he delivered hot soup to her home.[224]
- He told apologetic members of the public that he liked to help them with fish identifications and did not consider it a waste of his time.[225]
- He sent stamps to the son of a company manager whom he probably had never met.[226]

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[220] *Ibid.*, pp. 134, 141.

[221] *Ibid.*, pp. 168, 170.

[222] Records of the JLBSI, file R/9, letters of 19 May 1950 from J.L.B. Smith and 10 February 1954 to J.L.B. Smith, and letter of 18 August 1966 from F. Robb to I. Branch.

[223] *Ibid.*, file L/6, letters of 12 January 1948 from J.L.B. Smith and of 5 July 1977 to M.M. Smith.

[224] Pote, personal communication.

[225] Records of the JLBSI, file O/4, C.T. O'Brien, letter of 30 April 1951 from J.L.B. Smith.

[226] *Ibid.*, file R/58, Reckitt & Coleman, letter of 13 December 1954 from J.L.B. Smith to Mr Marx.

Honesty and fairness were important to Smith. He refused to give ill-health as the reason for his resignation from the RUC Department of Chemistry to do research in Ichthyology as a CSIR research fellow even though he was well aware that he would lose his pension rights.[227] Furthermore he refused the college's offer to compensate him for what he should have received as pension, saying that his CSIR fellowship was adequate for his needs.[228] He returned a £1,000 equipment donation and considered refusing a donation for a new lab when he was not sure that the donor, H. Le May, was giving it willingly.[229] He also treated students and young scientists fairly and in an encouraging way. W. Fowler of the University of the Witwatersrand sent him observations on the stomach contents and behaviour of the prodigal son (*Rachycentron canadum*). Smith told him it was worth publishing and offered to write the paper with Fowler as the author even though Fowler had simply handed him the data without any expectations.[230] Similarly, when M.J. Penrith of the SAM asked him to co-author a scientific paper, Smith told him he should do it alone to create a name for himself, offered his assistance, and encouraged him by saying he had a reputation of a capable man.[231] The only issue I came across over which his attitude deviated from this pattern was the use of explosives to kill and collect fishes. Facing criticism about this practice he justified his continued use of explosives by arguing that objections were coming from sentimental people without actual experience in this matter, and that if used by experts like himself explosives do not cause permanent damage.[232] However Smith was not a diver and could not

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[227] *Ibid.*, file R/65E, Research Subcommittee, "Salary paid to the Director of the J.L.B. Smith Institute of Ichthyology," a March 1977 memorandum from Margaret Smith to the Research Subcommittee of the RU and file C/27, Rhodes Registrar, letter of 3 October 1946 from the Union Education Department to the RUC registrar.

[228] *Ibid.*, file C/27, Rhodes Registrar, letter of 1 September 1947 from J.L.B. Smith to the master of the RUC.

[229] *Ibid.*, file L/11, Hugh Le May, letter of 16 November 1948.

[230] *Ibid.*, file R/63, Rays, letters of 13 May 1965 from W. Fowler to J.L.B. Smith and 1 June 1965 from J.L.B. Smith to W. Fowler.

[231] *Ibid.*, file P/150, letter of 10 August 1964 from J.L.B. Smith to M.J. Penrith.

[232] *Ibid.*, file C/27, CSIR reports, "Report on research work for the period 1st October 1955 - 31st July, 1956," p. 8.

reliably judge the impact of explosives deeper than the first few metres below the surface. Moreover his 'expertise' in the handling of explosive charges is doubtful, given an incident that could have killed his wife.[233] In stark contrast to his massive network of correspondence and public relations, throughout his career in ichthyology Smith did not collaborate in a publication with any scientist other than his wife.[234] There may have been a 'loner' side to his personality, but I suspect that this was a deliberate decision taken for the sake of efficiency because at that time the only collaboration he could have had in systematic research was with ichthyologists abroad.

Smith put ichthyology before his own convenience and security, and knowingly made significant personal sacrifices, career-wise and financial, for the sake of his fish work.[235] He declined an invitation to become director of the Natal Museum, and at least one other similar job offer, because he knew it would mean giving priority to museum administration.[236] He gave up a secure career at the RUC Department of Chemistry for an uncertain future in ichthyology.[237] Although he was a professor and HOD at RUC, Smith's £800 CSIR fellowship, which constituted his annual salary, was well below that of a senior lecturer and did not include medical insurance or pension. Moreover when he resigned from the Department of Chemistry he lost his pension rights. He made his wife his research assistant, a position she held for 17 years without pay. When the CSIR started paying her at the end of 1962 their combined income was still below that of a senior lecturer.[238]

This evidence supports M.M. Smith's evaluation of her husband as "...a man of incredible drive and enthusiasm, a prodigious worker despite his frail body, who while intolerant of

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[233] W. Smith, "My parents," *Ichthos*, No. 49, 1996, pp. 28-29.

[234] Smith, "J.L.B. Smith," pp. 186-210. See page 117 for Smith's PR network.

[235] Records of the JLBSI, file C/27, Rhodes Registrar, letter of 9 May 1947 from J.L.B. Smith to the RUC registrar.

[236] *Ibid.*, file K/7, letters of 21 and 27 September 1949.

[237] *Ibid.*, file L/11, letter of 24 November 1947.

[238] *Ibid.*, file N/36, letter of 6 December 1962 and file R/65E, "Salary of the Director" memorandum.

inefficiency and laziness, was considerate, kindly and generous to others."[239] Denys Davies, an artist who worked with the Smiths on SFSA and who became a life-long friend, said this about J.L.B. Smith: "I never understood his reputation for being bad-tempered. He was exacting, yes, with an agile scientific mind intolerant of muddled thinking, but self-controlled and fair minded; a caring man aware and appreciative of what was going on around him, even though he seemed too busy to notice."[240] Glyn Hewson, a neighbour's daughter who worked for Smith, wrote that he was "...blunt, utterly focussed and unrelentingly prioritised...warm, affirmative and insightful."[241] But there was another lesser known side to his personality that occasionally surfaced as rumours that he was a racist.[242] This is confirmed by Smith's own writing. He referred to black Africans as being of "...low mental calibre and...little inventive ability..." compared to other races.[243] In addition, while visiting the U.S.A. in 1958 Smith told two prominent ichthyologists that black Africans are a different species.[244] Conversely, he believed that "...Anglo-saxons...may justifiably be classed among the most enlightened people."[245] Smith either lived in denial of the political and social problems created by apartheid or really believed that the abject poverty of African blacks was normal. He told his peers that "Despite the often deliberately falsified reports about South Africa that repeatedly appear in the world press, I have visited no other country in which life generally is more normal, secure and pleasant, for all races."[246]

In this regard, M.M. Smith was the opposite. As honorary patroness of the Reef Marine Aquarist Club, she strongly supported the club's motion to open it to all races, and she believed

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[239] Smith, "J.L.B. Smith," 'Honours.'

[240] Davis, "1946 and all that," p. 6.

[241] G. Hewson, "A remembrance: JLB and Margaret Smith," *Ichthos*, No. 62, p. 6.

[242] Stobbs, personal communication, 23 November 2001.

[243] Smith, *Old Fourlegs*, p.66. J.L.B. Smith, "Fish in the early days of the Cape," *Field & Tide*, Vol. 4, No. 3, 1962, p. 24.

[244] Randall, personal communication, 15 December 2001.

[245] Smith, "Sea Fishes was an experiment," p. 29.

[246] Records of the JLBSI, file A/18, Anglo American Corp. of SA Ltd., confidential letter circulated to colleagues around the world during 4-7 June 1965.

that it is important "...to pass knowledge to every human being...in South Africa."[247] She was kind and extremely generous, and never turned away a person in need.[248] Like her husband, Smith also made considerable personal sacrifices for ichthyology. Following her marriage to J.L.B. Smith she gave up her own ambitions and dedicated her life to his work. She worked, unpaid for many years, as his scientific assistant, photographer, artist and librarian at the Department of Ichthyology.[249] As director of the JLBSI, Smith donated her valuable private collection of rare scientific books to the Institute's library. She paid for official trips abroad out of her own pocket. She gave the royalties from her husband's and her own books to the Institute Publication Fund, and employed a scientific assistant at her own expense.[250] Informing W.J. Weideman, Head of the CSIR's University Research Division, about her new assistant she wrote: "...I will arrange for [his salary] to be paid from my own salary. I am not telling you this to pose as a martyr or something noble! I have enough to live on, and this Institute is my special baby."[251]

J.L.B. Smith believed that "...the scientist owes a duty to the general public, who after all pay for his work."[252] True to this conviction, he frequently told people that his department "...is run as an information bureau about fishes...and it is always open to the public."[253] Indeed, as evident from the JLBSI archives and his own testimony, he handled an enormous volume of public

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[247] *Ibid.*, file R/88, Reef Marine Aqaurist Club, letter of 9 March 1976 to the chairman of the club.

[248] Jackson, "Variations on a theme," p. 40.

[249] *Ibid.*, p. 37. Records of the JLBSI, file M/69, Marine Oil Refiners of South Africa, letter of 29 January 1952 from J.L.B. Smith to F.J.H. Le Riche.

[250] Records of the JLBSI, file R/65E, 'Salary of the Director' memorandum, and minutes of the meeting held on 12 June 1978, pp. 2-3.

[251] *Ibid.*, file C/28C, Weideman 1968-1976, letter of 6 April 1976.

[252] *Ibid.*, file N/17, undated letter from J.L.B. Smith to L. Farre-Brown, the secretary of the Foundation [written in 1952, probably around August]; file M/66, Dr T. Monod, undated letter from Smith [probably written early in 1950] responding to Dr Monod's letter of 14 November 1949; and file P/128, Mrs Maxia Pienaar, letter of 28 April 1961 from Smith.

[253] *Ibid.*, file L/39, letter of 17 March 1951; file N/17, undated letter; file M/69, Marine Oil Refiners of South Africa, letter of 29 January 1952 from Smith to F.J.H. le Riche; and file S/24, letter of 3 February 1953 from Smith.

correspondence from South Africa and abroad that must have taken a lot of his time.[254] This 'public' consisted of fishery officers, industrial managers, government and other officials, diplomats, media officers, and the public at large.[255] The latter group included angling clubs, numerous individual anglers and ordinary people with an interest in fishes. He also corresponded with underwater photographers and the Crown Prince of Japan.[256] An avid angler from childhood, Smith as well as his wife were 'at home' with the angling fraternity.[257] Both were elected to positions of honorary president and vice-president of, and received honorary life membership from major South African angling and aquarist clubs.[258] An important premise in Smith's strategy for maintaining a flow of specimen donations to his collection was based on his belief that anglers like to see their names in print and he tried his best to make sure that names mentioned in his press releases were indeed published.[259] Angling clubs constituted the largest donor group of the JLBSI until M.M. Smith retired as director of the Institute in 1982.[260] Although they added up to a

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[254] *Ibid.*, files A/69, Angling clubs; D/53, Donations (money); D/54, Donations in kind etc.; I/7, Requests for information, general; O/16, Odd enquiries; O/44, Oceanography: enquiries and leaflets; O/51 Oysters; P/172, Parasites; R/63; to name but a few.

[255] *Ibid.*, files G/17, Governador Geral do Mozambique; G/75, L.P.D. Gertenbach; H/45; I/1, B.M. Impey; L/5, G.F. Losse; L/90, G. Lionnet; M/107, Mossel Bay Advertiser; M/109, Municipality of Mossel Bay; M/110, Marlins; M/116, M. Mackenzie; O/41, Fish oil; P/62, N.E. Popkiss; P/123, R.R. Palmer; and S/11, to name but a few.

[256] *Ibid.*, file N/47, National Geographic Society, letter of 22 August 1955 to J.L.B. Smith; also files A/69; A/105, South African Anglers Union; D/71, Durban Undersea Club; D/96, D. Dreyden; E/8, E.P. Angler's Association; G/53, Knysna Angling Club; J/2; J/22, J.M. Jauffret; J/25, Mr Flip Joubert; J/26, The Crown Prince Household; N/42, Mr R. Nipper; N/54, F.L.A. Nativel; Q/8, Queenstown Sea Angling Club; R/50, J. Rawbone-Viljoen; R/111, C.H. Roncoroni; S/38, H.G. Simon; and many others.

[257] Smith, *Old Fourlegs*, pp. 6, 9-10. D. Bickell, "What a wonderful book," *Ichthos*, No. 12, 1986, p. 1.

[258] Records of the JLBSI, file L/35, letters of 6 and 15 January 1954. Also files D/71; G/53; L/93, Eastern Province Rock and Surf Angling Association; N/92, Natal Underwater Union; and R/88.

[259] *Ibid.*, file H/45, letter of 24 May 1952 from J.L.B. Smith. This is an old trick that had been used by the curators of the SAM a century earlier (see pages 20, 23).

[260] JLBSI, Annual Reports 1978-1981.

relatively small amount, their donations were important for the JLBSI research programmes while it operated on a small CSIR grant. Subsequent directors, both freshwater ichthyologists, and the new marine fish systematists of the JLBSI, none of whom is an angler, maintained the relationship with the angling fraternity at a lower, impersonal level compared to the Smiths. Nevertheless anglers remained loyal to the Institute through their membership in the society of friends of the JLBSI and their contributions to the Knysna Angling Museum (KAM).[261] The relationship that the Smiths had with industry was extensive. For the most part it was for the purpose of raising donations for expeditions,[262] but they also consulted several companies in South Africa and overseas on fish matters.[263] The most important and long-lasting relationship has been with Irvin & Johnson, the largest fishing company in South Africa. Starting in 1936 the company donated specimens for Smith's research in return for his assistance with fish identifications they required. Smith developed personal relationships with company skippers and crews, asking them to keep unusual specimens for him, that at least in one case grew into a lasting friendship.[264] Since the mid-1980s the Irvin & Johnson company has sponsored the production of educational material of the JLBSI (e.g. posters, the *Ichthos* newsletter).[265]

J.L.B. Smith viewed scientific work as useless unless it was shared with other people.[266] Guided by this philosophy the Smiths wrote several popular books on fishes and hundreds of

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[261] See page 123 for information about this museum.

[262] See page 125 for their fund-raising strategy.

[263] Records of the JLBSI, file N/59, New Western Fishing, letters of late 1959; file P/71, Porosan, letters of late 1954; and file R/61, Messrs. Robertson Ltd., letters of 12 and 18 June 1981. Smith, "J.L.B. Smith," 'Final Expeditions.'

[264] Records of the JLBSI, file D/28, Irvin & Johnson, PE; files I/4 and M/198, Irvin & Johnson, Mossel Bay; and file L/8, Captain M. Le Gras. Smith, *Old Fourlegs*, pp. 6, 9.

[265] JLBSI, Fifteenth Annual Report for the Period 1st April 1982 - 31st March 1983, pp. 24, 40, and subsequent reports.

[266] Records of the JLBSI, file S/2, W.B. Scott, letter of 26 January 1970 from M.M. Smith. J.L.B. Smith, "World-wide demand for 'Sea Fishes,'" *Aqua-Focus*, Vol. 4, No. 11, 1961, p. 3.

popular science articles.[267] They provided material for numerous news reports in South Africa and abroad to newspapers and magazines such as *Die Oosterlig, Natal Daily News, Punch, Spotlight, Sunday Express, The Star, The Times*, and others.[268] The Grahamstown community was not left by the wayside and the *Grocott's Mail* published numerous letters written by the Smiths, especially while they were on expeditions.[269] Educating the public about fishes formed an important part of their PR operations. They did this through writing popular articles and giving radio talk shows and public lectures on issues such as the dangers of venomous and poisonous marine animals and shark attacks.[270] With funds provided by the Ford motor company J.L.B. Smith prepared a colour booklet on South African fishes that was made available to the public in Ford garages throughout the country.[271] Smith regarded SFSA as his "first big experiment in simplifying science" for the public at large. He used common language in the fish descriptions as much as possible, provided more than one way of identifying a fish through the descriptions, keys and illustrations, and based the introductory chapters on questions and queries he had received

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[267] Smith, "JLB Smith," pp. 196-210. Records of the JLBSI, file P/128, letter of 15 July 1961 to Smith; also files N/23, Noticia; P/8, Personality; P/54, Panorama; P/72, J. Pereira Soares; P/177, Popular articles Mrs. M.M. Smith; and S/18, South Africa Foundation. See also the lists of popular publications in the annual reports of 1968-1983.

[268] Records of the JLBSI, file H/45, letters of 29 October and 14 December 1949 from Smith; also files L/10, G. Le May and N/46, Newspapers. Smith, *Old Fourlegs*, pp. 44-45, 86-87, 179-180. Jackson, "Variations on a theme," p. 40.

[269] Hewson, "A remembrance," p. 6.

[270] *Natal Daily News*, 29 September 1950. J.L.B. Smith, "Beware of blaasops: a recent tragedy," *South African Angler*, Vol. 5, No. 6, 1950, p. 8. J.L.B. Smith, "Letter to the editor about currents and shark attacks," *South African Angler*, Vol. 6, No. 8, 1952, p. 13. J.L.B. Smith, "Have you heard of Ichthyosarcotoxism?" *Veld & Vlei*, Vol. 1, No. 29, 1955, p. 16. J.L.B. Smith, "Dreaded creatures of the sea," *Field & Tide*, Vol. 2, No. 12, 1960, pp. 20-21, 27-28. M.M. Smith, *Sea and Shore Dangers. Their Recognition, Avoidance and Treatment* (Grahamstown, 1977), pp. 1-64, and many more. Records of the JLBSI, file F/29, Fish and fishy ways; file R/58, letter of 13 December 1954 from J.L.B. Smith to Mr Marx; file S/39, correspondence of September to November 1951; and file Q/8, letter of 29 August 1975 from M.M. Smith to E.V. Marriott. *Daily Dispatch*, 21 April 1972. See also lists of broadcasts and public lectures in annual reports of 1968-1983.

[271] Records of the JLBSI, file C/4, Dr & Mrs George Campbell, letter of 20 July 1959 from J.L.B. Smith.

from anglers and naturalists over a period of 20 years.[272] Following the publication of SFSA he noted a significant decline in the number of queries he received from the public and a relative increase in the number of rare or new fish sent to the department. He concluded that people were able to identify most of the fishes they caught or saw, and that the book had achieved this objective.[273] Perhaps the best measure of the success of Smith's PR strategy was provided by his death. It was noted in *Time* magazine and an obituary appeared in the *New York Times*.[274] The Department of Ichthyology was then "...inundated by letters from all part of the world... Research work came to a virtual standstill..." for two months.[275] The high value the Smiths attached to public relations is evident from the following examples:

- Starting in 1949 J.L.B. Smith's research reports (his annual reports) included a "Public Relations" item. In many reports this is the first item in the report.[276]
- Arriving in South Africa after the long 1952 flight to the Comoro Islands to bring the second coelacanth, the exhausted Smith agreed to address the nation over the radio, using notes he had written in anticipation on the plane, and to write a news article for *The Times* of London even though he could hardly stand on his feet.[277] The public responded with numerous letters of appreciation.[278]

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[272] J.L.B. Smith, "'The Sea Fishes was an experiment," p. 29.

[273] Records of the JLBSI, file L/11, letter of 11 February 1950 from Smith and file N/17, undated letter. Smith, "World-wide demand,'" p. 3.

[274] Jackson, "Variations on a theme," p. 36. Hewson, "A remembrance," p. 7.

[275] Records of the JLBSI, file C/27A, "Report on Research Work for the Period ending May 31, 1968," p. 1.

[276] Records of the JLBSI, file C/27, CSIR reports, see reports from 1949 to 1967.

[277] Smith, *Old Fourlegs*, pp. 164-167, 179-180, 243-246. A. Ryan, "Memories of JLB," *Ichthos*, No. 54, 1997, p. 12.

[278] Smith, *Old Fourlegs*, pp. 253-254.

- Invited to speak at the Queenstown Sea Angling Club in 1974 M.M. Smith insisted that the event be open for the general public.[279]
- The same club later awarded a copy of SFSA as a club prize only to discover that the book was out of print. They asked Smith for assistance and she agreed to give them a copy from the small, secret stock of books she had kept specifically for scientists.[280]

The hold that J.L.B. Smith had over the South African media is demonstrated through his handling of the first capture of striped marlin in South African waters. In February 1956 an unusual marlin was caught off Mossel Bay when Smith was at his holiday home in Knysna. He contacted the press and got them to establish that the fish had been transported to Cape Town; he asked for photos and they immediately dispatched a series to him; when he could not get a seat on a fully booked flight to Cape Town he had the press do it for him through the department of transport; landing in Cape Town he was met by press and angling representatives who drove him to the fish; he had them record and film his examination of the specimen; following his identification of the fish as the first striped marlin caught outside the Pacific Ocean he gave numerous interviews to South African and overseas news groups.[281] Always grateful to those who assisted him,[282] he did not forget to acknowledge the financial assistance that the CSIR provided for his unexpected trip to Cape Town at very short notice. Over a lunch, most likely in the presence of the press, he gave credit to the anglers who were responsible for getting the fish to Cape Town intact, including the man who caught it. The latter then promptly gave it to Smith as a gift.[283] The only South African scientist I am aware of who commanded such respect from local and international media was the heart surgeon, Dr Chris Barnard.

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[279] Records of the JLBSI, file Q/8, letter of 29 August 1975, from M.M. Smith to E.V. Marriot.

[280] *Ibid.*, correspondence of 3 and 8 March 1977 between M.M. Smith and E.V. Marriot.

[281] *Ibid.*, file C/27, CSIR reports, "Special report to the CSIR on discovery of striped marlin," February 1956. J.L.B. Smith, "The striped marlin (*Makaira audax* Phillipi) in South Africa," *Nature*, Vol. 177, 1956, p. 758.

[282] See page 112.

[283] Records of the JLBSI, file C/27, CSIR reports, "Discovery of striped marlin."

PR activities continued in the post-Smiths era but, the JLBSI being a national institution, with more formality. Press releases and all interviews had to be done through the office of the director. In 1982 *Ichthos*, the Society of Friends of the J.L.B. Smith Institute, was created[284] with a newsletter that has served as a platform for public debate – on, for example, the ethical aspects of angling and fishing competitions,[285] and for popular science articles written by JLBSI staff. Education became an official function of the JLBSI and an education officer was appointed in 1986.[286] Of all PR activities education is where growth was most noticeable over the last 15 years, including a junior supplement for *Ichthos*, outreach programmes for local schools and participation in national and international events, such as the National Science Festival, National Marine Week, World Environment Day.[287] In July 1994 the JLBSI opened the KAM in collaboration with the Knysna municipality.[288] The stated aim of the new museum was "...to sensitise people to the delicate nature of mankind's relation to fishes and aquatic environments and to encourage the sustained, long-term use of fishes and other renewable aquatic resources."[289] Most of the artifacts displayed in the museum were donated by individual anglers in a show of their continued loyalty to the JLBSI.[290] The new museum complex included an education centre, constructed with financial support from industry, that served the communities of Knysna and its

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[284] JLBSI, Fifteenth Annual Report, pp. 24-25. Anonymous, "The founding of Ichthos," *Ichthos*, No. 44, 1994, p. 9.

[285] See *Ichthos* No. 14, 1987, pp. 1-3 and No. 16, 1987, pp. 1-15.

[286] JLBSI, Seventeenth Annual Report for the Period 1st April 1986 - 31st March 1987, p. 5.

[287] See education section in JLBSI annual reports of 1994 - present.

[288] M.N. Bruton, "Milestones in the history of the Angling Museum," *Ichthos*, No. 42, 1994, p. 19. Records of the JLBSI, file K/9, Knysna Angling Museum, "Proposed establishment of an angling museum in Knysna by the JLB Smith Institute of Ichthyology" of 1 September 1992 by M.N. Bruton, pp. 2, 4.

[289] Records of the JLBSI, file K/9, "Proposed establishment," p. 2.

