

## COAXING HISTORY FROM THE ROCKS: THE CONTRIBUTION OF THE BPI (PALAEOLOGY)

by

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### ABSTRACT

From humble beginnings at the conclusion of the Second World War, the Bernard Price Institute for Palaeontological Research has developed into a major centre of palaeontological research and training whose contribution extends far beyond the borders of South Africa. Over the 50 years of its existence it has amassed large collections of fossils from most of the fossiliferous deposits of South Africa, covering a large segment of geological time and a broad sweep of the diversity of life. These collections have provided the foundation for ongoing research by its staff and students, as well as by visiting scientists from many other parts of the world. As a component of the University of the Witwatersrand, the Institute incorporates the only separate teaching department of palaeontology in any South African university, through which a steady stream of undergraduate and graduate students has passed over the years. Many of those students now occupy senior research and management positions in institutions and corporations scattered across the world. Under its current leadership, the Institute looks set fair for the next 50 years of solid contribution to world palaeontology.

KEYWORDS: Bernard Price Institute.

### THE BEGINNING

During the mini-symposium to commemorate the jubilee of the Bernard Price Institute ('BPI', as it is commonly known), several contributors gave personal accounts of where the Institute has come from and what it is busy doing today. In particular, James Kitching, who has been at the hub of the Institute since the very beginning, gave some unique personal reminiscences of the early history of the BPI. From these discussions it was clear that it was the determination, enthusiasm and a certain brash pushiness on the part of Dr Robert Broom, combined with the philanthropic generosity of Dr Bernard Price, the vision of Field Marshal Jan Smuts, and the enlightened attitude of the University of the Witwatersrand that led to the Institute's birth. Basically it was because Broom was deeply concerned that South Africa was losing a large part of its priceless palaeontological heritage to erosion each year. He blamed this on what he regarded as an unwilling, unenlightened and mean attitude on the part of state bureaucrats who, by failing to provide sufficient money to ensure that this heritage was properly cared for, were failing in their duty to the nation.

The main motive for the establishment of the Institute was therefore to carry out a task that was actually the responsibility of the State, but was being badly neglected – namely, to initiate a systematic programme to find and collect fossils, especially the fossil reptiles of the Karoo, and to ensure that they were properly prepared, stored, curated, and made

available for study by local and foreign specialists. As it was to be part of a university, the Institute would also have an obligation to develop local palaeontological expertise by teaching students.

Broom's initiative came towards the end of World War II, and no sooner was the war over than the first full-time member of staff was appointed and the programme of work got under way. That person was James Kitching – soon to be joined by his two brothers – and in their hands a two-pronged campaign of almost military precision swung into action: half the year spent in the Karoo collecting fossil reptiles, and the other half partly at headquarters, virtually where the Institute stands today, doing the necessary preparation and curation work, and partly at Makapansgat collecting Plio-Pleistocene mammal fossils – ever hopeful that a hominid or two might turn up.

### THE FRUITS OF FIELDWORK

Over the half-century since then the collections have grown enormously, making the Institute's collection of mammal-like reptiles from the Karoo one of the largest, most comprehensive, best prepared and better curated in the world. It now runs into tens of thousands of specimens from right across the Karoo rock sequence in this country and its equivalents in several other parts of the world. Inside the BPI almost one entire wall of the 'map room' is covered by a 1:250 000 map of the southern part of the country with coloured pins showing the localities from which specimens in the Institute's

collections – and in those of several other institutions – have been collected. It is affectionately and simply known as ‘The Map’, and it is awesome to stand in front of it and reflect on the fact that one man – James Kitching – has personally walked over virtually every one of those localities, and laboured to remove the fossils and carry them out on his back. In this task over more than forty years he was usually helped by his long-time field assistant and special friend, the late Regent (‘Lukas’) Huma. Whether anyone has ever counted the number of pins on the map I don’t know, but it certainly runs into many hundreds. It alone is a monument to the commitment and dedication of James Kitching as a field collector of fossils, under conditions that were often physically punishing.

One major shortcoming of South African fossil collections in the era of Broom and afterwards was that they consisted almost exclusively of skulls. In this, let it be said, collectors were following Broom’s own example, usually targeting only skulls, and leaving behind in the rock whatever other parts of the skeleton might still be there. Over the years the Karoo became littered with these sad victims of palaeontological decapitation, and collectors working the Karoo became derisively known as ‘head-hunters’. To some extent this criticism also applied to the early material in the BPI’s own Karoo reptile collections, but it is no longer true and is not as much of a problem here as it is in other collections. The BPI now houses significant numbers of well collected complete skeletons of many fossil forms which have proved a great boon to those trying to interpret these ancient life forms correctly. In particular, they have helped to trace the evolutionary transition from reptiles to mammals, and this remains one of the Institute’s greatest and most enduring contributions over the years.

