

Julian Tenison Woods, Scientist, 1832 - 1889

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INTRODUCTION

In the last decade of his life Julian Tenison Woods was certainly not without recognition of his achievements as a scientist. At its meeting on 14 December 1887 the Council of the Royal Society of New South Wales, 'on the motion of Mr. Hunt, seconded by Dr. Leibius, unanimously resolved to award the Clarke Medal' for 1888 to Woods, for his services to Australian science. The following May, C.S. Wilkinson, Government Geologist and President of the Society, in his anniversary address to the members declared that a more appropriate award could not have been made for:

During the last thirty-one years the Rev. Tenison-Woods has been well known as a writer upon the Natural History of Australasia. Of his 157 works published since the year 1857 no less than 74 are upon his favourite branch of Science - Geology ... wherever I have travelled I have found his name a household word, so wide an influence have his writings exercised among all classes (Wilkinson, 1889).

Woods, the eleventh recipient of the medal, joined a distinguished company. He shared the award with Sir Richard Owen, George Bentham, Professors Thomas Huxley, Frederick McCoy and James Dwight Dana, and with Baron Ferdinand von Mueller, Alfred R.C. Selwyn, Sir Joseph Dalton Hooker, Professor L.G. De Koninck and Sir James Hector. These men currently held or had formerly occupied government scientific posts. Woods alone of the group had no official appointment and his designation of Union Club, Sydney fitted ill with such descriptions as: Director of the Royal Gardens, Kew; Director of the Geological and Natural History Survey of Canada, Ottawa; Government Botanist, Melbourne; the Royal School of Mines, London; University of Liege, Belgium and so on. (Royal Society of New South Wales, 1887)

WOODS AND THE AUSTRALIAN MUSEUM

Seven years earlier, on 2 November 1880, when the Board of Trustees of the Australian Museum met in Sydney James C. Cox, doctor and conchologist, Charles Moore of the Botanical Gardens, and Robert Hunt of the Sydney Mint nominated the Reverend

Julian Tenison Woods as a trustee of the museum 'on account of his scientific.....attainments' (Cox et al, 1880). The secretary of the Board wrote to Woods on 9 December informing him of his election. After a second letter had been sent in March 1881 the priest replied from Rockhampton explaining he had not received the first notification. He thanked the Trustees for the honour, declaring he would be happy to serve as an elective trustee if they considered he could assist the interests of the Museum. At the same time he reminded them that while his duties as priest often took him away from Sydney he expected, after his return from Queensland, about 15 May, that his future absences would not be for extended periods of time (Woods, 1881a).

The illness of Bishop James Quinn of Brisbane delayed Woods, and in his letter to E.P. Ramsay, Curator of the Museum, on 21 June he expressed concern that he had assured the Trustees he 'would be down in May' and requested Ramsay to mention the matter to them (Woods 1881b). Woods was too late. When the Board met on 7 June the chairman declared the priest's position vacant on the grounds that he had been absent from meetings for six consecutive months without leave. By 21 June the date of Woods's letter to Ramsay the Hon. P.G. King MLC had been nominated in his place.

Near the time of his election to the Board Woods prepared his 'President's Address' for the Linnean Society of New South Wales. At the Society's annual meeting in Sydney on 27 January 1881, however, the vice-president, not the president, delivered the address. Woods was busy conducting an 'eminently successful mission' in Bundaberg 'where the little chapel was well filled at each service, especially at night, the well known eloquence of Father Woods drawing many of all sorts to hear him' (Australian, 1881).

WOODS'S EARLY SCIENCE

Born in London in 1832, Julian Woods from his earliest years had shown an interest in natural history, and with his brothers had collected and preserved butterflies, beetles, shells, fossils and rocks (Woods,

1889a). His boyhood coincided with the 'heyday of natural history' in England when the pursuit of natural science became almost a 'national obsession' (Barber, 1980). Science was regarded as 'part of the intellectual culture of mankind into which all might enter and from which all might profit' (Lucas, 1979). Thus 'the naturalist might be anyone from Darwin down to the lowliest Sunday bug-hunter' (Barber, op cit) Science fascinated the young man and he made the most of any opportunity to increase his knowledge and skill. Thus while teaching English and pursuing his theological studies at the Marist College at Toulon in the south of France in 1854 he also took part in drawing, natural philosophy, natural history and chemistry classes, and in laboratory sessions. (Barber, 1980). When the College closed in the mid-year as a result of a cholera outbreak he returned to England and while there he attended a short course of lectures on scientific subjects (Woods, 1889a).