[290] M.N. Bruton, "Why start an Angling Museum," *Ichthos*, No. 42, 1994, p. 1. Records of the JLBSI, file K/9, KAM Newsletter No. 1-3.

surrounding areas.[291] The marine scientists of the JLBSI contribute to the development of educational material and participate in activities organised by the Institute's education staff. In addition, in conjunction with the present WIO project,[292] the marine curator of the JLBSI, Dr P.C. Heemstra, has developed the East Coast Fishwatch programme that is designed for public education and participation in science. In this programme divers and underwater photographers observe and collect fishes on the east coast of South Africa together with scientists, at the same time learning about the fish.[293]

There was another reason why the Smiths gave high priority to public relations. Following his experience over the discovery of the first coelacanth in 1938 J.L.B. Smith understood the value of staying in the public eye.[294] He developed intricate and active relationships with the public that he used extensively to advance his affairs, particularly fund raising (in cash and kind). Running such complex public relations was no mean feat and both Smiths were experts at it. M.M. Smith even received an award for her outstanding PR work in the eastern Cape.[295] They managed their multifarious network of contacts in the same way that they managed their ichthyological literature, and developed a filing system of people and companies that eventually became the archive of the JLBSI.[296] Their ingenious strategy was based on the simple premise that "...it is almost always more satisfactory to deal with a human individual than with an office alone."[297] J.L.B. Smith was

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[291] JLBSI, Annual Report 1994/1995, p. 17. M.N. Bruton, "Exciting developments in the Angling Museum," *Ichthos*, No. 40, 1993, p. 2. M. Baxter, "Opening of the Nestlé Underwater Discovery Centre at the Angling Museum in Knysna," *Ichthos*, No. 42, 1994, p. 11.

[292] See page 161.

[293] JLBSI, Annual Report 1997/1998, pp. 23-24.

[294] Jackson, "Variations on a theme," p. 34.

[295] Records of the JLBSI, file P/103, PRISA, letter of 28 March 1980 from F.K.S. van Rensburg to M.M. Smith.

[296] *Ibid.*, file R/24, letter of 4 May 1956 from J.L.B. Smith to Mr Cartwright.

[297] *Ibid.*

an expert in maintaining that personal touch. Despite being a high-flying academic he was able to come down to the level of ordinary people and they appreciated it.[298]

The strategy for raising donations of money and goods entailed keeping people informed about their donation and, frequently, giving away autographed copies of Smith's books. Following the publication of SFSA in 1949 Smith dispatched books to key people in South Africa and abroad, including the British Queen.[299] This paid off handsomely, for example, when he called Prime Minister D.F. Malan on Christmas day 1952 to ask for a military plane to bring the second coelacanth to South Africa. Malan returned his call, even though it was late at night and he was on holiday at the sea, because he remembered the book he received from Smith.[300] After meeting the Minister for Economic affairs in 1951 Smith sent him a copy of SFSA. He subsequently received the minister's help in arranging official support for his 1952 expedition to colonial East Africa and for obtaining permission to import a vehicle he could not purchase in the country.[301] He did the same thing with other government officials,[302] including those of the colonial government in Mozambique who provided logistic and financial support for his work.[303] With companies he would first approach a key person for a donation, usually for an expedition, explaining in detail what he required and why. Being well known in the country he usually received what he asked for. He would then write back from the field, or soon after returning to Grahamstown, and tell his contact person about his work, praising the product and explaining how it had been used, usually with a lot of flattery. A copy of a book, usually SFSA, would follow

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[298] *Ibid.*, file N/22, Norris, letters of 20 July 1949 from Smith and 29 July 1949 from Norris. See page 113 for examples.

[299] Records of the JLBSI, file N/17, letters of 17 July and 21 August 1952 and file S/3, W.W. Small, letter of 5 February 1951 from Smith.

[300] Smith, *Old Fourlegs*, pp. 123-124.

[301] Records of the JLBSI, file L/39, correspondence from March 1951 to May 1953.

[302] *Ibid.*, file P/50, Department of Commerce, letter of 10 July 1956 from F.J. De Villiers to J.L.B. Smith.

[303] *Ibid.*, file N/13, Ncala, letters of 13 and 24 September 1956 and file R/76, Joao Moreto Rato, letters of 12 July and 6 August 1949 from J.L.B. Smith, and letter of 4 May 1951 from Moreto Rato.

soon after, unless the donation was small and he saw no more use for keeping the contact. Almost invariably he received replies inviting him to contact the company again if he needed anything else, leaving the door open for another request which he usually made. Using this strategy Smith was able to obtain most of his requirements for expeditionary work, including a variety of food items, footwear, medicines, insect repellents, packing materials, etc.[304] He even got one company to donate cigarettes that he used in exchange for specimens and services in remote places where money had little value, such as the Comoro Islands.[305] The strategy paid off particularly well in his relationship with the Union Castle shipping company. He developed a good rapport with the SA manager, the agents of the company and the captains of the ships he travelled on. Consequently, the Smiths received a hefty discount on tickets and were granted services no ordinary passenger could get. These ranged from cold-storing large fish specimens on board, to using the communications room of the *Dunnottar Castle* in December 1952 looking for a way to bring the second coelacanth from the Comoro Islands, and to sending flowers to the RUC master, Dr Alty and his wife while they were aboard a company ship.[306]

Beyond their own systematic work, the Smiths engaged in issues of wider public interest pertaining to the marine environment. J.L.B. Smith advised the East London municipality on matters concerning the aquatic environment, from fish kills in rivers to shark attacks, and he wrote a leaflet on shark attacks for coastal authorities.[307] The municipality of Mossel Bay consulted him on the possibility of building a marine aquarium in their town.[308] He came up with the idea of

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[304] *Ibid.*, files M/89, Glaxo Laboratories; M/90, Helen McGregor & Co. Ltd.; N/39, Nestlé SA; N/40, Tea & Coffee; N/41, Natal Cane; O/13, OXO; P/52, EDWorks; P/64, Patoma Canning & Preserving Co.; R/54, L. Rose & Co.; R/58; R/61; and many others. Smith, *Old Fourlegs*, p. 85.

[305] Records of the JLBSI, file R/59, C.E. Roberts United Tobacco Company; letters of 23 March and 13 December 1954 from J.L.B. Smith. Smith, *Old Fourlegs*, p. 126.

[306] Records of the JLBSI, file M/116, letters of 24 March, 17 July and 24 October 1952 and letter of 15 June 1953 from J.L.B. Smith; letters of 7 April and 22 July 1952, and letter of 17 June 1953 to J.L.B. Smith. Smith, *Old Fourlegs*, pp. 90, 100.

[307] Records of the JLBSI, file M/54, Municipality East London and file P/128, letter of 28 April 1961 from Smith.

[308] *Ibid.*, file M/109.

building marine biological research stations in KwaZulu-Natal and Mozambique more or less at the same time the South African Association for Marine Biological Research (SAAMBR) hatched the idea of building an aquarium and marine research station in Durban (now part of the Seaworld complex). He duly gave it his full support and in the process befriended the SAAMBR president, Dr G. Campbell.[309] Through his involvement in the SAAMBR's campaign to market the Durban project Smith had an opportunity to do battle, albeit indirectly, with his old nemesis C. von Bonde. In a published letter Von Bonde, then director of the Fisheries Development Corporation, Cape Town, dismissed the SAAMBR research plans for their proposed marine research station.[310] Fearing the letter would have a negative effect on the SAAMBR fund-raising campaign Campbell sent Smith a copy of his response to Von Bonde's letter and asked him to publish his own letter of support for the project.[311] Instead Smith suggested a different, more diplomatic reply letter, accepted by Campbell, that welcomed Von Bonde's criticisms and at the same time presented him as an arrogant conservative, a pessimist and a defeatist.[312] When the project started the SAAMBR appointed Smith to the Scientific Advisory Committee of the project.[313] Several years later he served on a committee to investigate allegations of mismanagement at and oversee the operation of ORI.[314] He wrote a book on the fishes of the newly established Tsitsikamma National Park for the National Parks Board.[315] In her capacity as director of the JLBSI M.M. Smith served on committees investigating issues of public interest. An insight into her level of involvement is

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[309] *Ibid.*, file C/4, correspondence of 18 November 1947 to 8 January 1948 and file M/7, Dr E.G. Malherbe, correspondence of 1947-1949. A. Bowmaker, "What is the SAAMBR?" *Ichthos*, No. 20, 1988, p. 6.

[310] C. von Bonde, "Where are Natal's 'RICH FISHING GROUNDS'?" *Food Industries of South Africa*, December 1953, p. 55.

[311] Records of the JLBSI, file C/4, letter of 13 January 1954 to J.L.B. Smith.

[312] *Ibid.*, letters of 18 and 21 January 1954 from and to J.L.B. Smith, respectively.

[313] *Ibid.*, file B/25, Bush Univ. of Natal\1947-1963, letter of 5 December 1956.

[314] *Ibid.*, file L/35, letters of 18 July and 9 November 1967 to from R.E. Levitt to J.L.B. Smith.

[315] *Ibid.*, file C/27, CSIR reports, "Report on research work for the period ending June,1965," p. 4.

gained from her activities during 1979. The KwaZulu-Natal Administrator invited her to chair a commission of enquiry on the shad ban in KwaZulu-Natal waters;[316] she served on the Transkei Environmental Advisory Board; chaired a national committee investigating the possibility of using electric barriers to protect bathers on KwaZulu-Natal beaches from shark attacks; and was engaged in a public debate on controlling purse-seine netting in False Bay.[317] The Smiths were alert to problems of pollution and conservation in South Africa. They engaged with the public, various societies and government on these issues and strongly advocated recycling.[318]

Both Smiths advised colonial governments in Africa on fisheries and conservation matters. J.L.B. Smith investigated the commercial fisheries in Kenya and Zanzibar (1952)[319] and the commercial fisheries in Angola (1955).[320] He also identified fish remains from the stomach content of birds and seals for the government biologists working in South West Africa (now Namibia).[321] The Smiths' influence and involvement in 'fishy' issues outside South Africa was nowhere as deep as in colonial Mozambique. South African marine biologists began working regularly in Mozambique in 1933 when Professor C.J. van der Horst of the University of the Witwatersrand, Johannesburg, started taking his students to Inhaca Island for summer camps of field work.[322]

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[316] JLBSI, steering committee, minutes of the meeting held on 21 March 1979 at 11h00, p. 3. Bowmaker, "SAAMBR," p. 6.

[317] Records of the JLBSI, file F/84, False Bay Conservation Society and file G/6, Dr Perry Gilbert, letters of 23 May and 26 June 1979 from M.M. Smith. JLBSI, steering committee, meeting of 21 March 1979, p. 3. *Argus* 19 January 1979.

[318] Records of the JLBSI, file P/101, Pollution, correspondence during 1963 - 1976 and file O/49, Outeniqualand Trust, correspondence with M.M. Smith during 1970-73. *Daily Dispatch*, 21 April 1972.

[319] Records of the JLBSI, file C/27, CSIR reports, "Report on research work for the period 1st October, 1952 - 15th September, 1953," p. 1, Annexure A and B.

[320] *Ibid.*, "Report on research work for the period 1st July 1954-30th September 1955," p. 3.

[321] *Ibid.*, file M/61, Marine Research Laboratory SWA, correspondence of 1949 - 1968 and file R/2, R.W. Rand, correspondence during 1955 - 1957.

[322] J.M. Rato, "The marine biological station in Inhaca," *South African Journal of Science*, Vol. 55, No. 7, 1959, pp. 161-162.

J.L.B. and M.M. Smith first visited Inhaca in 1938, and again in 1946 and 1948 for SFSA work.[323] They learned to speak Portuguese and made numerous friends at high levels of government who willingly assisted them with their work.[324] At a 1947 congress in Mozambique Professor A. Quintanilha, with the support of Van der Horst, proposed the building of a marine research station on Inhaca Island, Maputo Bay.[325] They invited J.L.B. Smith to participate in the project and to provide technical advice.[326] Van der Horst's letter on the project to Smith arrived just after the November 1947 visit to Grahamstown of H. Le May.[327] Being sceptical of the ability of the colonial government of Mozambique to raise the funds for this project and always the entrepreneur, Smith tried to take the lead. He wrote to Quintanilha immediately, telling him that he liked Van der Horst's draft plan for the station, but that he had some ideas of his own. He also said that he had in mind a person who could finance the whole project, but that the lab would have to be named after this person.[328] Smith then wrote to Le May proposing that he make a donation for the Inhaca lab on condition that the lab be named after him and that Smith head a committee to select the site and design the facility.[329] However the Portuguese were committed to pay for the project themselves and Le May was averse to having any project he was contributing to carry his name.[330] In 1956 Smith investigated the deep line fishery in Mozambique.[331] M.M. Smith

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[323] See pages 61, 91.

[324] Smith, "J.L.B. Smith," 'Final Expeditions.' Smith, "Sea Fishes," p. 3.

[325] Rato, "Station in Inhaca," pp. 161-162.

[326] Records of the JLBSI, file V/3, letter of 20 November 1947 and file Q/2, Prof. A. Quintanilha, letter of 31 December 1947.

[327] See page 93.

[328] Records of the JLBSI, file Q/2, letter of 17 December 1947.

[329] *Ibid.*, file L/11, private letter of 24 November 1947 from J.L.B. Smith to H. Le May.

[330] *Ibid.*, file Q/2, letter of 31 December. See also page 98.

[331] Records of the JLBSI, file C/27, CSIR reports, "Special report on deep line fishery in northern Mozambique."

advised the government of Mozambique on the establishment of marine reserves along their coastline.[332]

Evidently, the Smiths carried scientific authority and enjoyed a high public profile in South Africa and abroad. It gave them a kind of a moral authority in the eye of the public, encouraging concerned organisations, the media, individuals and government to seek their support and/or advice on issues such as pollution, the need for conservation on Africa's coast, fishing for marlin and the immorality of fishing competitions.[333]

In 1965 the Anglo-American Corporation, the large South African business concern, offered Smith an advanced research fellowship tenable at his department. The fellowship was to be awarded to a promising young ichthyologist living in another country, South Africans studying abroad included, for a period of 1-3 years.[334] In the absence of South African candidates Smith's first choice for the fellowship was Dr J.E. Randall (Fig. 8) of the Bernice P. Bishop Museum, Honolulu.[335] Although Randall was interested in coming to South Africa he eventually had to withdraw because the South African government refused his Chinese American wife entry into the country despite the pleas for an exception Smith had made using friends in high places.[336] Smith

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[332] *Ibid.*, file R/111, letter of 16 July 1973 from M.M. Smith and file S/19, Messrs Spence & Weedon, letter of 25 July 1977 from M.M. Smith. JLBSI, Annual Report 1973/74, p. 5 and Annexure A.

[333] Records of the JLBSI, file N/42, letters of 7 and 13 October 1965; file O/51, letter of 1 December 1971 from M.M. Smith to W. Beacon [Deacon?] and his reply, and letter of 13 October 1975 from Deacon to minister of Economic Affairs; and file S/18, letter of 15 May 1974 to M.M. Smith; also files F/84, M/107, M/110 and P/101.

[334] Records of the JLBSI, file A/18, letter of 5 April 1965 from the Anglo American Corporation to J.L.B. Smith.

[335] JLBSI, "Director's Report" attached to minutes of Board meeting of 19th September 1977, pp. 3-4. Records of the JLBSI, file A/18, letters of 17 May, 23 June, and 15 October 1965. J.E. Randall, personal communication, 7 August 1996.

[336] Records of the JLBSI, file N/36, letter of 21 July 1965 from Smith to Meiring Naudé, and file O/24 G.H. Oosthuizen, letter of 3 September 1965 from D.G. Kingwill to Smith, letter of 14 September 1965 from Smith to D.G. Kingwill and letter of 24 September 1965 from G.H. Oosthuizen to Smith. See also page 193.

then offered the fellowship to Dr P.H.J. Castle of New Zealand whose main research interest had been the systematics of eels, a large group of fishes that Smith could not address adequately for lack of time.[337] Smith knew Castle from correspondence on eel systematics started in 1959 and they had exchanged publications.[338]

Having completed his Ph.D. in late 1964 Castle viewed the fellowship as a postdoctoral appointment. He took a leave of absence from his lecturing post at the Victoria University of Wellington, New Zealand, and arrived in Grahamstown in August 1966. To Castle's surprise he and Smith got along quite well despite Smith's reputation for having an intractable nature.[339] In retrospect, the 'chemistry' between the two men can be attributed to at least one common trait – their dedication to science. The fellowship was a dream deal for a young scientist. In addition to the return trip from New Zealand to South Africa, the fellowship paid Castle's salary and provided an annual travel grant. The latter grant allowed him to visit other institutions in South Africa on a regular basis, as well as a trip to Europe in 1968.[340] Additional funding for research was provided by RU and the CSIR.[341] Anglo-American also provided most of the funding to start the department's *Special Publication* series.[342] Initially designed as a vehicle for reporting Castle's results, the series has continued to the present. An X-ray facility is an essential tool for eel taxonomy. Before Castle's arrival Smith had been using the 1930 vintage dentist machine at the RU's Department of Physics. However he knew that the old machine would be inadequate for Castle's work and he approached Anglo-American for a modern one.[343] Although the company

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[337] P.H.J. Castle, personal communication, 21 December 1995. Records of the JLBSI, file A/18, letters of 13 January, 15 April and 6 May 1966.

[338] Records of the JLBSI, file C/187, Castle, correspondence of the years 1959 - 1965. *Grocott's Mail*, 13 January 1967.

[339] P.H.J. Castle, personal communication. See pages 111, 116 for Smith's reputation.

[340] P.H.J. Castle, personal communication.

[341] Records of the JLBSI, file C/187, letter of 28 November 1967 from the registrar of the RU and a RU expenditure report for July 1968.

[342] P.H.J. Castle, personal communication.

[343] Records of the JLBSI, file A/18, letters of 15 April 1966.

agreed to buy the equipment, Smith cancelled the deal when two Grahamstown doctors donated a suitable machine to the department.[344]

Castle was a prolific worker, and in about three years he produced nine papers that contributed significantly to the knowledge of eels. In the WIO he worked mainly on conger eels, pike congers and spaghetti eels (families Congridae, Muraenesocidae and Moringuidae, respectively). In a visit to the collection of the SAM, Castle discovered two very large and unusual larvae one of which was an undescribed species.[345] Castle came to South Africa with a reputation of being a good eel specialist. In addition to his work on WIO eels he was frequently asked to help overseas colleagues with eel identification, particularly eel larvae. During his stay at the Institute he identified collections from the south Pacific Ocean, the eastern Indian Ocean, and the south Atlantic Ocean.[346] In 1968 he was invited by E. Bertelsen of the Zoological Museum of the University of Copenhagen, Denmark, to study the eel larvae collected by the Danish American North Atlantic Expedition. His stay in Copenhagen (September-November 1968) was funded by the Danish Johannes Schmidt Foundation.[347] Possibly Castle's most important contribution to eel taxonomy was his bibliography of eel larvae. In this paper he indexed about 600 descriptions of eel larvae, published from 1758 to the end of 1968, in several checklists grouping references by different criteria. This work is an essential tool for matching larvae described as species (e.g. *Leptocephalus* spp.) with their adult species.[348] Castle and his

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[344] *Ibid.*, letters of 6 May and 18 November 1966 and file C/187, letter of 14 May 1966. P.H.J. Castle, personal communication.

[345] P.H.J. Castle, "Two remarkable eel larvae from off Southern Africa," *Special Publication of the Department of Ichthyology, Rhodes University*, No. 1, 1967, p. 2.

[346] P.H.J. Castle, "Synaphobranch eels from the Southern Ocean," *Deep-sea Research*, Vol. 15, 1968, p. 393. P.H.J. Castle, "Species structure and seasonal distribution of leptocephali in the eastern Indian Ocean (110°E)," *Cahiers ORSTOM, série Océanographie*, Vol. 7, No. 2, 1969, pp. 54-56. P.H.J. Castle, "Ergebnisse der Forschungsreisen des FFS 'Walther Herwig' nach Südamerika. XI. The Leptocephali. *Archiv für FischereiWissenschaft*, Vol. 21, No. 1, 1970, p. 1.

[347] Castle, P.H.J. "Distribution, larval growth and metamorphosis of the eel *Derichthys serpentinus* Gill, 1884 (Pisces: Derichthyidae)," *Copeia* 1970, No. 3, p. 452.

[348] Castle, P.H.J. 1969. "An index and bibliography of eel larvae," *Special Publication of the JLB Smith Institute of Ichthyology*, No. 7, 1969, pp. 4-5.

family left Grahamstown at the end of May 1969 and he returned to his post at the University of Victoria.

The J.L.B. Smith Institute of Ichthyology, Grahamstown

In the year following J.L.B. Smith's death in January 1968 the future of the Department of Ichthyology and of M.M. Smith at RU was in a state of flux. The CSIR continued to pay Smith's salary without disruption, but her position was tenuous because a decision on a new HOD was delayed.[349] Apparently the CSIR had reservations about continuing their financial support of the fish collection and fish research at RU without an ichthyologist of high standing at the helm. RU was not interested in taking sole financial responsibility for the collection. Two alternatives were considered: moving Smith's collection to and integrating it with the established collection of the SAM in Cape Town; or handing over the fish collection and Smith's extensive reprint collection to ORI, then a young institution in Durban. J.L.B. Smith himself favoured giving his collection to ORI and tried, though unsuccessfully, to pre-arrange it with the CSIR long before his death.[350] M.M. Smith opposed any move from Grahamstown, even though it was logical to move closer to the sea, and refused to part with the book and reprint collection, which she now owned.[351] At the end of April 1968 the vice-president of the CSIR and the head of its University and Medical Research Division visited RU and held talks with Smith and university authorities. Consequently, the CSIR accepted Smith as the acting head of the department and allowed her to submit an application for funding; later in the year she was appointed research associate in charge of its ichthyology research at RU.[352] The university appointed an *ad hoc* committee to consider the future of the Department of Ichthyology. The committee recommended that ichthyology should remain a discipline supported by RU, but that its nature should be determined over a period of

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[349] Records of the JLBSI, file M/15, letter of 1 March 1968 from M.M. Smith to the CSIR.

[350] *Ibid.*, file C/4, letters of 9, 17 and 19 March, and 30 April 1959 from J.L.B. Smith.

[351] P.A. Hulley, personal communication.

[352] Records of the JLBSI, file C/27, CSIR correspondence with Registrar, letter of 7 March 1968 to M.M. Smith and circular of 19 June 1968 from the RU registrar; file C/27A, "Report for May 31, 1968," p. 4; and file J/65, J.L.B. Smith Institute of Ichthyology, letter of 8 October 1968 from the RU registrar to M.M. Smith.

Figure 8. Professor Margaret M. Smith, first director of the J.L.B. Smith Institute of Ichthyology, with Drs Gerald R. Allen (left) and John E. Randall in 1979.

three years. To incorporate the department into its teaching environment, the committee recommended that Smith be appointed HOD and Senior Lecturer, and that the latter status also be offered to Dr P.H.J. Castle. The committee also recommended that the name of J.L.B. Smith be associated in some way with ichthyology at RU.[353] In November 1968 the CSIR appointed a Steering Committee for Ichthyological Research, later changed to Joint Steering Committee at the request of RU, to review fish research at the university.[354] The committee met at RU on 11 December 1968 and, following a thorough discussion, recommended to the CSIR and RU that the department should continue to operate under the name of the J.L.B. Smith Institute for Ichthyological Research, with Smith as director (Fig. 8), and under the supervision of a Board of Control. It also made several recommendations regarding the finances of the new Institute. The

[353] RU Council, Vol. 15, joint research committee, minutes of meeting held on Monday, 17 June 1968 at 4.00 p.m. and Vol. 16, minutes of council meeting held on Friday, 25 October 1968, at 2.15 p.m., p.6.

[354] Records of the JLBSI, file C/27, CSIR correspondence with Registrar, undated document by Dr C. v.d. M. Brink, "Summary of the decisions of the Joint Steering Committee appointed to investigate the research undertaken in the field of ichthyology at Rhodes University," p. 1. [Most likely compiled between 11-19 December 1968.]