The Institute’s early work at Makapansgat, sparked originally by the discoveries of Wilfred Eitzman in the ’20s, which galvanised Raymond Dart and later his student and successor, Phillip Tobias, produced vast quantities of generally fragmentary bone. Out of that work arose what is to my mind a very unfortunate split in the University’s Plio-Pleistocene fossil collections: all hominid specimens were to go to the Anatomy Department at the Medical School, and the BPI was to keep the rest, including non-hominid primates. This is still so to the best of my knowledge, and I regard it as regrettable – it is undesirable to split collections from the same locality in this frankly rather arbitrary way, with its unfortunate overtones of “first class” and “second class” collections.

### BREAKING NEW GROUND

An important new direction which soon grew out of the Institute’s interests at Makapansgat was the detailed analysis of bone accumulations in the various ancient cavern infills at Makapansgat, in an effort to find out how and why they accumulated there. The BPI and the Transvaal Museum tackled this question at sites in the Northern Transvaal and the Swartkrans

localities respectively. From it there developed considerable taphonomic expertise in the institute, especially of Plio-Pleistocene cave deposits under the stimulating leadership of Judy Maguire. Linked to this has also been the detailed analysis of cave stratigraphy to unravel the often enormously complex stratigraphic relationships of the various separate but interlinked depositories in these complex systems.

### BIRTH OF A JOURNAL

With a steadily increasing flow of studies by staff, research students and visiting scientists, the need was soon felt for a journal in which these studies could be published, thus making the work of the Institute known to a wider scientific world. This need gave rise to the birth of the only specialist journal in South Africa devoted entirely to palaeontology, *Palaeontologia africana*, now in its 33rd volume. This journal is widely circulated to many countries of the world, but I think it would be fair to say that it is better appreciated outside South Africa than it is at home. Over the nearly forty years of its existence it has published hundreds of papers, most dealing with some aspect of palaeontology related to the Institute’s own extensive collections.

### FORGING LINKS WITH INDUSTRY

From the initial two-pronged collecting programme, it wasn’t long before the fledgling Institute branched out into other areas of palaeontology which were equally exciting academically, but were also important from other points of view. Palaeontology is sometimes dismissed by people with a ‘bean-counting mentality’ as being of no economic importance and therefore of no value other than a mild curiosity value at best. But the new areas into which the Institute was moving started to change that; these were the fields of palaeobotany and micropalaeontology – both with strong links to industry through the fossil fuels (coal and oil) with which they are associated. The illustrious Edna Plumstead initiated and led the palaeobotanical programme, and through her efforts and those of her students, very large and important collections of fossil plants of many kinds were built up. It was she who first put before the scientific world the intriguing fruiting structures of the plant forms which dominated the extensive Ecca coal flora, and interpreted their importance as showing the path of the evolutionary transition from non-flowering to flowering plants. These highly attractive fossils, and their promise of exciting new information, attracted several students, some of whom have gone on to build significant international reputations of their own as palaeobotanists of note.

One important application which grew out of this palaeobotanical initiative, and which now serves industry directly in a meaningful way, was the development and refinement of laboratory techniques to assess coal quality and its suitability for a variety of industrial uses. This aspect was developed in the Institute by Rosemary Falcon, herself one of Plumstead’s original students.

The other move into applied palaeontology was in the field of micropalaeontology related to the oil industry. This was greatly boosted by a decision by the oil exploration corporation SOEKOR to locate its micropalaeontology laboratory within the institute, under the direction of Ian McLachlan, himself a former student. Throughout its active prospecting phase, and before its move to the Western Cape, SOEKOR ran this lab and an excellent co-operative relationship built up between the Institute and the local oil prospecting industry.

### TRAINING NEW PALAEOLOGISTS

Whatever other contributions the Institute has made, one of its most important has been the training of students in palaeontology. Attached to the Institute is the only separate teaching department of palaeontology at any university in South Africa. Although it offers no undergraduate courses of its own, it contributes to the undergraduate teaching of both the School of Earth Sciences and the School of Biological Sciences in the Faculty of Science. At postgraduate level it runs its own courses and caters for its own graduate students. Students who have received their training through the Institute have found their way into senior research and management posts not only in museums and universities, which is where one would normally expect to find palaeontologists, but also in industry and in various quasi-governmental bodies. Some have even successfully entered the precarious world of the entrepreneur – including one professional astrologer!