Woods arrived in Hobart with Bishop Robert Willson in January 1855. Two of his brothers had already settled in Australia and as his goal of ordination as a Catholic priest had eluded him for the second time he had accepted Willson's invitation to act as a lay chaplain to the convicts of Tasmania. Before the end of the year, dissatisfied with his work, he joined his brother James in Adelaide and some months, later under the patronage of the local bishop, Francis Murphy, he resumed his studies for the priesthood. After his ordination on 4 January 1857 Murphy appointed him as priest in charge of the vast mission of the south east of South Australia centred on Penola.

SOUTH AUSTRALIA AND WIDER VIEWS

His isolation in Penola proved an impetus to his interest in science and the priest used his frequent trips on parish work to observe and to note the natural history of the region. By the close of the year he had contributed articles on the extinct volcanoes, Mt. Gambier and Mt. Schank, to the *South Australian Register* (Woods, 1857a & b), and had established contact with Ferdinand von Mueller in Melbourne. With the botanist's advice and encouragement, he published his first formal paper, 'Observations on Some Metamorphic rocks in South Australia' in the *Transaction of the Philosophical Institute of Victoria* (Woods, 1857c). His investigations during his years in Penola (1857-67) showed him to be a perceptive and careful observer, conversant with the scientific literature of the day and, as befitted one who came from a family of journalists, an excellent writer.

Scientific workers in Australia in the early 1860s faced the problem of a lack of local journals in which to publish their investigations. As Woods did not engage in scientific pursuits for interest alone the questions of the right of authorship and priority of discovery, as determined by date of publication, concerned him no less than they worried fellow scientists, Robert Ellery, government astronomer in Victoria, Frederick M'Coy and others (Royal Society of Victoria, 1864). In 1863 when for the third successive year the Royal Society of Victoria failed to publish the papers he submitted he had protested by refusing to pay his membership subscription (Woods, 1863). Initially he fared no better with the Philosophical Society of Adelaide in his quest for publication (Philosophical Society of Adelaide, 1861). Certainly he did not go to the lengths of John Brazier, the conchologist, who wrote a short paper in 1880 to prove his right of priority over George Angas in the naming and description of three shells (Brazier, 1880). Nonetheless, as late as 1880, in his 'President's Address' to the members of the Linnean Society Woods regretted that 'a few species of Brachiopods, Pectens and Echini' which he had described in the mid 1860s had been redescribed by 'foreign authors' because of the insignificant circulation of the *Transactions of the Philosophical Society of Adelaide*. (Woods, 1880)

With the publication in 1862 of his first book, *Geological Observations in South Australia*, Woods became well known as a scientist, The *Edinburgh Review*, the *Quarterly Review* and other British periodicals as well as the colonial press praised the book's style and its content, and the *Border Watch* published extracts from the various reviews. (*Border Watch*, 1863). The *South Australian Register*, in an editorial in May 1863, declared it knew of no other book by an Australian which would bear comparison with *Geological Observations* for it contained so much useful matter for men of science and so much the ordinary reader could understand. Woods had wished the book to be of use to a wide audience and for that reason he had deliberately 'entered more into detail and given more explanation than he would have done had the Work been intended only for men of Science' (Woods, 1862). He firmly believed that the goal of a complete geological history of the colony would be materially advanced if scientists encouraged amateurs to report what they knew of the geology of their local area (Woods, 1865a). In *Geological Observations* he provided a model for the general reader and so made such contributions a possibility.

Though the observations concentrated on the south east of South Australia, the area which Woods traversed time and again as he ministered to the Catholics of the district, *Geological Observations* did not degenerate into a simple parochial work. Woods carefully situated the local area into the wider context of the geology of the Australian continent. As a first attempt at a systematic examination of the geology of South Australia, the book marked a noteworthy achievement in the history of such endeavours in the colony (Corbett et al, 1986).

During his relatively short life Woods wrote about 200 scholarly and popular scientific papers and a close look at them reveals a concern with taxonomy. Yet he did not engage in this work for the sake of naming species after species. To him taxonomy was always a tool, a means to help unravel problems and to arrive at comparisons and generalisations. In the South East the age of the local Tertiary deposits interested him and he sent fossil material overseas to the experts. Charles Lyell proved the most helpful of Woods's contacts for he suggested the means by which the young naturalist could work on the problem independently. In 1859 he wrote to Woods in Penola:

What I should advise you to do is to make yourself thoroughly acquainted with the marine zoology of South Australia. Without troubling yourself with specific names, collect wherever you can and examine collections of marine objects. Compare them with the fossil forms you know. By such means you will soon be in a position to tell more of the age of your tertiary[sic] beds than the most learned of our Palaeontologists in Europe could tell you. You will add in a valuable degree to the store of scientific knowledge, and for a young Geologist I cannot well conceive a more inviting position. (Lyell, 1859).