RU Council approved these recommendations on 13 December 1968, but changed the name to the J.L.B. Smith Institute of Ichthyology and the CSIR concurred.[355]

The mandate of the new Institute was to continue with research on fishes and, because it incorporated the old Department of Ichthyology, to provide students with training in ichthyology.[356] The latter posed a problem for Smith. She was not a qualified biologist and could not teach ichthyology.[357] In fact, the only qualified and experienced marine fish systematist in South Africa at the time was P.H.J. Castle who was about to return to New Zealand.[358] Smith had to recruit new staff members, and while on a tour of ichthyology laboratories in the U.S.A. she found two potential candidates. At a meeting of the American Society of Ichthyologists and Herpetologists she attended in June 1969 in New York she met C.S. Woods, an Irishman who was doing post-doctorate work in Canada and who expressed an interest in coming to South Africa. While visiting the Institute of Marine Science, University of Miami, Smith was introduced to T.H. Fraser, then a Ph.D. student at that Institute.[359] Evidently Fraser made a good impression on her as she convinced him to apply for the lecturer post at the JLBSI. Woods, however, decided to return to Ireland before Smith made her choice.[360] Fraser was offered the job, accepted the appointment in December 1969 and arrived in Grahamstown, with his wife and two children, on 16 March 1970.[361] Professor P.H. Skelton, the current director of the JLBSI, was Fraser's first and only student.[362]

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[355] *Ibid.*, pp. 1-2, and letter of 19 December 1968 from the registrar to M.M. Smith. RU Council, Vol. 16, minutes of meeting held on Friday, 13 December 1968, at 2.15 p.m., pp. 6-7.

[356] See page 184 for the background to teaching and the continuity issue.

[357] Jackson, "Variations on a theme," p. 38.

[358] See page 131 for details about Castle.

[359] JLBSI, Progress Report: 1 June, 1968 - 30 November, 1969, p. 1 and attached report on American study tour - May 25th to November 7th, 1969.

[360] Records of the JLBSI, file C/187, letter of 20 January 1970.

[361] JLBSI, Progress Report: 1969 - 1970, p. 2.

[362] JLBSI, Annual Report 1st September, 1972, to 31st August, 1973, p. 4 and "Director's comments" attached to the Annual Report for 1973/74, p. 3.

While settling into his new job at the JLBSI, Fraser completed several projects he had started before coming to Grahamstown. These included work within his primary research interest, namely the systematics of the cardinalfishes and the sea perches (Apogonidae and Centropomidae, respectively); a paper on a nerve staining technique; and a study of flounders (Paralichthyidae) in Florida.[363] To study apogonid and centropomid type specimens, Fraser travelled to museums in Holland, France, England and the U.S.A. in 1972.[364] The data collected during this trip were used in most of his subsequent cardinalfish papers, including a description of a new genus published while he was still in Grahamstown.[365] In 1972 Fraser published his Ph.D. dissertation that had been revised and enlarged in Grahamstown. This paper was the first of the *Ichthyological Bulletin* series to appear under the name of the JLBSI.[366] With Smith's approval, Fraser introduced sweeping changes in the collection. Type specimens were separated from the main body of the collection, the whole collection was moved from formalin preservation to propyl alcohol, and proper specimen accessioning procedure was established.[367]

During his three years in Grahamstown Fraser collected fishes in the Port Elizabeth area and along the KwaZulu-Natal coast.[368] He also went on two major field trips to WIO countries. In 1970 he spent two weeks at the Marine Biological Station on Inhaca Island, Mozambique, then run by the Portuguese colonial government, and in 1971 he travelled to Mauritius and St. Brandon Shoals.[369] Although the main goal of these trips was to collect cardinalfishes there were

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[363] JLBSI, Annual Report 1st November 1970 - 31st August 1971.

[364] JLBSI, Annual Report 1st September, 1971, to 31st August, 1972, Appendix B, p. 2.

[365] JLBSI, Annual Report 1972 - 1973, p. 8.

[366] T.H. Fraser, "Comparative osteology of the shallow water cardinal fishes (Perciformes: Apogonidae) with reference to the systematics and evolution of the family," *Ichthyology Bulletin of the JLB Smith Institute of Ichthyology*, No. 34, 1972, p. v.

[367] JLBSI, Progress Report 1969 - 1970, pp. 2-3 and Annual Report 1970 - 1971, pp. 7-8. Annual Report 1971 - 1972, p. 3.

[368] JLBSI, Progress Report 1969 - 1970, p. 3.

[369] JLBSI, Annual Report 1970 - 1971, p. 6.

unexpected finds such as a new species of klipfish collected in the intertidal zone of Mauritius.[370] The collections he made in this trip also included several new blennies and gobies that were described by ichthyologists from other institutions, and a new cardinalfish, *Apogon abrogramma*, from St. Brandon Shoal.[371] All financial support for his research came from the CSIR grant to the JLBSI.[372] Fraser left Grahamstown in August 1973 "...mainly because his wife never became 'acclimatised' to being so far away from her home..." and took a post-doctoral fellowship at the United States National Museum of Natural History, Washington D.C., to continue the study of cardinalfish systematics.[373]

Fraser was replaced by Dr Richard Winterbottom who was appointed in June 1973 and took office in November that year.[374] Born in 1944 in Livingstone, Northern Rhodesia (now Zambia), his family later moved to Cape Town where he went to school and university, completing a B.Sc. degree at UCT in 1967. He then proceeded to study at Queen's University, Kingston, Ontario, Canada, from which he received his Ph.D. in 1971.[375] Winterbottom had had a long relationship with the Smiths and M.M. Smith did not hide her wish to bring him back to the country.[376] On his arrival he proceeded to acquaint himself with the JLBSI fish collection and the

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[370] T.H. Fraser, "A new species of the klipfish genus *Springeratus* (Clinidae) from the Indian Ocean," *Special Publication of the J.L.B. Smith Institute of Ichthyology*, No. 9, 1972, p. 3.

[371] T.H. Fraser and E.A. Lachner. "A revision of the cardinalfish subgenera *Pristiapogon* and *Zoramia* (genus *Apogon*) of the Indo-Pacific region (Teleostei: Apogonidae). *Smithsonian Contributions to Zoology*, No. 412, 1985, pp. 5, 8. T.H. Fraser, personal communication, 3 March 1996.

[372] T.H. Fraser, personal communication.

[373] JLBSI, Annual Report 1972 - 1973, p. 1 and Annual Report for 1974/75, attached 'Report for the three years 1972 - 1974,' p. 3. [Submitted to the CSIR.]

[374] Records of the JLBSI, file W/46, Winterbottom, letter of 20 June from the registrar of the RU. JLBSI, Annual Report for 1973/74, p. 1.

[375] JLBSI, Annual Report 1972 - 1973, Annexure A.

[376] See page 188.

South African fish fauna, and by the middle of 1974 he discovered several type specimens of J.D.F. Gilchrist and C. von Bonde previously considered lost.[377]

Winterbottom did much field work throughout his employment with the JLBSI. In fact, he started collecting before he even arrived in South Africa. On his way from North America to South Africa, Winterbottom took time to tour several countries in the Mediterranean, including Italy, Yugoslavia and Greece. He collected inshore fishes and obtained specimens from local markets. [378] This was an important addition to the collection from a previously unrepresented area. Winterbottom spent much time in the field with his students and was among the first to use scuba diving and rotenone to collect fishes in South Africa.[379] While Fraser's collecting effort was directed mostly toward the WIO outside South Africa, Winterbottom collected mostly in the country. He worked in Transkei (now part of the Eastern Cape Province; August 1974 and January 1975 in the Coffee Bay area; September 1974 at Mazeppa Bay; September 1975 from Coffee Bay to South Sand Bluff), and northern KwaZulu-Natal (September 1974 at Shaka's Rock, Salt Rock and Sodwana Bay; July 1976 from Sodwana Bay to Boteler Point). The Cape region was not left out and additional collections were made in Port Alfred (May 1974 and June 1975), Cape Padrone (July 1975), Kenton-on-Sea and Bushman's River Mouth (May 1974 and October 1975), Tsitsikamma National Park (November 1975) and False Bay (December 1974 and November 1975).[380]

In these trips Winterbottom and his students were assisted by R.E. Stobbs, the JLBSI's technician, boat skipper and diving supervisor.[381] The need for technical assistance was identified soon after the JLBSI was established.[382] It was exacerbated when Fraser arrived in Grahamstown

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[377] See page 56.

[378] JLBSI fish collection database.

[379] R. Winterbottom, personal communication, 30 September 1993.

[380] JLBSI fish collection database.

[381] JLBSI, Annual Report for 1973/74, p. 6.

[382] JLBSI, Progress Report 1968 - 1969, attached report on the European study tour 1968 - 1969, p. 2, and Annual Report 1970 - 1971, p. 2.

and started overhauling the collection.[383] Moreover throughout Fraser's tenure the JLBSI had been buying new research equipment that needed expert handling and maintenance, chores that took valuable time from the scientists.[384] Space constraints in the old department building made it impossible to hire a full-time technician, so when Stobbs started working for the JLBSI he was employed on a part-time basis on Saturday mornings.[385] In September 1973 Stobbs accompanied Smith on an expedition to northern Mozambique, contributing his technical prowess, organising abilities and knowledge of East African molluscs.[386] To keep the skilled Stobbs at the JLBSI Smith motivated for hiring him full-time at a Board meeting on the eve of the expedition.[387] Consequently Stobbs was hired in February 1974.[388] In retrospect Smith could not have made a better choice. Stobbs was a qualified medical technician, experienced in building and maintaining aquaria, an amateur malacologist, an able handyman, photographer and diving supervisor.[389] He certainly proved to be an asset to the JLBSI. Soon after he had joined the JLBSI as a permanent staff member it became clear that he could do much more than technical work.[390] In the 1970s he ran a research project on feeding biology of the giant clingfish[391] and led the eel research

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[383] JLBSI, Progress Report 1969 - 1970, p. 2.

[384] *Ibid.*, p. 3. Annual Report 1970 - 1971, p. 2; Annual Report 1971 - 1972, p. 2; and Annual Report 1972 - 1973, p. 4.

[385] JLBSI, Board meeting, minutes of the meeting held on Monday, 6th November, 1972, at 9 a.m., p. 1 and Annual Report for 1973/74, p. 1.

[386] JLBSI, Annual Report for 1973/74, p. 5 and Annual Report for 1974/75, 'Report for 1972 - 1974,' p. 3.

[387] JLBSI, Board meeting, minutes of the meeting held on Monday, 24th September, 1973, at 2.15 p.m., p. 2.

[388] JLBSI, Annual Report for 1973/74, p. 1.

[389] JLBSI, Annual Report 1973/74, attached "Director's comments," p. 1.

[390] JLBSI, Annual Report for 1974/75, attached "Report for 1972 - 1974," p. 4.

[391] R.E. Stobbs, "Feeding habits of the giant clingfish *Chorisochismus dentex* (Pisces: Gobiesocidae)," *South African Journal of Zoology*, Vol. 15, No. 3, 1980, pp. 146-149.

project of the JLBSI.[392] In the mid-1980s and early 1990s he established himself as a world authority on the history of coelacanth research. Retired in March 1994, Stobbs has continued to serve the JLBSI as a technical consultant.[393]

In undertaking his extensive sampling programme Winterbottom's objectives were to:[394]

- build up the JLBSI collection of inter- and subtidal fishes;
- get an idea of diversity and abundance as well as identify dominant species in various habitats in different localities;
- investigate the concepts of geographical transitions and numerical dominance of fish faunal elements;
- collect ecological data to study resource partitioning and compare similar habitats in different regions of the South African coast.

The programme resulted in numerous range extensions and new records to South Africa,[395] at least two new species were discovered,[396] and taxonomic problems were resolved particularly in the families Clinidae and Gobiidae.[397] Despite the frequent field trips and his teaching commitments Winterbottom continued with research he had started before coming to Grahamstown. This involved a revision of the South American characoid subfamily Anostominae.

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[392] JLBSI, Annual Report for 1974/75, attached "Report for 1972 - 1974," p. 4 and Annual report 1975-1976, p. 27.

[393] JLBSI, Annual Report for 1994/1995, p. 6.

[394] R. Winterbottom, "Additions to, and range extensions of the South African marine ichthyofauna," *Zoologica Africana*, Vol. 11, No. 1, 1976, p. 59.

[395] *Ibid.*, pp. 59-60. R. Winterbottom, "Range extensions and additions to the South African marine ichthyofauna, with the description of a new species of congrogadid from Kwazulu," *Zoologica Africana*, Vol. 13, No. 1, 1978, p. 41.

[396] R. Winterbottom, "Range extensions and additions," pp. 41, 49-52. R. Winterbottom, "A new genus and three new species of the family Congrogadidae (Pisces, Perciformes) from Natal, South Africa," *Annals of the South African Museum*, Vol. 83, No. 1, 1980, pp. 1-2.

[397] R. Winterbottom, "On *Clinus nematorpterus* Günther with notes on other South African clinid fishes," *South African Journal of Science*, Vol. 72, 1976, p. 178-180. R. Winterbottom, "Notes on South African gobies possessing free upper pectoral fin rays (Pisces, Gobiidae)," *Special Publication of the J.L.B. Smith Institute of Ichthyology*, No. 16, 1976, p. 1.

Winterbottom's wife had a job and family in Canada and at the end of 1976 they returned to Canada where he is now a curator of ichthyology and herpetology at the Royal Ontario Museum, Toronto.[398] South African born Dr M.N. Bruton, a freshwater fish ecologist who later became the second director of the JLBSI, succeeded Winterbottom in the lecturing post in January 1978.[399]

The three years Winterbottom spent at the JLBSI were a turning point in the Institute's development as it diversified to encompass the zoogeography, evolution, ecology and fisheries potential of the southern African and WIO fish fauna.[400] Students started ecological studies in the intertidal zone and estuaries, but it was soon realized that intertidal and estuarine fish communities were not well known and systematic studies followed.[401] Although this diversification was considered to be a necessary development for the JLBSI to be in tune with the trends of the time, it did not last long.[402] When the JLBSI became a National Museum in 1980 its marine division returned to its traditional role of being a centre of fish systematics. The ecological and fisheries studies were taken over by the re-established DIFS at RU. Ecological studies of estuarine fishes at the JLBSI resumed in 1987 when Dr A.K. Whitfield joined the Institute.[403]

Another major milestone of the JLBSI that took place during Winterbottom's tenure was the Institute's move into its new building. Shortly after J.L.B. Smith died the university had contemplated moving the Department of Ichthyology into a small prefabricated structure that

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[398] JLBSI, Annual Report for 1975 - 1976, p. 4. W. Holleman, personal communication, 11 April 2002.

[399] Pote, "Historical highlights," pp. 17, 19.

[400] Records of the JLBSI, file W/46, document of May 1975, "Current research activities and trends of the JLB Smith Institute of Ichthyology," May 1975, p. 2.

[401] *Ibid.* JLBSI, Annual Report 1975 - 1976, p. 31.

[402] Records of the JLBSI, file W/46, "Current research activities," p. 1 and file C/187, letter of 13 December 1975.

[403] Pote, "Historical highlights," p. 23.

belonged to the Department of Chemistry, but it turned out to be impractical to do so.[404] In retrospect, this was a fortunate event for the JLBSI. M.M. Smith convinced the Steering Committee that better accommodation was needed. The recommendation the committee made resulted in a commitment by RU that eventually led to a new building for the JLBSI.[405] The planning of the new building started immediately, but it was a long haul before the building became a reality. In the interim period, to relieve the congestion in the old building, the JLBSI was given two rooms in the Department of Chemistry building on campus which were used to accommodate staff, books and collections. [406] RU appointed East London architects, Messrs Vos, Lane and Vincent, to design the new building. Smith and Fraser prepared the scientific requirements (for instance, the large collection room at the basement) after her two overseas trips to examine existing ichthyological laboratories around the world.[407] A year later Smith received positive feedback on the draft plan for the building she presented to colleagues while attending a conference in the U.S.A.[408] Once construction started in January 1974, progress was fast and the building was completed well ahead of schedule. The roof wetting ceremony took place on 21 February 1975 and the building was handed over to the Institute at the end of July that year.[409] For most of 1975 the staff of the JLBSI was occupied with the building, first preparing to move and then the move itself. Moving the fish collection was a joint effort of the staff and volunteers from the general public. The latter included school children, both black and white, and anglers

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[404] Records of the JLBSI, file C/27, CSIR correspondence with registrar, letter of 22 March 1968 from M.M. Smith to the registrar.

[405] *Ibid.*, "Summary of the decisions," p. 2 and letter of 19 December 1968 from the registrar to M.M. Smith. RU Council, meeting of 13 December 1968, p. 7.

[406] Records of the JLBSI, file M/15, letter of November 1969 from M.M. Smith. JLBSI, Annual Report for 1974/75, attached "Report for 1972 - 1974," p. 1.

[407] JLBSI, Progress Report 1969 - 1970, pp. 1, 4.

[408] JLBSI, Annual Report 1970 - 1971, p. 2.

[409] JLBSI, Annual Report for 1973/74, p. 1 and Annual Report for 1974/75, p. 1.

from the Grahamstown District Sea Angling Club.[410] The official opening of the building purposefully took place on 26 September 1977 to commemorate J.L.B. Smith's 80th anniversary; it was also M.M. Smith's 61st birthday.[411]

The huge administrative load of getting the new Institute and the new building on the road considerably reduced the time Smith had for her own research work. Nevertheless during the period 1969-1975 she collated J.L.B. Smith's publications in four fully indexed volumes and managed to publish 1-2 scientific papers per year.[412] In 1973 she led a major expedition to survey the coral reefs of northern Mozambique, following which she went on to collect in the islands of Mauritius and Réunion. These expeditions added valuable material to the collection and expanded its coverage of the WIO fish fauna.[413]

Looking back at the first 10 years of the JLBSI, Smith had good reasons to be proud of her creation. Despite the difficulties of the first years, including her inexperience as director and independent researcher, the research staff of the Institute produced 70 scientific papers, 25 books or chapters in books and attended 55 conferences, delivering 45 presentations. They conducted numerous collecting trips, participated in six major expeditions of which four were in other countries and went on 10 trips to work in museums and laboratories abroad. There was also a high level of interaction with the general public, including 11 exhibitions on the life of J.L.B. Smith, 57 popular science articles, 176 popular lectures, 95 broadcast programmes and numerous radio and television interviews in South Africa and abroad.[414]

At the establishment of the JLBSI the 5th edition of SFSA, last printed in 1965, had been out of print and the idea of revising the book before reprinting it was floated by B. Le May then chairman

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[410] JLBSI, Annual Report for 1974/75, p. 2 and attached "Report for 1972 - 1974," p. 2.

[411] JLBSI, Tenth Annual Report, p. 3. Pote, "Historical highlights," p. 17.

[412] See the Publications section in the annual reports for the years 1969 - 1975.

[413] JLBSI, Annual Report for 1973/74, p. 5.

[414] JLBSI, Tenth Annual Report, p. 5.

of the SFSA book fund.[415] Smith had her plate full with the new Institute so the book was reprinted in 1972.[416] However the need for the revision was on her mind and indirect preparation was made through her publication about the common names of South African marine fishes.[417] In September 1975 the Board of Control of the JLBSI approved the SFSA revision as the main research project of the marine division of the Institute.[418] The project was then submitted to the CSIR with the starting date of October 1975 and a duration of five years;[419] Mrs. S. McKinnel was hired as a part-time research assistant.[420] At about the same time the old, inactive SFSA book fund was replaced by the Sea Fishes of Southern Africa Trust.[421] The new book was to be called *Smiths' Sea Fishes* (SSF). The timing of the project was not coincidental. The old SFSA was out of date; the original plates and type were deteriorating; the John S. Schlesinger Foundation made R25,000 available over five years for a fellowship bearing the same name to bring prominent ichthyologists to work at the JLBSI;[422] and not least of all, at the end of 1975 the move into the new building was completed. Initially Smith believed that she could handle the revision herself with the help of a research assistant.[423] However she soon recognised that the administration the

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[415] Records of the JLBSI, file L/9, letter of 5 September 1968 to M.M. Smith. See also page 89.

[416] Records of the JLBSI, file C/116, Sea Fishes, "Report to the trustees on the revision of 'the Sea Fishes of Southern Africa,'" p. 1, attached to letter of 16 February 1977 from M.M. Smith.

[417] JLBSI, Annual Report for 1974/75, p. 6.

[418] JLBSI, Board meeting, minutes of the meeting held on Friday, 19th September, 1975 at 0900, p. 1.

[419] Records of the JLBSI, file C/27D, National register of research projects, project form attached to letter of 28 November 1975 from the RU registrar to M.M. Smith.

[420] JLBSI, Annual Report 1975 - 1976, pp. 25-26.

[421] Records of the JLBSI, file C/116, agenda for meeting of 23 October 1975 and copy of Trust Deed signed on 23 November 1975.

[422] JLBSI, Annual Report for 1974/75, p. 1 and Board meeting of 19th September, 1975, p. 2. Records of the JLBSI, file C/116, "Report to the trustees," pp. 2-7.

[423] JLBSI, Annual Report for 1975 - 1976, p. 26.

JLBSI would leave her little time for scientific work and she told the Board of Control that a full-time qualified and experienced marine fish systematist should be hired.[424] For the same reason Smith had no option but to make the SFSA revision a collaborative project, but there seems to be no record of a specific decision to go that way. She also raised funds from the new trust for clerical assistance; reduced her role to that of the senior editor of the book; and arranged for Dr A.J. Bass, then at ORI, Durban, to work on South African elasmobranches as the first J.S. Schlesinger fellow.[425] While Bass was in Grahamstown the JLBSI received a donation of a large collection of sharks from ORI which Bass was able to work on and incorporate into the JLBSI collection.[426]

In the absence of South African marine fish systematists Smith had to look for suitable candidates overseas. She consulted Dr J.E. Randall with whom she collected fish in Mauritius and Reunion Islands in 1973. Randall recommended two American ichthyologists, J.M. Leis and P.C. Heemstra.[427] Leis had already accepted a fellowship to work in Australia, so Smith hired P.C. Heemstra with five-year funding provided by SANCOR.[428] SANCOR's money came with the condition that an editorial board be created to oversee the project. Smith was not entirely happy with this demand but consented because she needed the funds.[429] Heemstra was born in 1941 in Melrose Park, Illinois, U.S.A. He received his B.Sc. in Zoology from the University of Illinois at Urbana (1963) and studied for his M.Sc. (1968) and Ph.D. (1974) at the University of Miami, Florida. His research interest encompasses the systematics, biology and conservation of marine fishes. He has been the marine fish curator of the JLBSI since his arrival in Grahamstown in 1978

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[424] Records of the JLBSI, file C/116, "Report to the trustees," p. 8.

[425] JLBSI, Annual Report for 1975 - 1976, p. 4 and Board meeting of 19th September, 1975, p. 1. Records of the JLBSI, file C/116, "Report to the trustees," pp. 6-9.

[426] JLBSI, Annual Report for 1975 - 1976, p. 5 and Board meeting of 19th September, 1975, p. 2.

[427] Gon, "Fifty years," p. 56.

[428] Records of the JLBSI, file J/65E, Steering Committee of the JLBSI, minutes of the meeting held on 15 July 1977, p. 2 and letter of 10 November 1977 from F.J. Hewitt to Dr D. Henderson. See page 9 for information on SANCOR.

[429] JLBSI, Tenth Annual Report, pp. 12, 14.

and has played an important role in the growth of the collection, especially with regard to the fishes of the WIO. Heemstra joined Smith as a junior editor of SSF and they enlisted 75 specialists from 15 countries to contribute chapters for the book.[430] He also did his own research and contributed 74 chapters to SSF.[431]

Field work was an important component of the SSF project. The intensive work, using scuba diving in the subtidal zone, initiated by Winterbottom, highlighted the need for a diving vessel. After rejecting the idea of using an inflatable boat the JLBSI purchased a 17-foot ski boat built to specifications by a Port Elizabeth company and equipped with an echo-sounder. The new boat was named MARLIN, after J.L.B. Smith's favourite dog. The boat was used for the first time for the first SSF expedition in 1977 to Sodwana Bay, but proved to be a mixed blessing. The dirt roads around Sodwana Bay were too rough for the trailer which broke down causing two holes in the boat's hull. Both were repaired with help of Natal Parks Board personnel at Sodwana Bay.[432] On returning to Grahamstown Stobbs, the boat skipper, made several modifications to the boat, including building an entirely new super structure.[433] Despite Stobbs' efforts to improve her performance and sea-worthiness, design and construction flaws made it necessary to completely rebuild MARLIN following a near-disaster failure of the steering mechanism in the Knysna lagoon in December 1979.[434] However she was still too heavy and underpowered and, consequently, underutilised. MARLIN was decommissioned in 1984 and was sold in October 1990.