Although systematic work has continued to underpin the Institute's research, other avenues have been progressively added as new approaches and imaginative ideas have emerged from the many talented people who have worked at or been associated with the BPI. The large Karoo reptile collections, painstakingly and meticulously collected especially by James Kitching, clearly lend themselves to more than mere classification. Indeed, from the earliest moments of research on Karoo reptiles – even before the seminal early work of Broom – the fossils of the Beaufort Group have been used as biostratigraphic tools, and the Institute's contribution to biostratigraphy has been and continues to be notable. Since the Task Group on Biostratigraphy of the South African Commission on Stratigraphy was established a little more than ten years ago, it has been chaired by the Director of the BPI, and Professor Bruce Rubidge, the current Director, is playing his role as chairman with flair and distinction.

One could say that the late forties and the fifties represented the 'alpha-phase' of work in the Institute, in which the emphasis was on growing the collections, and identifying, describing and classifying the forms found. In keeping with trends in the rest of the scientific world, in the sixties and seventies the Institute's net was cast wider. Although alpha-taxonomic studies continued, the focus began to shift more towards syntheses aimed at providing insights into the way ancient ecosystems functioned, and the

applied aspects of palaeontology became increasingly important. Sedimentology and palaeoecology assumed a central importance in the work, and this helped to bring the Institute's work much closer to that of the University's Geology Department. Where links with the earth sciences had been at best tenuous before, these new directions forged new links which have progressively strengthened. For a palaeontological institute which grew out of zoology, this was a healthy development because the true heritage of the discipline embraces the life sciences and the earth sciences equally.

It was also during this period that a School of Earth Sciences was established at the University, with the Institute itself playing a leading role in its establishment. One of the great benefits of that development was the adoption of a 'topic' system for teaching courses in the Earth Sciences, and as a result students from a much wider spread of academic backgrounds – including the Arts – were exposed to palaeontology, out of which some important graduate research in palaeontology grew. There is no doubt in my mind that this was a valuable and healthy development for the Institute.

Since the eighties the Institute has further broadened its interests, and has now added other 'micro' aspects of the study of fossils – including fossil wood, which has for so long been a seriously neglected corner of palaeobotany, and osteohistology, which holds out so much promise of new insights into aspects of the lives of animals which are usually beyond the reach of traditional palaeontological methods. A further exciting project has been the ongoing investigation of the volcanic crater-lake deposits at Orapa in Botswana, with its astonishingly well preserved fossils, including not only insects and other delicate soft-bodied invertebrates, but also some of the earliest flowers in southern Africa. These deposits have opened up the very real possibility of study of the co-evolution of plants and their insect pollinators over the last 100 million years. Such studies again promise interesting insights into the ways plants and animals lived in a vanished world of long ago.

The Institute remains loyal to its original mission in that it recognises that the fossil fauna and flora of this part of the world is still far from being completely known, so there is still ample room for 'alpha' studies. But its study base is broadening all the time as innovative and imaginative new approaches are brought to bear on problems old and new, and as new areas of research open up to the fresh minds entering the field.

### THE IMPORTANCE OF CROSS-POLLINATION

Finally, a very valuable contribution of the BPI is that it has always been an important magnet drawing visiting foreign specialists here, even during the height of the academic boycott of South Africa during the seventies and eighties. This has been true despite the strenuous efforts of some within this University (and

even one within the Institute itself) to intensify the boycott. It was satisfying for those of us opposed to the boycott to see their campaign against academic contacts with the BPI fail; even in the darkest, deepest days of the boycott a steady stream of foreign specialists came to the Institute to study its fossils and to interact with its staff, students and associates. This value as an academic magnet is an important one of which the University should take due note; in any academic institution, intellectual cross-pollination with specialists from elsewhere is a crucially important factor which largely determines an institution's academic relevance, viability and progress.

**FROM SMALL ACORNS ...**

The permanent staff of the BPI has always been small – some would say sub-critically small. But hopefully this brief review has shown that not only is the Institute alive and kicking, but buzzing with a vitality and enthusiasm that will carry it in healthy state into the next half century, if only it can be assured of the

support it deserves from the University, from important research funding sources such as the FRD, and from other potential benefactors. As someone said, "From small acorns tall oaks grow". May this acorn continue to yield tall oaks – none taller than the 'oke' we all know as 'Oom James'. If I look for one abiding contribution of the Bernard Price Institute to the world, I personally need to look no further than him. He is a legend in his own lifetime, and there are many of us who feel immensely privileged and proud to call him friend; all who are associated with him as a colleague admire him and hold him in the deepest affection.

Under the dynamic leadership of the present Director, Bruce Rubidge, the Bernard Price Institute indeed looks set fair to sail on into another half-century of exciting palaeontological achievement. One wonders what Broom or Price hoped for when they dreamed their first dreams of a palaeontological institute, and how they would feel now if they could see what had become of it in the intervening half-century. I suspect we would see smiles of deep satisfaction and contentment.