The 1977 expedition to Sodwana Bay included Randall, by then a major collaborator with SSF. He was the third recipient of a J.S. Schlesinger Fellowship (the second was a fish parasitologist not associated with SSF). However the objective of surveying the off-shore reefs

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[430] Smith and Heemstra, *Smiths' Sea Fishes*, pp. xii-xiii.

[431] *Ibid.*, pp. xiv-xx.

[432] JLBSI, "Director's Report" attached to minutes of Board meeting of 19th September 1977, p. 6.

[433] JLBSI, Tenth Annual Report, p.40.

[434] JLBSI, Twelfth Annual Report, pp. 10, 26.

of the area was not achieved due to bad weather conditions.[435] Consequently, a second expedition took place in April 1979 with Randall and another collaborator, Dr G.R. Allen (Fig. 8), included. Though more successful then the first expedition it was not without mishaps. This time it was the Landrover, borrowed from RU, that broke down many times. When the expedition returned to Grahamstown the vehicle was taken back to the university's workshop with a carrot dangling in front of it.[436] This was the last field trip of Smith, who was then 63 years old, and Heemstra took over this aspect of the project. Shortly after the 1979 expedition to Sodwana Bay, he joined a SAM cruise (June 1979) on the CSIR vessel, MEIRING NAUDÉ, off the Transkei coast.[437] In April 1980 Heemstra and a team of divers boarded the South African Navy vessel, SAS FLEUR, to collect on the reefs of northern KwaZulu-Natal but the trip was hampered by bad weather which forced the ship to seek shelter in Richard's Bay.[438] Heemstra also made several collections at the Tsitsikamma Coastal National Park (1980-82).[439] In 1982 he joined students of DIFS on a trip to Coffee Bay in Transkei. Since then a visit to Coffee Bay has become the traditional annual field trip of the honours class of the department.[440] In November 1983 Heemstra took part in a research cruise of the RS AFRICANA along the eastern Cape coast.[441] *Ad hoc* collections were made in Port Alfred (1978) and Algoa Bay (1981).[442] Throughout the SSF project numerous specimens were donated to the JLBSI by members of the public, scientists, museums and research

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[435] JLBSI, "Director's Report" attached to minutes of Board meeting of 19th September 1977, pp. 6-9.

[436] JLBSI, Eleventh Annual Report. Pote, "Historical highlights," p. 18.

[437] JLBSI, Eleventh Annual Report.

[438] JLBSI, Twelfth Annual Report, pp. 11-12.

[439] *Ibid.*, p. 12. Thirteenth Annual Report, p. 8 and Fourteenth Annual Report, p. 9.

[440] JLBSI, Fourteenth Annual Report, p. 9.

[441] JLBSI, Sixteenth Annual Report, p. 13.

[442] JLBSI, Tenth Annual Report, p. 15 and Thirteenth Annual Report, p. 8.

institutions, and Irvin & Johnson.[443] Among these specimens were several new species.[444] The specimens of six of the new species, including an unusual six-gill sting ray, came from the public, demonstrating the importance of the relationship between the JLBSI and the public.[445] *Hexatrygon bickelli*, named after Dave Bickell, an angling columnist who had found it on a Port Elizabeth beach, had several anatomical features which were strikingly different from all other known stingrays and mantas (myliobatiform fishes), including six gill arches, the morphology of its snout and the configuration of its spiracle. It was classified in a suborder, family and genus of its own,[446] and was regarded as one of the most important ichthyological discoveries since the first living coelacanth.[447] During the SSF years the scientists and students of the JLBSI and DIFS benefited from visiting collaborators who were internationally known ichthyologists.[448]

The increased level of field work during Winterbottom's years, followed by the high level of research and editorial work of the SSF project and enhanced field work of the freshwater ichthyologists of the JLBSI, stretched the staff of the Institute to their limit. In 1976 E. Matama, hired in the previous year as a laboratory assistant for a freshwater eel culture project, was put in charge of the collection, and Mrs H. Tomlinson, then a new secretary and administrator, did the

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[443] JLBSI, Tenth Annual Report, p. 10; Twelfth Annual Report, p. 12; Thirteenth Annual Report, p. 9; Fifteenth Annual Report, pp. 11, 22; and Sixteenth Annual Report, pp. 13, 39.

[444] JLBSI, Tenth Annual Report, p. 15; Twelfth Annual Report, pp. 10-12; Thirteenth Annual Report, pp. 6-8; Fourteenth Annual Report, p. 9; and Fifteenth Annual Report, p. 11.

[445] P.C. Heemstra, "Smiths' Sea Fishes – A milestone in the ichthyology of southern Africa," *Ichthos*, No. 12, 1986, pp. 2-3.

[446] P.C. Heemstra and M.M. Smith, "Hexatrygonidae, a new family of stingrays (Myliobatiformes: Batoidea) from South Africa, with comments on the classification of batoid fishes," *Ichthyological Bulletin of the J.L.B. Smith Institute of Ichthyology*, No. 43, 1980, p. 1. JLBSI, Thirteenth Annual Report, pp. 6-7.

[447] JLBSI, Thirteenth Annual Report, pp. 6-7.

[448] JLBSI, Tenth Annual Report, pp. 12, 15; Twelfth Annual Report, pp. 11, 42-43; Fourteenth Annual Report, pp. 5, 35; Fifteenth Annual Report, pp. 10, 38-39; and Sixteenth Annual Report, pp. 11, 36.

specimen accessioning.[449] By 1978 Stobbs and other members of staff also had to devote an increasing amount of their time to specimen curation and to handling of specimen loans.[450] Smith requested a full-time collection manager as early as 1975, but the Board of Control rejected her application for lack of funding.[451] A subsidy from the DNE allowed this post to become a reality in 1979 and B. Ranchod was hired for the job.[452] The appointment made such a difference that within a year Smith, with the support of Professor B. Allanson, convinced the remaining members of the JLBSI Board to make it a permanent position.[453] On the research side, two contract assistants were hired in 1982 to help with the increasing burden of work on SSF. Mrs J. Wright, a South African, assisted with the processing of manuscripts for the book and with the research work of Heemstra and Smith. Mr O. Gon, an Israeli whose arrival was held back for 10 months by the arrangement of his work permit, was assigned to writing a chapter on the cardinalfishes of South Africa.[454] Both Gon and Wright later became permanent staff members in the marine division of the JLBSI.

The SSF project was responsible for the establishment of an art department and the introduction of computers to the JLBSI. At the old Department of Ichthyology M.M. Smith was the principal artist. During that time and in the early years of the JLBSI other artists were employed on an *ad hoc* basis. One of these was Ms E. Tarr. The daughter of a friend of the Smiths, she was first employed as a technical assistant to work on a card index for the freshwater fishes of Africa.[455] Soon afterwards her artistic skills were realized and put to use for scientific

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[449] JLBSI, Annual Report for 1974/75, p. 2; Annual Report 1975 - 1976, pp. 5-6; and Board meeting, minutes of the meeting held on Tuesday, 21st September, 1976 a 2.30 p.m., p. 1.

[450] JLBSI, Tenth Annual Report, pp. 10.

[451] JLBSI, Board meeting of 19th September, 1975, p. 4.

[452] JLBSI, Twelfth Annual Report, p. 6.

[453] JLBSI, Board meeting, minutes of the meeting held on Wednesday 24 September 1979 at 9.30 a.m., p. 2 and steering committee, minutes of the meeting held on Thursday, 19th June [n.d., most likely 1980] at 09h30, p. 2.

[454] JLBSI, Fourteenth Annual Report, p. 4 and Fifteenth Annual Report, pp. 6, 10

[455] JLBSI, Annual Report 1972/73, pp. 1-2.

illustration, and in 1975 she became a permanent staff member of the JLBSI.[456] By the end of the 70's artwork occupied her full-time. But that was not enough for the amount of artwork required by the various JLBSI projects and she supervised several other part-time artists, mainly to assist with SSF work.[457] One of these was D. Voorvelt who joined the JLBSI in February 1983.[458] Voorvelt proved to be a versatile artist and within a year he became a permanent staff member. He took over the SSF artwork and this freed Tarr to handle other projects. Moreover being a fast and precise worker Voorvelt was able to do much more than SSF illustrations, including posters, drawings for scientific papers, and designing and building exhibitions.[459]

The SSF project ushered the JLBSI into the information age. Several collaborators and other scientists who visited the Institute during 1980-81 pointed out that a wordprocessor operated on a microcomputer would be very useful for the SSF project. Following negotiations with the South African branch of Hewlett-Packard this company donated a HP 125 computer to the project in April 1982.[460] The machine was given to J. Pote, then Smith's secretary, to type and edit SSF manuscripts. The arrival of the first computer changed the way the JLBSI operated forever. Everybody wanted to have access to it and it was difficult to refuse just-do-this-little-job-for-me-please requests. To alleviate the situation Smith purchased another identical machine using her private money at the end of 1982. One can imagine the dismay of the Institute's budding computer enthusiasts when they discovered that this machine was also given to Pote, then employed part-time, for SSF work at home in the afternoon and evening. The machines were the responsibility of Stobbs who had to learn the software and teach the staff how to use them. In the process he realized the potential of these machines for collection management and accounting.[461]

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[456] JLBSI, Annual Report for 1974/75, p. 2.

[457] JLBSI, Fourteenth Annual Report, pp. 20-21; Fifteenth Annual Report, pp. 10, 20; and Sixteenth Annual Report, p. 23.

[458] JLBSI, Fifteenth Annual Report, pp. 6, 10, 20.

[459] JLBSI, Sixteenth Annual Report, pp. 22-23.

[460] JLBSI, Fourteenth Annual Report, p. 4 and Fifteenth Annual Report, pp. 10, 19.

[461] JLBSI, Fifteenth Annual Report, p. 19.

From then until his retirement a portion of Stobbs' time was devoted to helping staff with computers. He may be regarded the JLBSI's first IT person.

The growth of the JLBSI in the 1970s strained RU's financial resources. Towards the end of this period the annual cost of the JLBSI to RU reached R75,000, an amount equivalent to about 80% of the government research subsidy to the university.[462] The vice-chancellor of RU, who was then chairman of the JLBSI Board of Control, suggested that the DNE may agree to support the museum (i.e. research) part of the JLBSI.[463] Following a period of negotiations with the DNE the JLBSI acquired the status of a Declared Cultural Institution – a state supported national museum – in 1980.[464]

M.M. Smith retired as director of the JLBSI at the end of April 1982.[465] Without the administrative load she was able to devote all her time to completing the 44 chapters she authored and co-authored, and to assist Heemstra with the editorial work of the new book.[466] In 1984 Smith underwent surgery to relieve pain in her knee caused by an old hockey injury exacerbated by arthritis. The operation did not solve the problem and she resorted to taking large doses of cortisone to be able to continue with her work.[467] The drug impaired her immune system and in the last two years of her life she was plagued by illness.[468] Fortunately she lived to see the new book published and attended its launch on 12 September 1986 at the JLBSI.[469] She died at her

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[462] Smith, "It all started," p. 2. JLBSI, Twelfth Annual Report, pp. 4-5 and steering committee meeting of 21 March 1979, p. 2.

[463] JLBSI, steering committee meeting of 21 March 1979, p. 2.

[464] Smith, "It all started," p. 2. Government Gazette, Notice No. R.794, 18 April 1980. JLBSI, Twelfth Annual Report, pp. 2-4.

[465] JLBSI, Fourteenth Annual Report, pp. 3-4.

[466] Smith and Heemstra, *Smiths' Sea Fishes*, pp. xiv-xx.

[467] Smith, "My parents," p. 29.

[468] Bruton and Heemstra. "The life and work," pp. 11-12.

[469] JLBSI, Seventeenth Annual Report, pp. 8, 12. Pote, "Historical highlights," p. 22.

home in Grahamstown on 8 September 1987.[470] In recognition of her contribution to science in South Africa Smith received numerous awards. The highest of these was the Order of Meritorious Service awarded to her by the president of South Africa on 25 February 1987.[471] Smith's death brought to an end a distinguished era in the history of ichthyology in South Africa. The Smiths dominated ichthyology in this country and in the WIO for over 50 years, founded the RUC department of ichthyology and the JLBSI, and gave it a reputation it still enjoys in South Africa and overseas.[472]

Even before SSF was published the JLBSI embarked on its next large project to produce *Fishes of the Southern Ocean* (FSO). In 1983 SASCAR invited the JLBSI to submit a research proposal on Southern Ocean fishes.[473] At that time Dr T. Hecht, the HOD of DIFS, was already working on a SASCAR funded project. The initial idea was to have a joint programme with DIFS and in 1983 the department sent students to collect fishes on two relief cruises to the sub-Antarctic Prince Edward Islands.[474] At the same time the JLBSI submitted a research proposal for a complete systematic revision of the fishes of the Southern Ocean. The project was designed for three years under the leadership of Dr H. DeWitt, a prominent American Antarctic fish systematist. RU agreed to fund half of DeWitt's salary for two years, and Gon, who had just finished his SSF work, was contracted to be DeWitt's research assistant.[475] The JLBSI director, M.N. Bruton, discussed the project with Dr J.-C. Hureau, a leading Antarctic ichthyologist, at the Fourth SCAR Symposium on Antarctic Biology at Wilderness, South Africa, in September 1983.

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[470] Pote, "Historical highlights," pp. 23-24.

[471] *Ibid.*, p. 23. Anonymous, "OMS for prof Smith," *Ichthos*, No. 14, 1987, pp. 14-15. Bruton and Heemstra. "The life and work," p. 12.

[472] Gon, "Fifty years," p. 59.

[473] JLBSI, Sixteenth Annual Report, p. 5.

[474] *Ibid.*, p. 12 and minutes of council meeting held on Thursday 24 March 1983 14h00, p. 4.

[475] JLBSI, Sixteenth Annual Report, pp. 7, 12 and minutes of council meeting held on Thursday 21st July 1983 at 14h30, p. 4.

With Hureau's backing SASCAR agreed to fund the proposal and the project was launched on 1 April 1984.[476] A month later Gon left on a tour of European Antarctic fish collections and research institutes in France, Germany, Sweden, and the U.K., where he familiarised himself with and collected data on Southern Ocean fishes, made new contacts and recruited collaborators for the project.[477] Later that year the project's international standing increased considerably when it was endorsed by the BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) Working Group on Fish Ecology.[478] Early in 1987 DeWitt withdrew from the project due to his teaching commitments and personal reasons and the deal with RU fell through. Attempts to replace him with other prominent Antarctic ichthyologists failed and Gon took over the running of the project with the assistance of Heemstra.[479] Gon and Heemstra made FSO a collaborative project much like SSF. They assembled a team of 32 scientists from 11 countries who contributed six introductory chapters and 49 taxonomic chapters. Most of the numerous illustrations as well as the attractive dust cover of the book were prepared by the versatile Voorvelt.[480]

As a member of the Antarctic Treaty South Africa participated in BIOMASS, a large international Antarctic research programme during 1976-86.[481] The JLBSI took part in two cruises that formed the Second International BIOMASS Experiment (SIBEX). In March-May 1984 a South African research team aboard the Antarctic research and supply vessel SA AGULHAS participated in SIBEX I. Because the planning of this cruise took place before the FSO project

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[476] JLBSI, minutes of council meetings held on Wednesday 21st September 1983 at 10h00, p. 5; minutes of council meeting held on Thursday 1st December 1983 at 14h30, p. 5; and Sixteenth Annual Report, p. 12.

[477] JLBSI, minutes of council meeting held on Thursday, 27 September 1984 at 10h00, p. 5. O. Gon, "A new project has been launched – preparation of a guide to the fishes of the Southern Ocean," *Ichthos*, No. 7, 1984, pp. 12-13.

[478] O. Gon and P.C. Heemstra (eds), *Fishes of the Southern Ocean* (Grahamstown, J.L.B. Smith Institute of Ichthyology, 1990), p. v.

[479] JLBSI, Seventeenth Annual Report, p. 13.

[480] Gon and Heemstra, *Fishes of the Southern Ocean*, pp. ix-xviii.

[481] Gon and Heemstra, *Fishes of the Southern Ocean*, pp. 60-61. J.R.E. Lutjeharms, "A history of recent South African marine research in the Southern Ocean," *South African Journal of Antarctic Research*, Vol. 21, No. 2, 1991, pp. 160-161.

officially started, fish were collected for the JLBSI by a research assistant from UCT. Shortly after Gon returned from Europe he joined the RV AFRICANA on the SIBEX II cruise (February-March 1985). The research work of both cruises took place in the Prydz Bay area of the Indian Ocean sector of the Southern Ocean. From an ichthyological point of view the latter cruise was a success even though it was terminated prematurely due to damage to the ship's rudder caused by a severe storm.[482] The BIOMASS programme greatly benefited FSO research because most, if not all, FSO collaborators participated in one or more BIOMASS cruises, or were able to examine material collected during these cruises. Field work was also done closer to home. Between 1985 and 1990 Gon and diving assistants visited the Prince Edward Islands (PEI) in the south Indian Ocean. South Africa has sovereign power over this sub-Antarctic island group that was included in the area covered by FSO. Sampling and observations of inshore species was done from the manned meteorological and research station on Marion Island, the larger of the two islands of the group.[483] Offshore collecting was done from aboard the SA AGULHAS during cruises of the Marion Offshore Ecosystem Study (MOES), also a SASCAR funded project.[484] Additional data came from fish remains found in the stomach contents of the seabirds of Marion Island during the early 1980s.[485] As a result of these studies the number of fish species known from PEI has tripled.[486] At the end of March 1987 the funding for FSO ended. To be able to continue with the project SASCAR provided money for another year.[487] From then until FSO was

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[482] O. Gon, "The fishes collected during the South African SIBEX I + II expeditions to the Indian Ocean sector of the Southern Ocean (60-66° S, 48-64° E)," *South African Journal of Antarctic Research*, Vol. 18, No. 2, 1988, p. 55. Lutjeharms, "Research in the Southern Ocean," p. 161.

[483] O. Gon and D. Mostert, "Aspects of the ecology of two nototheniid fish species in the inshore zone of the sub-Antarctic Marion Island," *South African Journal of Antarctic Research*, Vol. 22, No. 1, 1992, pp. 59-60.

[484] Lutjeharms, "Research in the Southern Ocean," p. 161.

[485] O. Gon and N.T.W. Klages, "The marine fish fauna of the sub-Antarctic Prince Edward Islands," *South African Journal of Antarctic Research*, Vol. 18, No. 2, 1988, pp. 34-35, 40, 48.

[486] *Ibid.*, p. 48.

[487] JLBSI, minutes of council meeting held on Thursday 25 September 1986 at 14h15, p. 5.

published in December 1990 the project ran concurrently with and its costs absorbed by a new project, funded by the then Department of Environmental Affairs, on the biology of two inshore fish species in Marion Island.[488] The Antarctic fish research programme of the JLBSI terminated in 1991. Although the stated reason was lack of funds,[489] there were other considerations. South Africa's geographical position, commonly viewed as a strategic place for marine research in the southern Atlantic and southern Indian Oceans, as well as the Southern Ocean,[490] was in fact a drawback for fish studies in the latter ocean. Project field work relied on the SA AGULHAS either for transport to and from study sites (e.g. Marion Island) or as a research platform, and was done during relief cruises to the South African bases in Antarctica and the PEI. However the distance from South Africa to the bases is large and the government cannot afford more than one cruise per year to each base. Moreover the cruises take place at a similar time every year because visits to Antarctica can only be made during summer. Consequently, research can be done for a few weeks at a fixed season effectively ruling out any long-term seasonal observations. In addition, the SA AGULHAS was not equipped for fishing other than limited midwater trawling.[491] The lack of fishing facilities for the work at the PEI bore an economic cost for the country. The presence of the patagonian toothfish, *Dissostichus eleginoides*, at the islands was first reported in 1983 by French scientists,[492] and later on confirmed from fish otoliths found in the stomachs of gentoo penguins.[493] JLBSI recommendations for a proper fish survey of the PEI area[494] were not

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[488] JLBSI, Annual Report 1991/1992, p. 24.

[489] *Ibid.*, p. 14.

[490] *Ibid.*, p. 7.

[491] O. Gon, "A concise review of Antarctic fish research in South Africa," *South African Journal of Antarctic Research*, Vol. 21, No. 2, 1991, p. 124.

[492] G. Duhamel, J.-C. Hureau and C. Ozouf-Costaz, "Ecological survey of the notothenioid fishes in the Southern Ocean from Bouvet to Kerguelen Islands," Proceedings of the BIOMASS Colloquium in 1982, in: *Memoirs of the National Institute of Polar Research, Special Issue* No. 27, 1983, p. 178.

[493] Gon and Klages, "The marine fish fauna," p. 40.

[494] *Ibid.*, p. 48. O. Gon, "Taxonomy and biology of the fishes of the Southern Ocean," SANARP Final Project Report No, 12, 1988, pp. 9, 11-12.

followed by the relevant authorities because the RV AFRICANA, the only vessel that could undertake such a survey, was over-committed with work along the South African coast. Consequently, when the PEI stocks of the patagonian toothfish were discovered and fished by foreign fishing fleets in the late 1990s the South African government had no knowledge of these stocks and the fishery was wiped out within 3-4 years.

In the 1980s two SSF and FSO collaborators from the U.S.A. joined the research staff of the JLBSI. The first was the shark expert Dr L.J.V. Compagno whose association with the Institute started in late 1978 when Heemstra involved him in the SSF project.[495] His first visit to the JLBSI was in 1982 while on contract to the US Office of Naval Research to prepare a catalogue of the world's sharks for the United Nation Food and Agricultural Organisation (FAO).[496] During that visit Compagno and Heemstra described a new species of stingray from KwaZulu-Natal.[497] Compagno returned in November 1983 for one year at the Institute as a recipient of a CSIR Senior Research Fellowship by the end of which he was appointed as a permanent staff member of the Institute.[498] While setting up his lab at the JLBSI and developing relationships with other institutions in South Africa, Compagno completed the FAO shark catalogue and 17 family accounts for SSF.[499] He also wrote the chapters on sharks for FSO.[500] In 1986 Compagno established the Shark Research Centre which focussed on the systematics, biogeography, ecology, behaviour, natural history, exploitation and management of cartilaginous fishes in southern Africa.[501] Compagno's work attracted several South African and American post-graduate students

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[495] JLBSI, Tenth Annual Report, p. 15.

[496] M.N. Bruton, "Farewell to Len Compagno," *Ichthos*, No. 22, 1989, p. 1.

[497] JLBSI, Fifteenth Annual Report, p. 11 and Sixteenth Annual Report, p. 26.

[498] JLBSI, Sixteenth Annual Report, pp. 5, 7, 12 and minutes of council meeting held on Thursday 6 December 1984 at 14h15, pp. 3-4.

[499] JLBSI, Sixteenth Annual Report, pp. 12-13. Bruton, "Farewell," p. 1.

[500] Gon and Heemstra, *Fishes of the Southern Ocean*, pp. xiii, 81-85.

[501] JLBSI, minutes of council meeting held on Thursday 4 December 1986 at 14h15, p. 7. L.J.V. Compagno and D. Ebert, "The Shark Research Center," *Ichthos*, No. 15, 1987, p. 7.

which were known collectively as the *S-Team*. The *S-Team* regularly joined research cruises of the SFRI, Cape Town, aboard the RV AFRICANA along the South African west coast and contributed thousands of cartilaginous and bony fish specimens to the collection of the JLBSI.[502] They established excellent relationships with the angling clubs in South Africa, reminiscent of that of J.L.B. Smith. They regularly attended meetings and gave talks at clubs all over the country. Consequently, a steady stream of valuable specimens donated by anglers arrived at the Institute.[503] One of the most important programmes initiated by the Centre was long-term research on the biology and conservation of the great white shark.[504] As a consequence of this programme the great white shark is now afforded complete protection by the South African Fisheries Act.

While at the JLBSI, Compagno also continued working on projects started before he joined the Institute and he maintained his interest in elasmobranch fishes world wide. He completed research on west African stingrays, described new species from the Red Sea and from the Comoro Islands, and published his monumental work on the order Carcharhiniformes.[505] Because much of Compagno's field work was in the southern and western Cape it made sense to be permanently based in that area. He therefore moved his Shark Research Centre to the SAM in 1989.[506] Compagno also made an important contribution to the management of the JLBSI fish collection. Being well versed in computers in 1986 he designed the first electronic database for

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[502] JLBSI, council meeting of 27 September 1984, p. 5; Sixteenth Annual Report, pp. 12-13; Seventeenth Annual Report, p. 14; and minutes of council meeting held on Thursday 7 August 1986 at 14h15, p. 7. D. Ebert and A. Macras, "'S-Team' conducts west coast chondrichthyan survey," *Ichthos*, No. 14, 1987, p. 9.

[503] Bruton, "Farewell," p. 1.

[504] L.J.V. Compagno, "The white shark research program in South Africa (WSRP)," *Underwater*, No. 17, 1991, pp. 96-100. M. Baxter, "A cage with a view: tagging the Great White Shark," *Ichthos*, No. 39, 1993, pp. 14-16.

[505] Gon, "Fifty years," p. 64.

[506] JLBSI, minutes of council meeting held on Thursday, 16 March 1989 at 10h15, p. 3. Bruton, "Farewell," p. 1.

the collection and supervised the input of the catalogue data into the computer, putting the JLBSI well ahead of other South African museums in this aspect of collection management.[507]

The second SSF collaborator to join the Institute's marine research staff was the American ichthyologist Dr M.E. Anderson. Anderson had met Heemstra for the first time early in 1987 when the latter was visiting the California Academy of Sciences, San Francisco. Anderson, then a collection assistant at the Department of Ichthyology, had already been recruited to write a taxonomic chapter for FSO. He and Heemstra talked about the evolution of the Notothenioidei in the Southern Ocean and as a result of this discussion Anderson was asked to write a chapter on the origin and evolution of the Antarctic fishes for FSO.[508] After an international research cruise in the WIO in January 1989 Anderson visited the JLBSI briefly on his way back to the U.S.A. Receiving strong support from Heemstra, he was appointed in April 1989 to the post vacated by Compagno and took office in September that year.[509] Due to his interest in deep-sea fishes, Anderson maintained and developed the association with the SFRI started by Compagno. Since 1990 he has participated regularly in the stock assessment cruises of the RV AFRICANA; he began studies on the biology, particularly food habits, of selected species taken below a depth of 500 m and quickly established himself as the authority on the systematics of the deep-sea fishes of southern Africa.[510] Collaborative systematic studies on Southern Ocean deep-sea fishes were soon under way, with visits by Dr G. Pequeno from the Universidad Austral de Chile, Valdivia (1991), and Dr T. Iwamoto from the California Academy of Sciences, San Francisco (1992), funded by grants from FRD.[511] The project with Iwamoto on southern African grenadiers was

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[507] O. Gon and R. Wertlen, "Fishnet, a computerized database management system for the national fish collection at the JLBSI," *South African Journal of Science*, Vol. 92, No. 3, 1996, p. 117.

[508] Gon, "Fifty years," p. 64.

[509] *Ibid.* JLBSI, council meeting of 16 March 1989, p. 4 and minutes of meeting held on Thursday 8 June 1989 10h15, p. 3.

[510] JLBSI, Annual Report 1991/1992, pp. 14, 19.

[511] *Ibid.*, p. 19.

particularly successful and four new species were described.[512] Like Compagno, Anderson continued developing research interests and expertise he had before joining the JLBSI. The most important of these has been research on the systematics of the eelpouts (family Zoarcidae) of the world and related families. In this context, he revised/reviewed several genera, described new species and reviewed the eelpouts of the southwestern Pacific. He also described a new genus and two new species of pricklebacks from the eastern Pacific, and a new sand perch from South Africa.[513] In addition Anderson broadened the research scope of the JLBSI to include fish palaeontology. In the 1990s he developed his interest in the early evolution of fishes into a collaborative research programme that started on a site near Grahamstown where road construction had exposed a fossiliferous layer of black shale, and later expanded to include certain areas of the western Cape. The Grahamstown rock was the sediment at the bottom of an estuarine lagoon or lake complex that was dated by geologists at around 360 million years (Late Devonian); it contains fossil plants, aquatic invertebrates and fishes. The fossils found at the site, including at least 10 kinds of ancient fishes, were studied with palaeontologist J. Long of the Western Australian Museum, Perth, and former Rhodes geologist Dr N. Hiller and his student R. Gess who were the first to investigate the site.[514] The knowledge acquired from the Grahamstown site was disseminated to the public in the form of a poster depicting the nature of the area in ancient times.[515] Long visited Grahamstown in 1994 and 1996 on FRD fellowships. In the latter year he and Anderson collected fossils in the western Cape in collaboration with the South African

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[512] JLBSI, Annual Report 1994/1995, p. 33.

[513] JLBSI, Annual Report 1991/1992, pp. 21, 67; Annual Report 1994/1995, p. 32; and Annual Report 1995/1996, p. 30. Gon, "Fifty years," p. 64.

[514] M.E. Anderson, "First South African paleozoic lungfish discovered at Grahamstown," *Ichthos*, No. 29, 1991, pp. 11-12. M.E. Anderson, "More fossil fishes from Grahamstown," *Ichthos*, No. 33, 1992, p. 19. M.E. Anderson, "Grahamstown fossil fish update," *Ichthos*, No. 47, 1995, pp. 21-22. JLBSI, Annual Report 1994/1995, p. 33.

[515] Anderson, "Fossil fish update," p. 22.

Geological Survey and made some interesting discoveries, including Africa's earliest known fish.[516]

The South African fish fauna is closely related to that of the WIO. During the SSF project research sometimes had to be expanded to the WIO, and even to the Indo-West Pacific region to resolve taxonomic problems of South African fishes. Both Heemstra and Smith worked with other SSF collaborators, particularly Randall, to solve such problems in groups including groupers, squirrelfishes, soapfishes and wrasses.[517] Smith became involved with WIO fishes through her husband's work.[518] Heemstra's involvement with WIO fishes started shortly after he arrived in Grahamstown. Smith was invited to attend a January 1980 workshop in Cochin, India, on the preparation of the *FAO Identification Sheets for the Western Indian Ocean and Red Sea.* At that time international sanctions against South Africa were in force and Smith, a South African passport holder, was refused a visa to India so Heemstra attended in her place.[519] The JLBSI played an important role in the preparations for the workshop as Smith was asked to compile a preliminary checklist of WIO fish species for which the Institute was paid $2,000.[520] Smith and Heemstra contributed several systematic chapters for the *Identification Sheets.*[521] After the publication of SSF Heemstra's research focus shifted from the South African fish fauna to that of the WIO. He continued his work with Randall on the groupers (family Serranidae), a large group of commercially important fishes, that developed to include first a revision of the groupers of the Indo-Pacific region and later a catalogue of the groupers of the world for FAO.[522] The catalogue

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[516] M.E. Anderson, "A fossil fish expedition to the western Cape," *Ichthos*, No. 51, 1996, pp. 6-8. JLBSI, Annual Report 1994/1995, p. 34 and Annual Report 1996/1997, p. 10.

[517] JLBSI, Thirteenth Annual Report, p. 25; Fourteenth Annual Report, p. 29; Fifteenth Annual Report, p. 11; Sixteenth Annual Report, p. 27; and Seventeenth Annual Report, p. 32.

[518] See page 104.

[519] JLBSI, Twelfth Annual Report, pp. 8-9.

[520] *Ibid.*, p. 9.

[521] *Ibid.* Thirteenth Annual Report, p. 9 and Sixteenth Annual Report, p. 27.

[522] JLBSI, Seventeenth Annual Report, p. 12 and Annual Report 1991/1992, p. 36.

required work on taxonomic problems with Mediterranean and Atlantic Ocean groupers that led to collaboration with Israeli and Portuguese ichthyologists.[523] In 1993 the WIO work became a distinct project with the objective of producing a comprehensive review of the shallow water (down to a depth of 200 m) fish fauna of this region. Much knowledge on WIO fishes has accumulated since J.L.B. Smith's work, but it has never been synthesised in the form of a scientific book. The *FAO Identification Sheets* covered mostly commercial species and left out more than half of the neritic species of the region.[524] The project was designed in a similar fashion to SSF and Heemstra started recruiting experts to contribute chapters for the book immediately; he also asked Randall to co-edit the book with him.[525] The project is still running and is the top priority of the marine division of the JLBSI; at present there are 50 collaborators from nine countries. Although the project is funded by the NRF, funds have been less than adequate and field work outside South Africa has been done mostly using *ad hoc* opportunities and funding. Even before 1993 Heemstra took every opportunity to do field work in the WIO region. At the end of 1980 he participated in a FAO cruise aboard the RV FRIDTJOF NANSEN to sample the outer continental shelf and upper slope off the coast of Kenya that yielded several new species and new records for the WIO.[526] In 1986 as part of South Africa's policy of assisting neighbouring countries with the management of their natural resources, the Department of Foreign Affairs contracted the JLBSI to work in the Comoro Islands. The purpose of the project was to advise the Comoran government on the conservation of the islands' marine resources that were perceived to be at risk due to increasing coastal development for tourism. The Comoran project provided opportunities to collect material for the WIO book project and four trips to the islands took place in the period 1986-1988.[527] Two more trips took place in October 1991 and May 1993 in conjunction with

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[523] P.C. Heemstra, "Santa Maria e Formigas 1990: expediçiao cientifica," *Ichthos*, No. 27, 1990, pp. 7-8. JLBSI, Annual Report 1991/1992, p. 36 and Annual Report 1994/1995, p. 25.

[524] JLBSI, Annual Research Report January-December 1993, p. 21.

[525] JLBSI, Annual Report 1995/1996, p. 22.

[526] JLBSI, Thirteenth Annual Report, pp. 7-8.

[527] JLBSI, Investigational Report, No. 23, 1987, p. 1; Investigational Report, No. 34, 1989, pp. 1-2; and Seventeenth Annual Report, p. 12.

coelacanth research.[528] An opportunity to collect in Mozambique presented itself when Heemstra was invited by the Shrimp Trawlers' Association in May 1992 to survey damage to reefs from an oil spill caused by the tanker KATINA-P which had run aground north of Maputo Bay in April that year.[529] Two more trips to Mozambique took place in the late 1990s. A joint expedition of the JLBSI and the Department of Biological Science of the Universidade Eduardo Mondlane, Maputo to Inhaca Island took place in July 1997. Several students of this university accompanied the expedition and benefited from the interaction with JLBSI staff.[530] In May 1999 Heemstra joined a DIFS students' expedition to southern Mozambique.[531] While attending a workshop in Eilat, Israel, in January 1993 Heemstra collected in the Gulf of Aqaba, Red Sea. Heemstra collaborated with ichthyologists from the US National Museum of Natural History, Washington D.C., the Natural History Museum, London, and the PEM in a survey of the marine fish fauna of Mauritius in May 1995.[532] In August that year he joined D. Hensley of the University of Puerto Rico on a trip to the northern part of Madagascar.[533] The fishes collected during all these expeditions have made a significant contribution to the WIO holdings of the JLBSI collection. Many new species and new records for the sampled areas were discovered. Many photographs and colour notes were taken that will be used for producing accurate colour illustration of the species included in the WIO book.[534] The project is expected to end in 2006.

During Smith's directorship the coelacanth remained largely a passive interest of the JLBSI. The one notable event was the donation of a coelacanth through the efforts of Bruton

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[528] P.C. Heemstra, "Conservation in the Comoros," *Ichthos*, No. 34, 1992, pp. 1-2. JLBSI, Annual Research Report 1993, pp. 21, 24. See also page 166.

[529] JLBSI, Research Report Series I, p. 26. Pote, "Historical highlights," p. 27.

[530] JLBSI, Annual Report 1997/1998, p. 22. O. Gon, "In the footsteps of the Smiths on Inhaca Island," *Ichthos*, No. 54, 1997, pp. 17, 19-20.

[531] JLBSI, Annual Report 1999/2000, p. 21.

[532] JLBSI, Annual Report 1995/1996, p. 22. P.C. Heemstra, "Survey of the marine fish fauna of Mauritius," *Ichthos*, No. 46, 1995, p. 9.

[533] JLBSI, Annual Report 1994/1995, p. 25.

[534] JLBSI, Annual Report 1995/1996, p. 22.

who saw it while on a visit to the Queen Victoria Museum, Harare, Zimbabwe.[535] The frozen specimen was flown into South Africa with financial assistance from SASOL. Tissue samples were then sent to the Fishing Industry Research Institute to conduct research on the coelacanth's oil.[536] Two weeks later Smith was offered another fish but she directed it to the Transvaal Museum, Pretoria.[537] These events must have ignited Bruton's interest in the coelacanth, leading to active JLBSI involvement in work on the biology and conservation of this animal during his tenure as director of the JLBSI. Coelacanth involvement started with an April 1987 expedition to the Comoro Islands, that was part of the contract work for the South African Department of Foreign Affairs and also supported by the Southern African Nature Foundation, to evaluate the conservation status of the coelacanth.[538] By coincidence the JLBSI research team met Dr H. Fricke of the Max Planck Research Institute, Germany, who was then observing and filming living coelacanths in their natural habitat using his two-man submersible GEO.[539] One evening, over dinner, the scientists founded the Coelacanth Conservation Council (CCC).[540] After consulting the Comoran authorities the CCC established its headquarters at the Comoran National Museum, Moroni, and a secreteriat at the JLBSI. Bruton was elected as the first CCC secretary.[541] The CCC started off with an ambitious list of objectives.[542] However its achievements were few, including a successful campaign to have the coelacanth listed in Appendix I of the Convention on International Trade in Endangered Species (CITES), thus giving it the highest level of

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[535] JLBSI, Thirteenth Annual Report, p. 2. Pote, "Historical highlights," p. 19.

[536] JLBSI, Thirteenth Annual Report, p. 2.

[537] *Ibid.*

[538] Investigational Report, No. 34, p. 98. M.N. Bruton, "Comores expedition," *Ichthos*, No. 15, 1987, p. 6.

[539] M.N. Bruton, "Observations on the live coelacanth," *Ichthos*, No. 15, 1987, p. 6.

[540] R. Stobbs, personal communication,17 May 2002.

[541] M.N. Bruton, "Coelacanth Conservation Council Newsletter no. 1," *Environmental Biology of Fishes*, Vol. 23, No. 4, 1988, p. 316. Investigational Report, No. 34, p. 60.

[542] Bruton, "Coelacanth Conservation Council," p. 316.

protection;[543] the production of a coelacanth bibliography; and an inventory of captured specimens.[544] Coming into effect in January 1990 the CITES listing, prohibiting trading in the listed species by signatory countries, had no immediate impact on coelacanth conservation because the Comoran government was not a signatory of the convention until March 1993.[545]

For all intents and purposes the CCC became defunct shortly after Bruton left the JLBSI at the end of 1994.[546] The early 1990s was an active period of coelacanth research and discoveries. Bruton led an international team of scientists to the Comoro Islands in 1990. While there Bruton presented to the Comoran government a report on the conservation work the JLBSI did for them during the late 1980s. The Comoran government showed its gratitude by donating a coelacanth to the JLBSI.[547] In November that year the South African Minister of Foreign Affairs visited the Comoro Islands. In recognition of his contribution to development in these islands the Comoran president presented to him a large frozen coelacanth specimen. The minister donated the fish, dubbed the 'Pik Botha' coelacanth, to the JLBSI and Stobbs brought it from Grand Comore in a large cool box that he designed and built for that purpose. When it was dissected scientists discovered it was a female containing 65 eggs, far more than in past specimens. It is now on display at the KAM.[548] On Christmas eve of that year Bruton received information that an adult coelacanth had been caught off Mozambique apparently together with 26 juveniles, all kept at the Natural History Museum in Maputo. Bruton and Fricke travelled to Maputo in

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[543] M.N. Bruton, "Coelacanth and CITES," *Ichthos*, No. 24, 1989, p. 4.

[544] M.N. Bruton and S. Coutouvidis, "An inventory of all known specimens of the coelacanth *Latimeria chalumnae*, with comments on trends in the catches," *Environmental Biology of Fishes*, Vol. 32, 1991, pp. 371-390. M.N. Bruton, S. Coutouvidis and J. Pote, "Bibliography of the living coelacanth *Latimeria chalumnae*, with comments on publication trends," *Environmental Biology of Fishes*, Vol. 32, 1991, pp. 403-433.

[545] R. Stobbs, personal communication,19 May 2002.

[546] Stobbs, personal communications,17 and 19 May 2002.

[547] M.N. Bruton, "South African scientist conserve marine resources in the Comores," *Ichthos*, No. 26, 1990, p. 9. Pote, "Historical highlights," p. 25. See also page 161.

[548] M.N. Bruton, "The mingled destinies of coelacanths and men," *Ichthos*, No. 33, 1992, p. 1. Pote, "Historical highlights," p. 26.

January 1992 and found out that these juveniles were actually near term pups that had been removed from the body cavity of the adult female following its capture. This number was five times more than previously recorded and showed that the reproductive capacity of the coelacanth was higher than scientists believed.[549] Moreover it was the second largest coelacanth ever caught and the second to be found off the coast of Africa (the first was caught off East London in 1938). Bruton then predicted that coelacanth populations do exist somewhere between central Mozambique and the eastern Cape of South Africa.[550] His prediction was confirmed in October and November 2000 when coelacanths were observed and filmed underwater by deep-sea divers at Sodwana Bay, KwaZulu-Natal, South Africa.[551] Another discovery had been made in August 1995 when a coelacanth was caught by fishermen off the southwest coast of Madagascar. Fortunately, Heemstra was on the island at the time and was able to confirm the identification of this fish.[552] Another fish was caught in the same area in 1997.[553] Interestingly, at a 1989 coelacanth conference in San Francisco a Japanese scientist told Bruton of an unconfirmed record of a coelacanth from the northeast coast of the island.[554]

All told JLBSI scientists have made a small, but significant contribution to the biology of the coelacanth. Studying the visceral anatomy of recently acquired specimens they were able to disprove previous hypotheses of prenatal oophagy or uterine cannibalism in this animal.[555]

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[549] Bruton, "The mingled destinies," pp. 2-3.

[550] *Ibid.*

[551] *Saturday Dispatch*, 2 December 2000. P. Venter et al., "Discovery of a viable population of coelacanths (*Latimeria chalumnae* Smith, 1939) at Sodwana Bay, South Africa," *South African Journal of Science*, Vol. 96, 2000, p. 567.

[552] Pote, "Historical highlights," p. 29.

[553] S. Weinberg, *A Fish Caught in Time* (London, Fourth Estate, 1999), pp. 193-194.

[554] Anonymous, "Is there a Madagascar coelacanth?" *Ichthos*, No. 23, 1989, p. 25.

[555] P.C. Heemstra and L.J.V. Compagno, "Uterine cannibalism and placental viviparity in the coelacanth? A sceptical view," *South African Journal of Science*, Vol. 85, 1989, pp. 485-486. P.C. Heemstra and P.H. Greenwood, "New observations on the visceral anatomy of late-term fetuses of the living coelacanth fish and the oophagy controversy," *Proceedings of the Royal Society of London* B, Vol. 249, 1992, pp. 49-45.

The JLBSI collaboration with Fricke on the coelacanth benefited the Institute's research interests in South Africa as well. Bruton convinced Fricke to bring his submersible to South Africa to search for coelacanths and for other marine research in May 1991.[556] A successful fund-raising and public relations campaign à la J.L.B. Smith, mounted under the aegis of the CCC and including a South African lecture tour by Fricke, collected over R370,000 mostly from major industrial and financial concerns in South Africa.[557] It also raised the public profile of the JLBSI and Bruton through the extensive media coverage of the expedition.[558] Fricke and a team of scientists from several South African institutions performed 23 dives in his new and improved submersible, JAGO, off the Tsitsikamma and the Chalumna coasts.[559] This was the first time a submersible was used for oceanographic research in South Africa and it generated much excitement and expectation.[560] Certainly, it proved that submersibles can be used for marine research in South African waters. However despite the apparent wealth of observations amassed during the expedition[561] no official reports or scientific papers have been produced so far and Bruton's grandiose idea of building a South African submersible quietly died out.[562] After the

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[556] M.N. Bruton, "Let's bring Prof Fricke's submersible to South Africa," *Ichthos*, No. 16, 1987, p. 20. M.N. Bruton, "The meaning of the JAGO expedition," *Ichthos*, No. 30, 1991, p. 1. Pote, "Historical highlights," p. 26.

[557] Pote, "Historical highlights," p. 26. M.N. Bruton, "Sponsors of the JAGO expedition," *Ichthos*, No. 30, 1991, p. 3.

[558] Bruton, "Sponsors of JAGO," p. 3. Bruton, "The meaning of JAGO," p. 2. L. Hayward, "Jago lights up the wonders of the sea," *Portlink*, August 1991, pp. 1-5.

[559] JLBSI, Annual Report 1991/1992, pp. 8, 23. M.N. Bruton, "Facts and figures on the JAGO dives," *Ichthos*, No. 30, 1991, pp. 4-5.

[560] Bruton, "The meaning of JAGO," p. 2. JLBSI, Annual Report 1991/1992, p. 29.

[561] Bruton, "Facts and figures," p. 5.

[562] Bruton, "The meaning of JAGO," p. 2. M.N. Bruton, "Subs for Africa," *Ichthos*, No. 30, 1991, p. 7. M.N. Bruton, "Submersible update," *Ichthos*, No. 31, 1991, p. 8. M.N. Bruton, "New South African submersible," *Ichthos*, No. 32, 1991, p. 2.

expedition Fricke invited Heemstra to join him in a survey of the reef fishes that live in the coelacanth habitat in the Comoro Islands.[563]

Since 1947 the RU and the JLBSI have employed nine dedicated marine fish taxonomists, though never more than three concurrently. These scientists collectively have described about 450 species of marine fishes (about 490 including J.L.B. Smith's work during 1931-1945), mostly from the WIO.[564] Initially concerned with South African fishes, they expanded the range of their research to include the WIO, the Southern Ocean and fossil fishes. Undoubtedly, with products such as SFSA, SSF, FSO and numerous ichthyological reviews and revisions the Grahamstown-based scientists, with the help of collaborators, have made a considerable contribution to the knowledge of marine fish diversity, particularly in the WIO and the Southern Ocean.[565]

The Port Elizabeth Museum

J.L.B. Smith remained the honorary curator of fishes at the PEM until his death in 1968. He was then replaced by his wife. When she died in 1987 Heemstra continued this long association with the PEM.[566] At the time of J.L.B. Smith's death, the marine biologist of the museum, Dr G.B. Ross was studying the biology of marine mammals along the eastern and southern Cape coasts. Examining the stomach contents of his specimens he came across fish otoliths that he could not identify. Consequently, in 1972 he started collecting otoliths from marine fishes, arranging them in a phylogenetic order following the classification of SFSA. The otoliths were used as a reference collection. The fishes from which otoliths had been extracted were identified by local

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[563] See page 161.

[564] Gon, "Fifty years," table 1.

[565] J. Pote, "List of scientific publications and books of the J.L.B. Smith Institute of Ichthyoloy: 1931-1996," *Transactions of the Royal Society of South Africa*, Vol. 51, 1996, pp. 281-320.

[566] PEM, Annual Report, 1968, p. 10 and Annual Report for the Year Ended 31 March 1988, pp. 2, 20.

experts such as M.M. Smith.[567] By the end of 1973 the collection included otoliths of 160 fish species.[568] In 1978 the otoliths collection was handed to Dr M.J. Smale who later became the first ichthyologist permanently employed by the museum. Smale initially joined the PEM on a five-year programme to study the biology of game fishes in the eastern Cape for which he received a Ph.D. in ichthyology from RU in 1983.[569] He continued collecting otoliths and made a point of depositing voucher specimens with either the SAM or the JLBSI.[570] At the same time other marine biologists at the PEM were identifying prey organisms for their research and as a service to other researchers. Soon it became evident that otoliths are a major tool for prey identification and it was felt that the information and experience gathered through the work on the collection should be made available to the international marine scientific community.[571] In 1987 Smale obtained funding for a five-year project to prepare an atlas of otoliths of South African fishes. Published in 1995 the atlas includes descriptions and illustrations of otoliths of 972 species in 181 fish families that occur off the coast of southern Africa.[572] Smale, an experienced diver and diving supervisor, joined many JLBSI expeditions in South Africa and the WIO.[573] Smale always kept an eye open for interesting specimens and has donated many fish to the JLBSI including new species.[574]

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[567] PEM, Annual Report for the Year ended 31st December 1972, p. 24 and Annual Report for the Year Ended 31 December 1978, p. 15. JLBSI, Annual Report 1972 - 1973, p. 3. M.J. Smale, "Putting fish on the map," *SA Commercial Fishermen*, Vol. 2, No. 2, 1990, p. 10.

[568] PEM, Annual Report for the Year ended 31st December 1973, p. 25.

[569] PEM, Annual Report for 1978, pp. 15, 29-31.

[570] M.J. Smale, J. Watson and T. Hecht, "Otolith atlas of southern African marine fishes," *Ichthyological Monograph of the JLB Smith Institute of Ichthyology*, No. 1, 1995, p. 2.

[571] PEM, Annual Report for 1978, p. 16. Smale, "Putting fish on the map," p. 11.

[572] Smale et al., "Otolith atlas," p. 1.

[573] JLBSI, Thirteenth Annual Report, p. 8. PEM, Annual Report for the Year Ended 31 March 1987, p. 7; Annual Report 1993/94, p. 15; and Annual Report 1995/1996, pp. 12-13.

[574] L.J.V. Compagno, "New shark collected from Kosi Bay," *Ichthos*, No. 7, 1984, p. 5.

From the late 1970s to the present, fishes collected during marine biological research conducted by scientists of the PEM were mostly donated to the JLBSI.[575]

The Durban Natural Science Museum

At present the Durban Natural Science Museum has a small and inactive research collection of fishes. It is not clear when the fishes were separated from the rest of the natural history collection and established as a distinct collection, but it was possibly done by Dr W.J. Lawson who was the ornithologist of the museum from 1960 to 1970. The Durban Natural History Museum has never had an ichthyologist as curator. The collection is arranged roughly by accession number. The catalogue lists 168 registered specimens (93 marine, 75 freshwater), most of which were collected by Lawson and colleagues during the 1960s in KwaZulu-Natal. The last entry in the catalogue was made in 1972.[576] J.L.B. Smith occasionally studied and identified specimens for this collection until 1956.[577]

A Novel Approach

The modern research period in South African marine fish systematics has been the domain of two institutions, the SAM and the JLBSI (including its predecessor at RU). Immediately after the Second World War the SAM department of marine biology was essentially dormant, and remained so until the arrival of Talbot.[578] The hiatus in research on marine fish systematics at the SAM actually dates back to 1927 when Barnard finished his monograph of the marine fishes.[579] At the same time RU started its new department of ichthyology with the ambitious and highly productive

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[575] PEM, Annual Report for 1978, p. 28 and Annual Report 1993/94, p. 15. Smale, "Putting fish on the map," p. 11.

[576] P.J. Taylor, personal communication, 18 January 1993.

[577] Records of the JLBSI, file B/40, Clancey Durban Museum, correspondence with Museum officials.

[578] See page 75.

[579] See page 50.

J.L.B. Smith at the helm and with a high profile project, the SFSA book.[580] Conversely, in the late 1960s, when Smith died and the future of his department hung in the balance, research activities and the growth of ichthyology at the SAM peaked. But the dice rolled again in the 1970s. Ichthyology at the SAM settled with a single permanent scientist[581] while the JLBSI in Grahamstown grew steadily and has dominated the discipline ever since. Why did the JLBSI do better than the SAM? The different nature of these organisations immediately comes to mind. Ichthyology at the SAM was part of a department in a large museum with a secure future and it did not need much attention from the administration of the museum. Plotting the course of research activities was left to the scientist in charge. By contrast, the JLBSI is a small organisation built and focussed around ichthyology with fish systematics its priority field of research.[582] The fact that in the first years its future was uncertain turned out to be a strength because it forced the first director to put all her energy into developing the Institute in a way that ensured its future existence as much as possible.[583] The SAM's Talbot and Hulley certainly had the capabilities and personalities that could have led to a significant growth of ichthyology in their department. However Talbot became involved in museum administration early in his career; Hulley started research on mid-water and deep-sea fishes and spent much time overseas and at sea.[584] Consequently, projects were relatively short-term and/or too narrowly defined – concentrated mainly on four groups of fishes: tunas, lanternfishes, klipfishes and skates, the latter two for the purpose of an academic degree.[585] In Grahamstown J.L.B. Smith's omnipotent presence carried enough credit to initially sustain M.M. Smith who, perhaps contrary to her contemporaries' expectations, turned out to be a strong leader in her own right.[586] In Bruton she

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[580] See page 85.

[581] See page 81.

[582] Jackson, "Variations on a theme," pp. 37-38. Bruton, "Is this the way," p. 687.

[583] Jackson, "Variations on a theme," pp. 37-38, 40. See also pages 133, 179.

[584] See pages 77 and 79.

[585] See pages 78 and 79.

[586] Jackson, "Variations on a theme," p. 37.

made a good choice of a successor. He was a highly ambitious director and was prepared to take risks to achieve his goals.[587] Large, collaborative projects coordinated by the JLBSI scientists, with well-defined high-impact end-products accompanied by wide national and international exposure, such as SSF and FSO, were tailor-made for his management strategy and he viewed them as institutional rather than individual scientist's projects. He also took full advantage of "...the Institute's full time Public Relations Officer, the coelacanth," to enhance the public image of the JLBSI.[588] Consequently, during Bruton's tenure the JLBSI staff increased by 70% and its budget grew 12-fold.[589] On the other hand Compagno, the present SAM ichthyologist, is a high-flying scientist, but he is not an ambitious leader and lacks the charismatic personality of Talbot and Hulley.

Modern ichthyology in Grahamstown epitomizes the cliché that history repeats itself though never in the same path. The last 55 years can be divided into two distinct periods, 1945-1967 and 1968-2000, each consisting of similar elements of research work and objectives. These are:

- Setting up a new research facility – The Department of Ichthyology (1946 - 1947); the J.L.B. Smith Institute of Ichthyology (1968 - 1975).
- Revising the knowledge of South African fishes – *Sea Fishes of Southern Africa* (1945 - 1949); *Smiths' Sea Fishes* (1975 - 1986).
- Revising the knowledge of WIO fishes – J.L.B. Smith's unfinished work on the WIO volume (1950 - 1968); the JLBSI book on the fishes of the WIO (1993 - present).
- Coelacanth work – J.L.B. Smith (1952 - 1953); M.N. Bruton and P.C. Heemstra (1987 - present).

There are important differences between the two cycles though. J.L.B. Smith's department was built around one scientist whose efforts were concentrated on marine fish systematics. The JLBSI

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[587] *Ibid.*, p. 41. M.N. Bruton, "What the Ichthyology Institute means to me," *Ichthos*, No. 49, 1996, p. 27.

[588] *Ibid.*, p. 26.

[589] JLBSI, Annual Report 1994/1995, p. 8.

was set up with a wider vision. Teaching was as important as research. In her fourteen years as director of the Institute M.M. Smith transformed it from a university department narrowly focussed on marine fish systematics to a national institution involved in national and international research programmes. The scope of research work diversified to include systematics and the biology of estuarine and freshwater fishes, as well as fish culture,[590] a trend that continued under the directorship of Bruton. Unlike her husband Smith persisted with efforts to acquire better accommodation and invested much time in a new building for the JLBSI. It took eight years to set up the JLBSI compared to 2-3 years for the Department of Ichthyology, but the new building enabled the growth mentioned above. J.L.B. Smith worked alone and collaborated only with his wife. Because of the large scope of his SFSA and WIO projects he could not afford the time to resolve all of the numerous taxonomic problems he encountered. By contrast, the SSF, FSO and WIO projects of the JLBSI have been collaborative ones and have benefited from the expertise and depth of knowledge of numerous ichthyologists from all over the world thus minimising errors. Similarly, while Smith worked on the coelacanth by himself, Bruton and Heemstra collaborated with overseas specialists such as E. Balon (Canada), H. Fricke (Germany), Greenwood (U.K.) and Musick (U.S.A.). Collaboration in these large projects was unavoidable if a high quality product was the goal. International reviews leave little doubt that these products were indeed of such quality.[591] In addition to local circumstances, such as limited funding, marine fish systematics worldwide has reached a high level of specialisation making it impossible for individual scientists to tackle projects of this scale on their own. When the last edition of SFSA was published in 1961 it included about 1,400 species. By 1986 over 2,200 species of South African marine fishes were recorded in SSF,[592] an increase of 57%. The first print run of SSF,

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[590] JLBSI, Annual Report for 1974/75 and Fourteenth Annual Report, p. 7.

[591] C.R. Robins, "Smiths'Sea Fishes," *Copeia* 1987, No. 3, pp. 816-818. R.G. Miller, "Fishes of the Southern Ocean," *Antarctic Science*, Vol. 4, No. 2, 1992, pp. 249-250. N.R. Merrett, "Fishes of the Southern Ocean," *Copeia* 1992, No. 1, pp. 260-261.

[592] Heemstra, "Smiths' Sea Fishes," p. 2. P.C. Heemstra, "Marine fish taxonomy in South Africa: where are we now, and where are we going?" *South African Journal of Science*, Vol. 82, 1986, p. 617.

5,000 books, was nearly sold out within five months of publication.[593] It was subsequently reprinted twice more and is currently out of print.[594] FSO was hailed as a "benchmark" book in the Antarctic literature that will be used internationally for a considerable time.[595] A South African president, F.W. de Klerk, presented this book to Emperor Akihito of Japan during a state visit to that country.[596]

The history of marine fish systematics also tells us that large projects covering regional faunas, such as SFSA, SSF and FSO, take a long time and a lot of resources to complete, much more than originally estimated by the scientists, funders and science managers involved in these projects. SFSA took five years to complete, but it benefited from the research J.L.B. Smith had done during more than 20 years before the project started. Smith thought he could do the WIO volume in 6-10 years. He worked on it for 18 years, but did not finish it before his death. SSF was designed for five years and took 11 years, and FSO was given financial support for three years, but lasted seven years. There are several reasons for this large error in judgement. Without exception, all these projects were understaffed and underfunded,[597] and yet the managers and the funders expected delivery on time, obviously unrealistically so. Invariably there have been unpredictable scientific issues that required more time than anticipated. Invariably collaborative projects have had to deal with the inevitable yet unpredictable non-cooperative collaborators. And invariably once again, the scientists ended up overworked, underappreciated and generally fed up with the system. It may be argued that scientists, who usually run this kind of projects, are bad managers and that may be part of the problem. However there is never enough money to bring into the project an experienced manager, notwithstanding the difficulty in finding one. The lesson to those who may be involved in such projects in the future is: once the time, manpower and costs

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[593] JLBSI, Seventeenth Annual Report, p. 12.

[594] Pote, "Historical highlights," pp. 25, 30.

[595] W.R. Siegfried, "Three decades of South African science in Antarctica," *South African Journal of Antarctic Research*, Vol. 21, No. 2, 1991, p. 226.

[596] Annual Report 1991/1992, p. 8. Pote, "Historical highlights," p. 27.

[597] Records of the JLBSI, file L/9, letter of 22 December 1983 from M.N. Bruton.

have been estimated, the latter two should be multiplied by a factor of two if the original schedule is to be adhered to.

Unlike the SAM, the growth of the marine research staff of the JLBSI during the 1970-90 period was marked by the appointment of six foreign scientists – Anderson, Compagno, Fraser, Gon, Heemstra and Winterbottom.[598] Such appointments may be viewed, particularly in the new South Africa, as taking employment opportunities from South Africans, but it was a worthwhile investment for the country because four of these scientists have made South Africa their home. These scientists brought with them their professional contacts and significantly increased the international networking of the JLBSI. They also contributed their experience and knowledge in research and teaching thus making the Institute more versatile. Before 1994 the foreigners indirectly benefited South African science by acting as 'ambassadors' when they attended international scientific meetings in countries ordinary South Africans could not go to.

South African marine fish collections and systematic research are relatively young, essentially a product of the 20th century. As this history shows, the establishment of a viable, long-lasting collection is a lengthy process. Fish collections sprouted in just about every natural history museum in South Africa. For about 60 years, their durability depended on the enthusiasm and persistence of individual curators and scientists who were not ichthyologists. More often than not, enthusiasm disappeared when such individuals left their museums. This dependence existed until RUC established the Department of Ichthyology and the SAM created a post specifically for the curation of the fish collection,[599] and thus ensured continuity. However it is difficult to imagine this happening without the prominence of Smith at the Albany Museum and RUC, and Barnard at the Marine Biology Department of the SAM. But even departments and permanent posts are not absolute guarantees, and in 1968 M.M. Smith had to work hard to convince the CSIR and RU that she could step into her late husband's shoes, culminating in the establishment of the JLBSI.[600]

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[598] During the same period of time foreign scientists also joined the freshwater division of the JLBSI and the staff of DIFS.

[599] See pages 86 and 75.

[600] See page 133.

In retrospect this was a key event that led to making marine fish systematics in South Africa established, productive, and highly respected nationally and internationally.

The collections of the JLBSI and the SAM have developed in the last five decades to become regional, national and international assets. Considering the rapid political and demographic changes that have taken place in eastern and southern Africa since the end of the Second World War, these collections constitute a vital record of the ecological history of the marine environment of this region. In an age of global environmental crises, and in the face of accelerated development along the east coast of Africa and its associated islands, such assets are assuming an even more vital significance. These collections therefore have a strategic value and it is of utmost importance to the countries of the region that they continue to play this role.

CHAPTER FIVE

SOME CONTEMPORARY ISSUES: AN HISTORICAL PERSPECTIVE

The continuity of biosystematic research in South Africa has been a major concern for the nation's systematists for decades.[1] Recently the issue has become of greater concern because of South Africa's commitment to the Convention on Biological Diversity,[2] and in view of the political changes that have taken place since 1994. However the problem is not unique to South Africa, and museums around the world are facing the same issues.[3] There are misconceptions among politicians and the public at large about the value of and use of museum science and natural history collections. Within the world scientific community there have been science managers, scientists other than systematists, and even some museum directors who perceive biosystematic research as unnecessary. They view the discipline as merely a tool for providing organisms with scientific names to be used by other scientists and regard its practitioners as second-rate scientists. In South Africa, the loss of Gilchrist's type specimens and of the collection of the S.S. PICKLE are examples of such attitudes in the first half of the 20th century that had a direct affect on marine fish

[1] E.P. du Plessis, "Taxonomy in South Africa" (Pretoria, 1985), pp. 1-2. M.N. Bruton, "Does animal systematics have a future in South Africa," *South African Journal of Science*, Vol. 85, 1989, pp. 348-350. T.M. Crowe et al., "Systematics is the most essential, but most neglected, biological science," *South African Journal of Science*, Vol. 85, 1989, pp. 418-423. T.M. Crowe, "Is there a future for research at South African Museums," *Origin*, No. 3, 1990, pp. 1-3. D.G. Herbert, "Museum natural science and NRF: crisis times for practitioners of fundamental biodiversity science," *South African Journal of Science*, Vol. 97, 2001, pp. 168-172.

[2] D.R. Drinkrow et al., "The role of natural history museums in preserving biodiversity in South Africa," *South African Journal of Science* Vol. 90, 1994, p. 470. South Africa signed the Convention on 4 June 1993 and ratified it on 2 November 1995 (see website of the Convention on Biological Diversity, p.3).

[3] Bruton, "Does animal systematics," p. 348. P. Morgan, "Natural Science collection resources," *Museums Journal*, Vol. 86, No. 3, 1986, pp. 145-146. A. Warhurst, "Triple crisis in university museums," *Museums Journal*, Vol. 86, No. 3, 1986, pp. 137-140. H.T. Clifford et al., "Where now for taxonomy," *Nature*, Vol. 346, 1990, p. 602. R. Idema, "Why is Canada burning its institutions for research and training in biosystematics?," *Global Biodiversity*, Vol. 3, No. 1, 1993, pp. 28-31. W.D. Allmon, "The value of natural history collections," *Curator*, Vol. 37, No. 2, 1994, pp. 83-84. H.C.J. Godfray, "Challenges for taxonomy," *Nature*, Vol. 47, 2002, p. 17.

systematics.[4] When J.L.B. Smith approached the president of the CSIR about paying for his wife's full time work on SFSA, Schonland told him he should be grateful for getting anything.[5] More recently, a senior CSIR manager has been quoted as saying no money will be allocated for biosystematic research because "All we need to know are the names; a baobab is the same as a blesbok." South African collections have been viewed as the creation of whimsical curators and museum directors.[6] The biodiversity crisis is helping to change such views throughout the world. The South African government has noted the important role that South African systematists and their collections play in the conservation of the country's biodiversity and natural heritage, but little has been done to improve the plight of this research sector.[7] South African systematists do make their concerns known. In the period 1994-2000 eleven papers warning about the situation were published in local scientific journals and that alone should have sounded the alarm in science management circles.[8] So far the NRF has largely paid lip service to the situation and a senior manager of its Research Support Agency recently told systematists that they have no chance of getting assistance, such as a special programme to assist systematics.[9]

The threats to marine fish systematics are of a financial, professional and political nature. Fortunately for marine fish systematics two consecutively long-serving presidents of the CSIR supported the discipline allowing it to establish itself in the South African and international

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[4] See page 56.

[5] Records of the JLBSI, file N/36, letter of 6 December 1962.

[6] Crowe et al., "Systematics is the most essential," p. 418. C.K. Brain, "A proposal for the integration of South African research collections in natural history. *South African Museum Association Bulletin*, Vol. 18, No. 7, 1989, p. 263.

[7] White Paper on the conservation and sustainable use of South Africa's biological diversity. Government Gazette, Vol. 385, No. 18163 (28 July 1997). D.G. Herbert, "Museum natural science," pp. 171-172.

[8] D.G. Herbert et al., "Taxonomy and systematics research in South Africa: vital research facing a crisis in capacity and resources," unpublished report prepared by a group of concerned systematists and submitted to the Department of Arts, Culture, Science and Technology (15 May 2001), pp. 6, 15-16.

[9] D.G. Herbert, "Museum natural science," p. 171. C.H. Scholtz, personal communication, 20 February 2002.

scientific landscape. Dr S. Meiring Naudé and J.L.B. Smith worked at the personal level and Smith communicated with him directly.[10] Smith, employing his usual PR strategy in this relationship,[11] received support for most, if not all his requests for funding throughout Naudé's term, whether they were made on short notice for a relatively small amount,[12] or were made through the normal channels and involved large sums.[13] During his 22 years as vice president and president of the CSIR, Dr C. van der Merwe Brink was a strong supporter of marine fish systematics through difficult times. He was in favour of creating the JLBSI in 1968 and served on its Board, and in 1980 he gave his full support for making it a Declared Cultural Institution (i.e. national museum status).[14] The strength of marine fish systematics in South Africa bears this out. However marine fish systematics was exceptional because during much of the period 1945-1980, a crucial time in its development, it was a 'museum' science practised at a university.

In previous chapters I have shown that fish collections at several institutions did not survive due to the lack of financial resources to maintain them and the absence of a resident ichthyologist.[15] Since the end of the Second World War marine fish systematics has been practised in two South African institutions, the SAM, Cape Town, and the JLBSI, Grahamstown. The former institution is the oldest and one of the largest natural history museums in the country. It has enjoyed the status of a national museum since the establishment of the Union and has always had a marine ichthyologist as curator of its fish collection. Moreover ichthyologists of the SAM

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[10] Records of the JLBSI, Grahamstown, file N/36, general correspondence during 1946-1967, particularly letter of 6 December 1962 from both Smiths.

[11] *Ibid.*, letters of 6 October 1955, 28 February 1956, 25 October 1962 and 12 June 1967 from J.L.B. Smith, and letter of 6 March 1956 to Smith.

[12] See page 122.

[13] See page 104.

[14] JLBSI, Twelfth Annual Report, p. 2, 1980. Smith, "The JLB Smith Institute," pp. 19, 25.

[15] See pages 64, 72 and 74.

have frequently held senior positions within the museum administration.[16] The fish collection and its curators have therefore enjoyed a relatively stable history.

The JLBSI in Grahamstown, on the other hand, is a much younger institution that has gone through several changes during its short history. The JLBSI owes its existence to the demise of RU's Department of Ichthyology. J.L.B. Smith had no formal qualification in ichthyology, but his prolific work won him high regard among his peers in South Africa and abroad. The initial reluctance of RU to continue supporting the department[17] after Smith's death is a clear demonstration of the linkage between professional reputation and funding, and its importance to the survival of marine fish systematics in South Africa. M.M. Smith averted both threats by convincing the university and the CSIR that she would be able to step into her late husband's shoes, leading to the establishment of the JLBSI.[18] Soon funding became a threat and she wrote:

> My greatest preoccupation, however, is lack of sufficient funds to run the Institute. Despite practising every economy I find out present grants are inadequate. Salaries have rocketed, printing, books and paper, chemicals, office and laboratory ware – everything, in fact, has increased so incredibly in price that it is imperative to find more money for the Institute.[19]

Smith used every possible way for raising money, including donating her own money to the Institute.[20] She even tried to raise funds in the U.S.A. but her trip coincided with the Soweto riots

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[16] K.H. Barnard was assistant director in the years 1921-1946 and director during 1946-1956. F.H. Talbot was assistant director in 1960-1964. P.A. Hulley has been assistant director in 1985-1987 and deputy director since 1988.

[17] J.L.B. Smith died in January 1968, but RU deferred the appointment of a new HOD for the Department of Ichthyology for nearly a year. The CSIR, however, appointed M.M. Smith as head of its ichthyological research unit at Rhodes in October that year (Records of the JLBSI, file J/65, letter from the registrar of RU to M. Smith, 8 October 1968).

[18] See pages 134, 187.

[19] JLBSI, Annual Report 1974/75, attached "Director's comments," p. 2.

[20] *Ibid.* See also page 117.

of 1976 and she was unsuccessful.[21] During 1969-1979, before it became a national museum, donations to the JLBSI were eligible for tax relief. One company, African Line Fish Wholesaler, made donations for at least 20 years.[22] In the mid-1970s the JLBSI received funds from the Fisheries Development Corporation and fishing companies to help equip its new building.[23] At the same time, the JLBSI created the Sea Fishes of Southern Africa Trust to handle fund raising for its books.[24] All told in the years it was governed by RU, the JLBSI raised over R120,000 from the South African public and industry;[25] another $2,000 were raised from FAO in 1980.[26] These donations were important for keeping the Institute solvent and helped with equipment purchase and repairs.[27] However even these extra funds did not prevent the JLBSI from going into the red in 1975.[28] The salaries were the major contributor to the deficit reported for 1975 and subsequent years, and in 1976 and 1977 retrenchment was used as a way of controlling operating costs.[29]

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[21] JLBSI, Annual Report 1975 -1976, attached "Director's comments," p. 2.

[22] *Ibid.*, file I/19, letter from M. Smith to Mr Visagie, Treasurer of the CSIR, 10 December 1969.

[23] *Ibid.*, files A/69, A/105, D/53, D/71, J/25, numerous documents. Smith, "The JLB Smith Institute," p. 19.

[24] Records of the JLBSI, file C/116, agenda for the inaugurating meeting of the Sea Fishes of Southern Africa Trust, 23 October 1975. The new trust replaced the inactive Sea Fishes of Southern Africa Book Fund of 1945 (see page 88).

[25] JLBSI, Tenth Annual Report, p. 7; Twelfth Annual Report, p. 44; and Thirteenth Annual Report, p. 36. The JLBSI has no copy of the report for 1979, but at least R4,000 was raised that year (see Twelfth Report, p. 7).

[26] JLBSI, Twelfth Annual Report, p. 9.

[27] *Ibid.*

[28] JLBSI, Board meeting of 19th September 1975.

[29] Records of the JLBSI, file L/9, letter of 1 July 1975 and file R/65E, application for full time secretary and technician to be paid by RU submitted by M.M. Smith in March 1977. JLBSI, minutes of Board meetings of 21st September 1976, pp. 2-3; 19th September 1977, p. 3; Thursday 21st September 1978 at 9 a.m., pp. 1-2; Wednesday 19 September 1979 at 2.15 p.m., p. 4; and 30th June, 1981, p. 1.

When the JLBSI joined the ranks of national museums in 1980 it lost the financial benefits it enjoyed while being part of RU such as tax incentives for donors. In terms of funding opportunities South African museums have always been at a disadvantage compared to universities. They were mentioned neither in the 'Objects of the Council' of the Scientific Research Council Act nor in Schonland's first policy statement for the newly established CSIR.[30] The CSIR did anticipate, however, that it would be required to fund museum scientists as part of its objective "to make grants in aid of research."[31] The CSIR acknowledged the value and importance of natural history museums in South Africa,[32] but it never recognised that museum research had different objectives and needs compared to university research. Consequently, the CSIR funding programmes have always lumped museums with universities, usually to the detriment of the former.[33] Unlike universities and overseas museums, corporate and private donations to museums in South Africa do not carry a tax benefit for the donor because museums here are not considered educational institutions.[34] Apparently this odd situation still exists even though museums in post-apartheid South Africa carry more educational programmes, catering for the needs of all South Africans, than ever before.[35] Moreover museum scientists were denied the publication subsidy that the old DNE awarded university researchers for every paper published in internationally recognised journals. Following a strong campaign against this discrimination the subsidy was awarded to the national museums during 1990-1994, but it was stopped when these

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[30] Scientific Research Council Act, pp. 300, 302. Kingwill, *The CSIR*, p. 13.

[31] S.H. Haughton, "Research in Museums," p. 1. Scientific Research Council Act, p. 300.

[32] Haughton, "Research in Museums," p. 1.

[33] This policy is reflected in D.G. Kingwill, *The CSIR*, in which museums are hardly mentioned, and there is no reference to Haughton's investigation (see previous two notes) that considered museums to be important at the time.

[34] Drinkrow, "The role of natural history museums," pp. 472.

[35] The ACTAG Report recommended that this be corrected (Report of the Arts and Culture Task Group, June 1995, pp. 374, 377, 384), but I could not establish that this has been implemented by law.

museums were moved to the new Department of Arts, Culture, Science and Technology (DACST) in 1995.[36]

Following its move to the DNE the JLBSI took responsibility for its own financial management and hired an accountant.[37] Several funds were created to ensure continuity of operations in times of financial constraints. These funds protected donations given for a specific purpose from being consumed by routine running costs.[38] The understanding with the DNE was that "...it would cover the costs of operating the Institute in order for it to attain its three main objectives (curation, research and education)."[39] The transfer to the DNE was accompanied by financial instability that lasted 2-3 years, and prevented the JLBSI from operating at full capacity and impeded its growth.[40] However in the years that followed, the DNE grant to the JLBSI increased at a rate of 20-28% per year allowing it to almost completely fill its establishment posts and expand its activities. The increase fell sharply, to 5.7%, in 1989 when the DNE implemented its new 'framework autonomy' system and fundamentally changed the way national museums were funded. Due to a national economic recession at that time grants were restructured in a way that significantly reduced the amount the JLBSI received from the state – unlike previous years, for instance, the employer's contribution to staff pension and housing subsidies was now included in the basic annual grant.[41] The situation deteriorated in 1991/92 when the DNE limited its publication subsidy to the JLBSI to a maximum of 10% of the Institute's total grant, but careful financial management and active fund-raising resulted in a small surplus at the end of that financial

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[36] A.K. Whitfield, personal communication, 18 September 2000.

[37] JLBSI, Fourteenth Annual Report, pp. 3, 18.

[38] JLBSI, Fourteenth Annual Report, pp. 18-19 and Sixteenth Annual Report, p. 17.

[39] JLBSI, minutes of the council meeting held on Thursday 7 December 1989 at 14h15, p. 3 and Fifteenth Annual Report, pp. 4-5.

[40] JLBSI, Fifteenth Annual Report, p. 5; Sixteenth Annual Report, pp. 7, 16-17; and Seventeenth Annual Report, pp. 8, 21.

[41] JLBSI, minutes of the council meetings held on Thursday 24 March 1988 at 10h15, p. 4; Tuesday 21 September 1989 at 10h15, p. 3; and 7 December 1989, pp. 3-4.

year.[42] During Bruton's directorship the state grant to the JLBSI increased from R171,428 in 1982 to R2,057,000 in 1995.[43] Impressive as it may seem, much of it was taken by routine operating costs that increased dramatically with the growth in staff and activities to establishment capacity.[44] In 1994/95 national museums were moved to the DACST. The department started a review of the status of these institutions, resulting in another period of instability. The unfavourable economic climate continued throughout the 1990s, restricting the government's allocation for research.[45] As the South African Rand depreciated the JLBSI saw its operating costs escalating while the government grant had not increased significantly beyond a basic provision for annual salary increases due to inflation.[46]

A new threat emerged in 1994, soon after the African National Congress (ANC) had won the first democratic election in South Africa. The ANC government moved the 18 Declared Cultural Institutions (i.e. the national museums), including the JLBSI and the SAM, from the DNE to the new DACST. The Department's Arts and Culture Task Group (ACTAG), charged with reviewing art and culture policies in South Africa, recommended that two national museums be created in Cape Town and Gauteng, respectively, incorporating the national institutions of these areas. The remaining institutions were to be controlled by the provinces in which they reside.[47] The perception at the JLBSI was that, being essentially a research facility, and located far from the major centres and tourist destinations, the JLBSI would not retain its national status. The idea

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[42] JLBSI, Annual Report 1991/1992, p. 9. See also page 181.

[43] JLBSI, minutes of the council meeting held on Tuesday 21st September 1982 at 10h00, p. 10 and Annual Report 1994/1995, financial statement.

[44] JLBSI, Annual Report 1994/1995, p. 8. *Ichthos*, No. 49, 1996, special edition commemorating 50 years of ichthyology in Grahamstown.

[45] Anonymous, "As you were for the science councils," *South African Journal of Science*, Vol. 93, 1997, p. 144.

[46] See financial statements in annual reports for 1995-2000. P.H. Skelton, personal communication, 16 May 2002.

[47] Report of the Arts and Culture Task Group, 1995, pp. 88, 96, 98. Republic of South Africa, White Paper on arts, culture & heritage, 4 June 1996, pp. 31-32. Government Gazette, Notice No. 1578, p. 6.

of being demoted to a provincial museum became even less attractive in view of the financial difficulties experienced by several provincial museums in the new province of the Eastern Cape.[48] The strategy that the JLBSI employed was to highlight its strength in research as well as its significant national and international standing to motivate a transfer to the Science and Technology side of the DACST. This strategy succeeded and in January 1999 the JLBSI was declared a National Research Facility to be operated and managed by the NRF.[49] The move to the NRF was accompanied by financial instability yet again.[50]

As this short review of the financial history of the JLBSI shows, apart from a few years in the mid-1980s, its directors faced adverse financial circumstances from the start. They were preoccupied by the constant need for fund raising to keep the Institute afloat. Moreover in the last 20 years the JLBSI went through three major changes of affiliation (to the DNE, DACST and NRF), each requiring a period of administrative adjustment. Adding to these the normal chores of running the Institute, it is not surprising that the directors had little time for less pressing, longer term priorities such as devising strategies to attract students to study marine fish systematics.

The most serious threat to the discipline has been the lack of a young generation of South African marine fish systematists. Considering the growth, productivity and high international standing of the discipline in the last 50 years,[51] the glaring question is why are there no students? To gain an insight into the student issue it is necessary to review its history. A look at who is who in South African marine fish systematics (Table 1) shows that throughout the history of the discipline South African universities produced only five marine fish systematists; all the others were 'imported.'[52] Although Gilchrist taught at UCT, none of his students pursued a career in fish systematics. Apparently Barnard was never involved in the teaching and training of students. When RUC established the Department of Ichthyology in 1947 J.L.B. Smith committed himself

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[48] *Daily Dispatch*, 26 and 27 November 1998. *Sunday Argus*, 13 December 1998.

[49] Government Gazette, Notice No. 103 and Government Gazette, Notice No. 104.

[50] JLBSI, Annual Report 98/99, pp. 8-9, 33 and Annual Report 1999/2000, p. 8.

[51] See Chapter 4.

[52] Strictly speaking is it only three because both Smiths were trained in chemistry, not in biology (see Jackson, "Variation on a theme," p. 38).

Table 1. South African marine fish systematists of past and present.

Name	Age	Country of birth	Country of work
J.D.F. Gilchrist[1]	Deceased	United Kingdom	South Africa
K.H. Barnard	Deceased	United Kingdom	South Africa
J.L.B. Smith	Deceased	South Africa	South Africa
M.M. Smith	Deceased	South Africa	South Africa
M.L. Penrith	Unknown	South Africa?	South Africa (8 years at SAM)[2]
P.A. Hulley	60 (retired)	South Africa	South Africa
T.H. Fraser	60	U.S.A.	U.S.A.(2 years in S.A.)
R. Winterbottom	57	Zambia	Canada (3 years in S.A.)
P.C. Heemstra	60 (retiring)	U.S.A.	South Africa
L.J.V. Compagno	58	U.S.A.	South Africa
W. Holleman	58 (retired)	South Africa	South Africa[3]
M.E. Anderson	55	U.S.A.	South Africa
O. Gon	52	Israel	South Africa

1 Gilchrist was not a trained fish taxonomist.
2 Penrith have not been working as a fish systematist since she had left the SAM.
3 Holleman was never employed as a fish systematist.

to supervising students at the M.Sc. and Ph.D. levels.[53] Furthermore Smith fully appreciated the monumental task of documenting the fish fauna of South Africa and the WIO. He knew it would take more than one scientist and more than one life-time to complete the job. He therefore proposed to the RUC Council the establishment of a school of post-graduate research in ichthyology at a cost of about £1,000 for the period 1948-1950.[54] However his proposal was made at a time when RUC was almost bankrupt and it apparently did not receive a serious consideration.[55] Following the publication of SFSA Smith received requests and offers of financial support to produce a similar book on the freshwater fishes of South Africa. Because the work on the fishes of the WIO was his first priority for the foreseeable future he raised money for an understudy on the freshwater fish project. However the number of applicants was small and the one Smith hired for the job did not live up to his expectations.[56] Continuity of marine fish systematics at RU became a rather pressing issue for Smith in the mid-1960s as his health deteriorated. The fellowship the Anglo American Corporation gave Smith for a promising young ichthyologist to study with him for 1-3 years was meant to address the continuity issue, but this part of the plan did not materialize.[57]

It could be argued that Smith would have had the successor he wanted had he taught an ichthyology course at RU. The Smiths and their Department of Ichthyology had high academic and public profiles,[58] and they attracted foreign young ichthyologists who wanted to work in South Africa. Apart from Randall and Castle, the Anglo-American fellowship also attracted a late

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[53] RUC Council, meeting of 15th August, 1947, pp. 4-5. Records of the JLBSI, file C/27, Rhodes Registrar, letter of 19 August 1947 from the RUC registrar to J.L.B. Smith.

[54] Records of the JLBSI, file C/27, Rhodes Registrar, letter of 9 May 1947 from J.L.B. Smith to the RUC registrar.

[55] See page 86.

[56] Records of the JLBSI, file N/17, letter of 16 March 1951 (Appendix A) to the Liaison Committee and letter of 16 July 1952 to the secretary.

[57] See page 130.

[58] See page 130.

application from W.N. Eschmeyer.[59] All these scientists have become internationally leading ichthyologists. The fact that no South African postgraduate students or young Ph.D. graduates looking for post-doc positions approached Smith on their own initiative implies that South Africans had no interest in studying marine fish systematics. The observation that since its inception in 1971 the ichthyology course at DIFS has produced only a single M.Sc. thesis in this field of research by a South African student supports this hypothesis.[60] Consequently, when Smith died there was no qualified South African ichthyologist ready to take his place, a situation that nearly brought about the end of financial support for ichthyology in Grahamstown. Fortunately his wife, who worked with him over 20 years, was able to take over his department and transformed it into the JLBSI.[61] The realization that there was no trained, experienced marine fish systematist in South Africa to take over from her was a prime motivator in her decision to start an ichthyology course at RU.[62]

As the first director of the JLBSI, M.M. Smith's decision to teach ichthyology was a shrewd move.[63] Knowing that she could not match her husband's research output, a commitment to teaching was the next best option to keep ichthyology at RU. She also recognised that the future of the discipline depended on the availability of well-educated South African marine ichthyologists.[64] She offered Castle the post of Senior Lecturer at the JLBSI, but his son became terminally ill and he decided to return to his university post in New Zealand.[65] Smith used a two-

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[59] Records of the JLBSI, file R/77, Prof. C.R. Robins, letter of 17 May 1966 to M.M. Smith.

[60] See footnote 77.

[61] See page 133.

[62] Records of the JLBSI, file S/11, letter of 5 August 1968 from M.M. Smith.

[63] The new Institute incorporated the old Department of Ichthyology of RU. Its mandate was to continue with fish research and to provide students with training in ichthyology (Gon, "Fifty years," p. 53).

[64] Records of the JLBSI, file S/11, Dr R. Shuttleworth, letter of 5 August 1968 from M.M. Smith.

[65] JLBSI, Progress Report: 1968 - 1969, p. 2. Records of the JLBSI, file C/187, letter of 24 December 1968 from M.M. Smith and letters of 16 and 29 May 1969 from the registrar of

prong approach to prepare for the future. On the one hand, to start the teaching programme she recruited Dr T.H. Fraser from the U.S.A.[66] On the other hand, she kept her eye on a local person, R. Winterbottom, who was studying overseas. Winterbottom's relationship with the Smiths dated back to 1967 when he had been a B.Sc. student in Cape Town.[67] After J.L.B. Smith's death, he continued to correspond with M.M. Smith who was also interested in cultivating the relationship. She was very pleased with his interest in fish systematics and hoped that he would one day return to South Africa to join the JLBSI. Soon after Fraser had arrived she told Winterbottom that if Fraser was to leave before the end of his contract "...I hope that you will be in a position to come back to South Africa. So you see, my boy, I am keeping my eye on you and I will be very interested to hear how you are getting on."[68] She told the Board of Control of her plan to bring Winterbottom back to South Africa and informed the Board of progress with his studies. She also regularly gave Winterbottom news of the JLBSI and of how he could fit in to keep him interested.[69] When Winterbottom told her that he had obtained his Ph.D., she replied: "Needless to say my brain is already ticking over in scheming – how I wish you could join us".[70] The teaching of ichthyology in South Africa formally started in the academic year of 1970/71 at the JLBSI, but the first student enrolled for the year 1972/73 and the first degree was awarded only in 1976.[71] There were several reasons for this slow start. On Fraser's recommendation the JLBSI

RU. See also pages 132, 134, 135.

[66] See page 135.

[67] Records of the JLBSI, file W/46, correspondence between R. Winterbottom and J.L.B. Smith during 1967.

[68] *Ibid.*, letter of 9 April 1970.

[69] *Ibid.*, letter of 20 October 1971 to Professor and Mrs. Winterbottom, and letters of 20 October 1971 and 10 April 1972 to R. Winterbottom.

[70] *Ibid.*, letter of 20 October 1971 to R. Winterbottom.

[71] JLBSI, Annual Report 1972 - 1973, p. 4 and Tenth Annual Report, p. 5. J. Pote, "Historical highlights," p. 17.

designed the course for M.Sc. and Ph.D. students.[72] This may have deterred potential younger students; Smith received numerous enquiries about a career in ichthyology, but no students resulted from these.[73] As director, she thought that due to the lack of space in the old building it would be better to postpone enrolment until the new building was ready.[74] Fraser apparently regarded students as a burden and did not 'market' the course even though he was lecturing undergraduate students on fishes every year. In contrast, Winterbottom was a natural teacher and a people's person who saw the students as an avenue to increase research work.[75] Moreover Winterbottom did not limit himself to teaching systematics and took on students to work on fish biology.[76] In his three years at the JLBSI he had several students studying for a postgraduate degree in ichthyology, but only one, W. Holleman, did a thesis in marine fish systematics.[77]

Winterbottom was replaced by M.N. Bruton, a fish ecologist, and at that point the emphasis in the teaching shifted from fish systematics to fish ecology. When the JLBSI became a national museum in 1980 it could no longer award academic degrees.[78] To continue with the teaching of ichthyology RU re-established Smith's old department under the leadership of Bruton, and later T. Hecht, and renamed it the Department of Ichthyology and Fisheries Science.[79] The Institute played host to the new department until it moved to a complex of renovated buildings,

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[72] JLBSI, Progress Report: 1969 - 1970, "Memorandum on teaching of ichthyology," annexed document by T.H. Fraser, April 1970.

[73] Records of the JLBSI, file I/53, Ichthyology studies enquiries.

[74] JLBSI, Board meeting, minutes of the meeting held on Wednesday, 18th November at 9.30 a.m., p. 1. [n.d., probably1970]

[75] JLBSI, Annual Report for 1973/74, p. 7. P.H. Skelton, personal communication, 10 April 2002.

[76] JLBSI, Annual Report for 1974/75, p. 8.

[77] W. Holleman, "The taxonomy and osteology of the fishes of the family Tripterygiidae (Perciformes: Blennioidei) of South Africa," M.Sc. thesis, RU, 1979.

[78] See page 151.

[79] JLBSI, steering committee meeting of 21 March 1979, p. 2; minutes of the inaugural council meeting held on Friday 27 February, 1981 at 14h15, p. 2; Twelfth Annual Report, pp. 3, 17; and Thirteenth Annual Report, p. 3.

located behind the former, in 1990.[80] The revived department has focussed on applied ichthyology, that is fisheries biology and aquaculture. Nevertheless the opportunity for students wishing to study marine fish systematics exists through the lasting close co-operation between the JLBSI and DIFS.[81] The latter department is the only university department in the country offering degrees in ichthyology.[82]

To date, none of the South African students that have graduated from the JLBSI and DIFS has taken marine fish systematics as a career, and student interest in marine fish systematics is still at zero level. No South African students, black or white, have undertaken to do a thesis in this discipline since Holleman graduated in 1979. In 1964 J.L.B. Smith voiced his views on career opportunities and pay in marine biology:

> despite all one reads today about the importance of marine biology...there is no guarantee of a position, let alone a well paid one...occasional positions in the Government Fisheries Survey as well as museums do fall open...salaries rarely measure up to what can be got in industry...Purely scientific research scientists are still the most poorly paid of all professional men.[83]

These concerns were shared by museum sciences in South Africa and overseas. Before he was offered the post at the JLBSI Winterbottom told M.M. Smith that he could not find a job when he finished his Ph.D. "...even in countries where there isn't the tremendous N. American overproduction of Ph.D.'s. I'm getting somewhat depressed!!"[84] J.L.B. Smith had a first-hand experience of these problems in his dealings with the Natal Museum.[85] When director R.F.

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[80] C. Buxton, "A DIFS move of historic proportions," *Ichthos*, No. 27, 1990, p. 2.

[81] Skelton, "Fifty years of ichthyology," pp. 406-407.

[82] T. Hecht, personal communication, 10 June 2002.

[83] Records of the JLBSI, file R/3B, Assistant Registrar (Academic), letter of 6 August 1964 from J.L.B. Smith to W. Askew.

[84] *Ibid.*, file W/46, letter of 29 October 1971.

[85] See page 100.

Lawrence retired in 1948 the museum had great difficulties finding a successor. Dr S.F. Bush, then acting director and chairman of the Board of Trustees of the museum, wrote in frustration:

> It is clear that the dearth of younger scientists in South African museums, due to inadequate financial support by the Union Government and local governing bodies, and the lack of interest shown by overseas museum workers and scientists due to the unsatisfactory salary-scale attaching to the post of Director, have been largely responsible for the fact that a suitable applicant has not been forthcoming for the post.[86]

Not much has changed since then. At present, students looking for a career in marine fish systematics in South Africa are facing the same issues. The few posts that exist (3 at the JLBSI and 1 at the SAM) have a very slow turnover and no positions are available for young and upcoming scientists. The low salaries have been unattractive to bright young scientists who prefer better paying jobs at universities or in the private sector.[87] By contrast, 87% of DIFS graduates in applied ichthyology and aquaculture since 1982 have found employment.[88] The situation is similar in other branches of systematic biology practised in the country's natural history museums.[89] Consequently, the number of South African students looking for a career in systematic biology has decreased.[90] In addition, postgraduate and even some undergraduate students are well aware of the disadvantages museum scientists face in terms of research funding.[91] Under these circumstances only two kinds of students will choose a career in marine fish

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[86] Forty-fourth Report of the Natal Museum for the Financial Year 1st April 1948 - 31st March 1949, pp. 4-5.

[87] J. Jacobs, "Remuneration trends," *The Graduate*, 1999, p.17 [Table 2 of this article shows that in 1997 a male university lecturer with 0-4 years of experience received an income package of R92,000; at that year the JLBSI was paying a similar package to a senior scientist with 17 years experience.]

[88] T. Hecht, personal communication, 22 August 2000.

[89] Herbert et al., "Taxonomy and systematics research," pp. 2, 6-7.

[90] Du Plessis, "Taxonomy in South Africa," p. 16.

[91] See page 181 and next paragraph.

systematics, fools or lunatics. The former type are undesirable because they will not last in the job and are unlikely to become good systematists. In any case, they usually do not reach postgraduate level and are not relevant. The lunatics are highly desirable because they are most likely making their choice out of interest and will be highly dedicated to their work. J.L.B. Smith described himself as "...a lunatic to whom fish...really is a kind of disease or affliction almost like diabetes where one has to have regular injections to keep going. I am afraid I have been like this since my earliest youth and I see no prospect of ever being cured." Indeed, both Smiths put ichthyology before their private life and made sacrifices in order to be marine fish systematists.[92] Unfortunately, students of the lunatic type are few and far between.

Museum scientists also do not have the same access to students and the financial resources that come with them, as university lecturers and professors do. Two factors that discriminate against museum scientists in this regard came to light recently. Delegates at the Second Conference of the Southern African Society of Systematic Biology complained that they are not able to compete for students with university academics because they do not have the resources to "top up" student bursaries. It transpired that postgraduate students are now lured by university scientists with promises of money over and above the usual NRF bursary that is available to all students. This top-up money comes from the scientists' own project money, and/or sources in the private sector that are usually not accessible to museum scientists.[93] At the same conference delegates also heard that in an attempt to increase the level of financial support to individual scientists the NRF is introducing a 'cut-off point' into their evaluation system. Simply put it meant that proposals that score less than the cut-off point would not be funded. The evaluation system was already heavily biased toward education and corrective action thereby favouring university scientists. In the absence of students, many museum scientists found themselves outside the NRF funding system.[94] Ironically, the focus area of Conservation and Management of Ecosystems and

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[92] Records of the JLBSI, file R/97, P.J. Rose, letter of 18 July 1967 from J.L.B. Smith. See also page 117.

[93] *Ibid.* T. Hecht, personal communication, 22 August 2000.

[94] Herbert, "Museum natural science," pp. 168-169. Herbert et al., "Taxonomy and systematics research," p. 7.

Biodiversity, a major component of the NRF strategic plan for research over the next five years, relies on these same museum scientists for biodiversity work.

The apartheid system and the segregation policies that preceded it can be construed as a past threat with far-reaching consequences.[95] These policies barred Randall from coming to live in South Africa and prevented at least two generations of black South Africans from receiving high quality education and becoming exposed to the science of systematics. Political reform of the last decade opened the tertiary education system to black South Africans and changed the racial composition of the student population dramatically. In technikons black students have been the largest component in the total enrolment since 1996.[96] The RU student population is now 47% black.[97] However this change is not reflected in the demography of DIFS students, the potential source of aspiring young marine fish systematists. Black students at DIFS never exceeded 25% of the department's students of which at most 14% were South African nationals (Table 2). More worrying is the low level of graduation of South African black students from that department, never more than 1 per year. They either take a very long time to complete their degrees or fail altogether. The reasons for the near absence of black South Africans at DIFS and their low level of graduation need to be investigated if we are to come up with a strategy for attracting more black students into studying fish systematics. Several factors come to mind: little interest in the sea, fishes and fisheries because they have not featured prominently in South African black culture and tradition;[98] South African blacks do not qualify for the postgraduate course at

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[95] N. Mostert, *Frontiers*, pp. 1274-1275. Reader's Digest, *Illustrated History of South Africa - The Real Story* (Cape Town, The Reader's Digest Association Ltd., 1992), pp. 312-319, 374-381.

[96] *Mail & Guardian*, 1 September 2000.

[97] RU, Letter to all alumni, and parents and guardians of Rhodes University students, from the vice-chancellor, Dr David Woods, 28 July 2000.

[98] W.M. Mahola, "Fishing and the Xhosa," *Ichthos*, No. 28, 1990, pp. 14-15. L. Fikizolo, "Xhosas, fish and fishing," *Ichthos*, No. 51, 1996, pp. 10-11.

Table 2. Demography of DIFS students in the period 1990-1999 given in number of individuals and (%) of total number of students.[1]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Enrolment										
South African blacks	0	0	1(5)	1(5)	3(11)	4(11)	4(14)	2(6)	4(9)	5(8)
South African whites	17(85)	13(72)	15(71)	17(77)	18(67)	24(65)	18(62)	24(69)	32(71)	42(67)
Foreign blacks	0	2(11)	3(14)	2(9)	3(11)	5(13)	4(14)	5(14)	6(13)	11(17)
Foreign whites	3(15)	3(17)	2(10)	2(9)	3(11)	4(11)	3(10)	4(11)	3(7)	5(8)
Graduates										
South African blacks	0	0	1(8)	0	1(11)	1(5)	1(11)	0	1(11)	0
South African whites	5(71)	3(50)	8(67)	8(89)	5(56)	15(71)	6(67)	10(77)	6(67)	10(72)
Foreign blacks	0	0	1(8)	1(11)	1(11)	2(10)	1(11)	2(15)	0	2(14)
Foreign whites	2(29)	3(50)	2(17)	0	2(22)	3(14)	1(11)	1(8)	2(22)	2(14)

[1] Based on data kindly provided by the office of the registrar of the RU.

DIFS due to a low pass rate in undergraduate science;[99] those that are accepted do not cope well with the high standard of the course; and personal and family finances may force South African black students to seek jobs as soon as they complete their B.Sc.[100] On the other hand, black students from other African countries are coming to DIFS in growing numbers (Table 2). The steep rise in the enrolment of foreign black students in 1999 has apparently been maintained over the last two years.[101] The foreigners, mostly from countries around Lake Malawi with a well established fishing tradition, almost always have the advantage of coming from a paid job in their countries, usually with government fisheries or conservation agencies. Their salaries support their families while they are studying in Grahamstown. In addition, their employers want them qualified and provide the necessary support even when theses are not completed by the prescribed time (obviously up to a point). These students are highly motivated because their new degree may spell a promotion and/or higher income, as well as a better social status in their home country.

While the number of black South African students in tertiary education has been growing, their interest in marine science remains generally low. It is non-existent, as it is with white students, when it comes to marine fish systematics. The 'corrective action' policy the NRF introduced in 1994 favouring students from disadvantaged communities in the awarding of bursaries has so far made little difference. The demographic composition of delegates and presentations at two recent national conferences reflects the current situation. At the South African Marine Science Symposium (SAMSS) in the year 2000 19% of the delegates were black, a figure that gives some support to claims of success in attracting black student to marine science.[102] However only 7.5% (14 of 186) of the oral presentations were given by black

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[99] *Sunday Times*, 6 August 2000. [The article cites low numbers of black graduates (out of the total graduate figure) in engineering (3%), natural sciences (12%) and medicine (9%). The number of black graduates, compared to total student intake, is about a third of the number of white ones.]

[100] S. Mbande and W. Modisakeng, personal communication, 19 and 23 June 2002, respectively.

[101] P. Britz, personal communication, February 2002.

[102] T. Akkers, N. Bacela, B. Durham, M. Gibbons, M. Mzimela, A. Naidoo and V. Radebe, "Corrective action in marine science," Abstract of oral paper, 10th South African Marine Science Symposium - SAMSS 2000, Land, sea and people in the new Millennium, 22-26

delegates, including two (of four) papers on fish by South Africans. Of three oral papers concerned with systematics or biodiversity issues of marine organisms two were presented by blacks, none on fish. The posters were not different: 5.5% (14 of 254) by blacks, including 10 fish posters by South Africans. Six posters were about taxonomic or biodiversity studies of which four were presented by blacks. Of the two posters related to fish systematics one was by a black person.[103] At a conference of the Southern African Society for Systematic Biology 15% of the delegates were black, but of those only 7% were South Africans. The latter delegates gave 4% (2 of 50) of the oral presentations and produced 10% (3 of 31) of the posters, none of which was on marine organisms.[104] The belief of many systematists that taxonomists are born and not made may prove to be valid yet again.[105]

Government transformation policy, including the programme of affirmative action, also poses challenges. In this regard the experience of the old SFRI in Cape Town (now MCM) is relevant. Restructuring forced on the SFRI by senior management of the Department of Environmental Affairs and Tourism (DEAT)[106] caused most of the senior scientists and top management to resign or take early retirement packages even though most were at the peak of their careers. Consequently, much of the experience, expertise and international links accumulated over the last couple of decades, as well as the Institute's mentorship capacity, were lost. Younger scientists were moved into these vacant posts to fill the gaps in scientific administration and management. New, even younger and largely inexperienced scientists were brought in to take over the research work. The result of this process was a drop in the level of services and research

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November 1999, Wilderness, South Africa, Programme, Abstract and Directory, p. 26. News@nrf, No. 4, July 2000.

[103] SAMSS 2000, pp. 6-22 and 155-160.

[104] Multidisciplinary Approaches to Systematics, Second Conference of the Southern African Society of Systematic Biology, 10-14 July 2000, Mtunzini, KwaZulu-Natal, Programme, pp. i-iii.

[105] Du Plessis, "Taxonomy in South Africa," p. 16.

[106] P. Fitzgerald (DG, DEAT), "Way forward for Sea Fisheries," letter to Dr M. Mayekiso (CD, Sea Fisheries), 27 October 1998 (Ref: P1/2/1), copy in my possession.

output.[107] The way the transformation policy has been implemented is recognised now as a "risk to South Africa's base of mentors and leaders posed by the 'retirement' of an outstanding generation of marine scientists."[108] To speed up transformation within the NRF management devised new conditions of service that set the normal retiring age of employees, including JLBSI scientists, to 60. The implication of this regulation is that in the course of the present decade all the practising marine fish systematists in South Africa will be retired. Consequently, if no aspiring, motivated students appear on the scene in the next couple of years marine fish systematics in this country will be in a deep crisis by the year 2010, possibly even earlier.[109] Another professional threat comes from reports, sometimes prepared by biologists, giving incorrect or misleading information that can be misconstrued by decision makers. One such report[110] refers to 11 working fish systematists in South Africa, but there have never been more than seven, including two working on freshwater fishes.[111]

The failure to produce young South African fish systematists over the last 25 years has left the directors of the JLBSI and the SAM with little choice but to bring in scientists from abroad. This option may not be available any more under the labour and immigration laws of post-apartheid South Africa. Even if it is allowed, good ichthyologists from developed countries may not consider South Africa as a career opportunity due to the socio-economic situation in the country (high crime level, low salaries, depreciation of the Rand). In the next round of hiring, starting within the next five years, affirmative action appointments may prove to be the only option available to science managers, even if the appointed persons do not qualify for the job in

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[107] *Eastern Province Herald*, 16, 19 and 23 November 1998, 6 November 1999 and 13 September 2000. *Mail & Guardian*, 19 March 1999.

[108] Minutes of the 10th meeting of the South African Network for Coastal and Oceanic Research (SANCOR) Forum held on 30 April 2002 at the Two Oceans Aquarium, Waterfront, Cape Town, p. 5.

[109] See next paragraph about the options science managers will have following the early retirement scenario.

[110] Drinkrow, "The role of natural history museums," p. 473.

[111] The actual number, in terms of posts, is only five because two of the scientists included in the count hold administrative posts in their institutions and have little time for research.

terms of their education and experience. Such appointments could be attractive to science managers and directors anyway because they will satisfy the government which would then continue to support the discipline, thus ensuring its survival in the short term. However these appointments may represent a long-term threat through the compromising of the quality of research, reduced productivity,[112] lower quality of teaching and tutorship, deterioration of the national fish collection and the loss of the good reputation South African marine fish systematists have enjoyed internationally. To counter this threat, in July 2000 the JLBSI submitted to the NRF a business plan for the next five years which includes mentorship posts for young upcoming scientists. Through this plan the JLBSI is hoping to turn the threat into an opportunity because the mentorship posts, if approved, will increase its professional capacity.

The future of South Africa as a player in the global arena depends on its science, engineering and technology (SET) capabilities. The long-term interest of the country is to maintain a high quality science sector. Fundamental science, including systematics biology, has an important role in this regard.[113] The events at the SFRI demonstrate that government pressure on science to deliver quickly on its transformation policy can be in conflict with this national interest. Moreover government actions in the case of the SFRI have contradicted the objectives of its own policy of transformation. The White Paper on the transformation of the public service warns against the brain drain of people with special skills.[114] It clearly stipulates that transformation should complement rather than contradict the stated goals of increasing efficiency and effectiveness. Furthermore the White Paper requires that the time frame and targets of the transformation process be "realistic and achievable," yet it expects that "within four years all departmental establishments must endeavour to be at least 50% black at management level." Strangely the

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[112] Drinkrow, "The role of natural history museums," p. 474.

[113] M. Baxter, "Science in the future South Africa," *Ichthos*, No. 31, 1991, pp. 2-3. At the SAMSS 2000 conference (see footnote 102) the then director of the SFRI, Dr A. Payne, stated unequivocally that if high quality of research is not maintained South African marine resources are doomed.

[114] Some of the senior people that 'retired' from the SFRI subsequently left South Africa.

White Paper makes no distinction regarding the skills, qualifications and experience required at different levels of the public service.[115]

Opinions on the issue of racial transformation in fundamental science fall mainly into two schools of thought: the government view, including some science managers, holds that rapid transformation in all sectors of society, including science, is the best thing for South Africa and that the system has enough resilience to cope with such a rapid change.[116] Scientists on the other hand maintain that one cannot transform science at the same pace as the public service because it takes about 8-10 years to turn a Ph.D. student into an independent productive researcher, let alone a good science manager,[117] hence the need for mentorship programmes. In the past systematists did not view in-service training as their duty,[118] but it is now obvious that, politics or not, without such training certain branches of systematics have no future in South Africa. It remains to be seen which view prevails, but history will judge whether marine fish systematics, and through it South African science and society, wins or loses.

To alleviate the professional threat to South African marine fish systematics, and other fields of systematic biology, a long-term plan involving all the stake holders is needed. The traditional shifting of the blame for the dearth of students to the individual scientist is counterproductive as they become alienated. Scientists alone are not holding the responsibility for the future of systematic biology, or any other scientific discipline, in South Africa. To my

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[115] Government Gazette, Notice No. 1227, pp. 19, 54-55.

[116] The absence of black South African students interested in taking a career in fish systematics was discussed in a SWOT analysis meeting that took place at the JLBSI in August 1999. The director of the National Accelerator Centre in the Western Cape expressed the view that children learn fast and that scientists should go out and find suitable candidates that would turn into fully fledged scientists when the current generation retires. While children may indeed learn fast, many other factors play a role in the development of independent, productive scientists. Otherwise South Africa would not have experienced the current failure rate in science education (see footnote 99; the article title "Help wanted: black graduates" in the *Mail & Guardian* of 1 Sept. 2000 speaks for itself). There are countries in Africa that were freed of colonial rule 40-50 years ago, yet none has produced a home-grown competent black marine fish systematist.

[117] Several JLBSI scientists at a SWOT analysis meeting at the J.L.B. Smith Institute, August 1999. Discussions with other systematists during the Systematics 2000 conference of the Southern African Society of Systematic Biology, Mtunzini, 10-14 July 2000.

[118] Du Plessis, "Taxonomy in South Africa," p. 17.

mind this is primarily the responsibility of the NRF and the Department of Education. Moreover the scientists know and can easily prove that it is not cost-effective to leave this task to the individual scientist. In the past the NRF responded to the plight of systematics by sponsoring one to three-day workshops of discussions and lectures about systematics.[119] However these were initiated and attended by mainly scientists and some students, and were limited to research and funding issues. The impact of such events was short-lived and did not extend beyond academic circles. I believe the initiative must start at the high school level, possibly even earlier. At present science education in South Africa does not include systematics. Scholars do learn how a scientific name of an organism is constructed, but with little or no reference to taxonomy, classification and phylogenetics as a whole.[120] If allegations that the 'curriculum 2005' outcome-based educational programme is not geared for science teaching are correct,[121] South African children, most of whom are unlikely to be introduced to this subject in the home environment, will continue to be unaware of systematic biology. Only a concerted effort by teachers, scientists, science managers and other interested parties will resolve this problem.

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[119] JLBSI, council meetings held on Thursday 16 July 1987 at 14h15, p. 4; 24 March 1988 at 10h15, p. 1; and Thursday 28 July 1988 at 10h15, p. 1.

[120] A.K. Whitfield, personal communication.

[121] M.B. Cortie and L.B. Cortie, "Science, technology and the education of the South African child," *South African Journal of Science*, Vol. 93, 1997, pp. 346-348.

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A/18 – Anglo American Corp. of SA Ltd.
A/69 – Angling Clubs
A/105 – South African Anglers' Union
B/4 – K.H. Barnard
B/25 – Bush Univ. of Natal\1947-1963
B/40 – Clancey Durban Museum
C/4 – Dr & Mrs George Campbell
C/27 – CSIR, correspondence with Registrar
C/27 – CSIR, reports
C/27 – Rhodes Registrar & Council
C/27A – CSIR, reports on research work 1963 & 1965-68
C/27D – National register of research projects
C/28 – CSIR 1948-1960
C/28C – Weideman 1968-1976
C/116 – Sea Fishes
C/187 – Castle
D/28 – Irvin & Johnson, PE
D/53 – Donations (money)
D/54 – Donations in kind etc.
D/71 – Durban Undersea Club
D/96 – D. Dreyden
E/8 – E.P. Angler's Association
F/29 – Fish and fishy ways
F/84 – False Bay Conservation Society
G/6 – Dr Perry Gilbert
G/17 – Governador Geral do Mozambique
G/53 – Knysna Angling Club
G/75 – L.P.D. Gertenbach
H/45 – R. Nesbitt Horne
I/1 – B.M. Impey
I/4 – Irvin & Johnson, Mossel Bay
I/7 – Requests for information, general
I/19 – Fund raising information
I/53 – Ichthyology studies enquiries
J/2 – W.G.H. Jackson
J/22 – J.M. Jauffret
J/25 – Mr Flip Joubert
J/26 – The Crown Prince Household

J/65 – JLB Smith Institute of Ichthyology
J/65E – Steering Committee of the JLB Smith Institute of Ichthyology
K/7 – D.G. Kingwill, CSIR
K/9 – Knysna Angling Museum
K/12 – Koch H.J., Anne & Robert
K/20 – B.A. Key
K/23 – H. Kohlberg
L/5 – G.F. Losse
L/5 – Natal Museum (to 1967)
L/6 – D. Lazarus
L/8 – Captain M. Le Gras
L/9 – Basil Le May
L/10 – G. Le May
L/11 – Hugh Le May
L/35 – R.E. Levitt
L/39 – E. Louw
L/90 – G. Lionnet
L/93 – Eastern Province Rock and Surf Angling Association
M/7 – Dr E.G. Malherbe
M/15 – Vice Chancellor
M/22 – University of Michigan
M/27 – T.C. Marshall
M/33 – Prof. G.S. Myers
M/54 – Municipality, East London
M/61 – Marine Research Laboratory SWA
M/66 – Dr T. Monod
M/69 – Marine Oil Refiners of South Africa
M/70 – John E McCosker
M/89 – Glaxo Laboratories
M/90 – Helen McGregor & Co. Ltd.
M/107 – Mossel Bay Advertiser
M/109 – Municipality of Mossel Bay
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M/116 – M. Mackenzie
M/173 – Michigan State Univ. Libraries
M/198 – Irvin & Johnson, Mossel Bay
N/13 – Ncala
N/17 – Nuffield Foundation
N/22 – Norris

N/23 – Noticia
N/28 – Natal Museum
N/36 – Dr Meiring Naudé
N/39 – Nestlé SA
N/40 – Tea & Coffee
N/41 – Natal Cane
N/42 – Mr R. Nipper
N/46 – Newspapers
N/47 – National Geographic Society
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N/59 – New Western Fishing
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N/92 – Natal Underwater Union
O/4 – C.T. O'Brien
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O/13 – OXO
O/16 – Odd enquiries
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O/41 – Fish oil
O/44 – Oceanography: enquiries and leaflets
O/49 – Outeniqualand Trust
O/51 – Oysters
P/8 – Personality
P/45 – Natal Parks Board
P/50 – Department of Commerce
P/52 – EDWorks
P/54 – Panorama
P/62 – N.E. Popkiss
P/64 – Patoma Canning & Preserving Co.
P/71 – Porosan
P/72 – J. Pereira Soares
P/101 – Pollution
P/103 – PRISA
P/123 – R.R. Palmer
P/128 – Mrs Maxia Pienaar
P/141 – Parkes - Knysna
P/144 – Aaron Pearl
P/150 – Dr M.L. Penrith and Mr M.J. Penrith
P/172 – Parasites

P/177 – Popular articles Mrs. M.M. Smith
Q/2 – Prof. A. Quintanilha
Q/8 – Queenstown Sea Angling Club
R/2 – R.W. Rand
R/3 – Registrar 1947-1952
R/3B – Assistant Registrar (Academic)
R/9 – Frank Robb
R/24 – Rand Daily Mail
R/29 – Adv. A.A. Roberts
R/50 – J. Rawbone-Viljoen
R/54 – L. Rose & Co.
R/58 – Reckitt & Coleman
R/59 – C.E. Roberts United Tobacco Company
R/61 – Messrs. Robertson Ltd.
R/63 – Rays
R/65E – Research Subcommittee
R/76 – Joao Moreto Rato
R/77 – Prof. C.R. Robins
R/88 – Reef Marine Aquarist Club
R/97 – P.J. Rose
R/111 – C.H. Roncoroni
P/150 – Dr M.L. Penrith and Mr M.J. Penrith
S/2 – W.B. Scott
S/3 – W.W. Small
S/11 – Dr R. Shuttleworth
S/18 – South Africa Foundation
S/19 – Messrs Spence & Weedon
S/24 – Prof. T.A. Stephenson
S/36 – O.L. Shearer
S/37 – Dr S.G. Shuttleworth
S/38 – H.G. Simon
S/39 – Dr & Mrs S.H. Skaife
T/3 – Transvaal Museum
V/3 – Van der Horst
V/11 – Von Bonde
W/46 – Winterbottom

Board (including Steering Committee) and Council Meeting Minutes
Meeting held on Wednesday, 18th November at 9.30 a.m. [n.d., probably1970]

Meeting held on Monday, 6th November, 1972, at 9 a.m.
Meeting held on Monday, 24th September, 1973, at 2.15 p.m.
Meeting held on Friday, 19th September, 1975 at 0900.
Meeting held on Tuesday, 21st September, 1976 at 2.30 p.m.
Meeting held on Monday 19th September 1977 at 2.15 p.m.
Meeting held on Thursday 21st September 1978 at 9 a.m.
Meeting held on Wednesday, 21 March 1979 at 11h00.
Meeting held on Wednesday 19 September 1979 at 2.15 p.m.
Meeting held on Wednesday 24 September 1979 at 9.30 a.m.
Meeting held on Thursday, 19th June [1980?] at 09h30.
Inaugural council meeting held on Friday 27 February, 1981 at 14h15.
Meeting held on Tuesday 30th June, 1981 at 14h15.
Meeting held on Tuesday 21st September 1982 at 10h00.
Meeting held on Thursday 24 March 1983 14h00.
Meeting held on Thursday 21st July 1983 at 14h30.
Meeting held on Wednesday 21st September 1983 at 10h00.
Meeting held on Thursday 1st December 1983 at 14h30.
Meeting held on Thursday, 27 September 1984 at 10h00.
Meeting held on Thursday 6 December 1984 at 14h15.
Meeting held on Thursday 7 August 1986 at 14h15.
Meeting held on Thursday 25 September 1986 at 14h15.
Meeting held on Thursday 4 December 1986 at 14h15.
Meetings held on Thursday 16 July 1987 at 14h15.
Meeting held on Thursday 24 March 1988 at 10h15.
Meetings held on Thursday 28 July 1988 at 10h15.
Meeting held on Thursday, 16 March 1989 at 10h15.
Meeting held on Thursday 8 June 1989 10h15.
Meeting held on Tuesday 21 September 1989 at 10h15.
Meeting held on Thursday 7 December 1989 at 14h15.

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RHODES UNIVERSITY

Council Minutes

Volume 10

Meeting held at 4 p.m. on Friday, 21st June, 1946.

Adjourned meeting held at 2.30 p.m. on Monday 26th August, 1946.

Adjourned meeting held at 8 p.m. on Friday, 20th September, 1946.

Meeting held at 2.15 p.m. on Friday, 16th May, 1947.

"Memorandum on the progress of the Rhodes University College 1937-1947," attached to letter of 26 May 1947 from the Master of the College to the Chairman of the Council.

Meeting held at 2.15 p.m. on Friday 15th August, 1947.

Meeting held at 2.15 p.m. on Friday 17th October, 1947.

Meeting held at 2.15 p.m. on Friday, 21st November, 1947.

Executive Committee, meeting held at 2.30 p.m. on Friday, 5th December, 1947.

Volume 11

Executive Committee, meeting held at 4 p.m. on Wednesday 3rd March, 1948.

Finance Committee, meeting held at 2.15 p.m. on Friday 8th April, 1949.

Finance Committee, meeting held at 2.15 p.m. on Friday 11th November, 1949.

Special meeting held at 3 p.m. on Thursday 5th January, 1950.

Volume 15

Joint Research Committee, meeting held on Monday, 17 June 1968 at 4.00 p.m.

Volume 16

Minutes of meeting held on Friday, 25 October 1968, at 2.15 p.m.

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P.H.J. Castle, Professor of Zoology, Victoria University of Wellington, New Zealand, letter of 21 December 1995.

L.J.V. Compagno, Curator of Fishes, Department of Marine Biology, South African Museum, meeting at the SAM, December 1992.

T.H. Fraser, 22602 Adorn Avenue, Port Charlotte, Florida 33952, USA, email, 3 March 1996.

W.D. Haacke, Head Curator, Herpetology Department, Transvaal Museum, letter of 22 June 1993.

T. Hecht, Professor of Ichthyology, Department of Ichthyology and Fisheries Science, Rhodes University, Grahamstown, meetings, March 1994, 22 Aug. 2000, 10 June 2002.

W. Holleman, Honorary Associate, J.L.B. Smith Institute of Ichthyology, 11 April 2002.

P.A. Hulley, retired Deputy Director, South African Museum, meeting at the SAM, December 1992.

P. B. N. Jackson, retired scientist of the J.L.B. Smith Institute of Ichthyology and a relative of Romer Robinson, meeting at the JLBSI, March 1993.

S.X. Kannemeyer, Education Officer, South African Museum, meeting at the SAM, December 1992.

A.E. Louw, Publications Editor, South African Museum, meeting at the SAM, December 1992.

P.R. Maylam, HOD, Department of History, RU, 22 July 2002.

S. Mbande, M.Sc. student, DIFS, RU, 19 June 2002.

K.W. Modisakeng, M.Sc. student, Department of Microbiology, RU, 23 June 2002.

J. Pote, retired secretary of the JLBSI, Grahamstown, meeting at the JLBSI, October 2000.

J.E. Randall, retired ichthyologist Bishop Museum, Honolulu, emails of 7 August 1996 and 15 December 2001.

C.H. Scholtz, President of the Southern African Society for Systematic Society, Department of Zoology, University of Pretoria, email of 20 February 2002.

P.H. Skelton, Managing Director, JLBSI, telephone conversation, 10 April 2002 and email 16 May 2002.

R.E. Stobbs, retired JLBSI technician, Grahamstown, meeting at the JLBSI, 23 November 2001. Telephone conversation, 17 May 2002. Email, 19 May 2002.

P.J. Taylor, Curator of Mammals, Durban Science Museum, letter of 18 January 1993.

A.K. Whitfield, Deputy Director, JLBSI, Grahamstown, meetings at the JLBSI, 18 Sept. 2000 and 31 May 2002.

R. Winterbottom, Curator of Fishes, Royal Ontario Museum, Toronto, Canada, letter of 30 September 1993.

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