From his Penola days Woods studied and named animals, living and fossil, as a means to determine the ages of the local Tertiary deposits (Woods, 1866a). In a letter to Frederick McCoy in Melbourne in June 1864, for example, he begged to communicate an accidental discovery which might 'be of some importance in determining the age of the Murray Cliffs'. He described coming across some unusual nodular ironstone composed of fragments of fossils. On examination he found that these fossils matched, at species level, specimens he had at home in his cabinet from Muddy Creek Hamilton. He gave his reasons for believing that the gravel rested above the Murray Cliffs and hence the cliffs would be older than the Miocene (Woods, 1864).

Not even the snub offered Woods by the *Geological Magazine* in London caused him to deviate from his course. When it reviewed his *Report on the Geology and Mineralogy of the South-Eastern District of the Colony of South Australia* in 1867 it remarked that the pamphlet would have been of more use if Woods 'had omitted his favourite discussion on the discrimination of Upper Miocene from Lower Pliocene' (Geological Magazine, 1867) It continued 'how can a single amateur geologist in one corner of South Australia dictate to the Geological Survey in Victoria and decipher aspects of the Tertiary which had baffled the experts in Europe'. Undeterred, Woods continued to work on the lines suggested by Lyell (Woods, 1880).

BARREN YEARS FOR SCIENCE

Bishop Sheil, the new bishop of Adelaide, transferred the priest to the capital city in 1867. The people of the South East appreciated Woods and he left Penola with their gift of 100 guineas to buy scientific books or instruments (*Border Watch*, 1867). Before taking up his new appointment he visited Melbourne, and at the annual conversazione of the Royal Society of Victoria on 4 March read a paper, 'On the Glacial Period in Australia' (Woods, 1867a). This occasion marked his last contribution to a scientific journal for seven years.

In Adelaide, in spite of library facilities, the possibility of personal interaction with members of the Adelaide Philosophical Society and many other advantages, Woods, as a scientist, simply disappeared from the colonial scene and from public literary life. As director of education he became immersed in working for the establishment of a Catholic education system and, with Mary MacKillop, founding and forming a group of religious women, the Sisters of St. Joseph, to staff the schools and provide other social services. His years in the city carried their measure of failure. When he finally left the diocese in 1872 his projects for education and the alleviation of social distress carried heavy debts. While he had been praised as a good and zealous priest, he had been found wanting in prudence in his direction of the Sisters. He had encouraged a group of self-proclaimed mystics among them. Nevertheless he and Mary MacKillop had responded innovatively to pressing colonial needs and their work survived.

In 1979 Max Harris, the columnist, wondered what bishops could do with a priest like Woods: an eloquent preacher, effective in recruiting young

women to join the Sisters of St. Joseph and, though not robust in health, possessing unbounded energy. Harris provided a perceptive answer: 'It's a Big Country - Keep 'em moving. Ride on Stranger'. (Harris, 1979). So from 1871 to 1883 Woods was continually on the move working as a mission preacher in a number of dioceses - Sydney, Bathurst, Maitland, Tasmania and Queensland. This constant travelling provided him not only with work in the Church which utilised his talents but presented him with unique opportunities for scientific observations and comparisons.

Bishop Murphy of Hobart persuaded Woods to visit Tasmania in 1874 to give a series of missions, and both Murphy and Bromby, the Anglican Bishop, as well as the local press attest to his zeal in his work as priest (*Mercury*, 1875). Tasmania also offered Woods the opportunity to re-establish his links with Australian science. He had been elected a corresponding member of the local Royal Society in April 1865 but only in July 1874 repaid the honour by reading a paper on the physical and zoological relations between the island and the mainland (Woods, 1874). The following year, 1875, decisively marked his return to involvement in science when he began to contribute an increasing number of papers to the Royal Society of Tasmania.

RENEWING SCIENTIFIC LINKS

So while Woods criss-crossed various parts of Tasmania (and in later years the other colonies) giving missions, he fitted in his investigations and writings in science. He always revelled in beating the constraints of time. At Penola in 1865 he declared that he would not give a fig for the excitement of his work unless always rushed for time and struggling. He believed that literary and scientific work for the rich who had plenty of time and money must be dreadfully tame (Woods, 1865b).

Even after an absence of more than seven years from serious involvement in science Woods in Tasmania found Lyell's early advice still relevant. As the priest pointed out- the generalisations made on the age of the Australian tertiaries in England by P. Martin Duncan in the early 1870s proved unreliable for two reasons: Duncan lacked familiarity with the country and consequently confused widely separated formations; moreover, because of the imperfect state of the knowledge of Australian fauna, his comparisons between fossil and living fauna were of little value. So during his three years in Tasmania Woods worked on

the taxonomy of the molluscan fauna of the island to supply data from which more accurate conclusions could be reached (Woods, 1880). At the August 1875 meeting of the Royal Society, he further justified his opting for such an approach. In preliminary remarks to his paper on the 'Freshwater Shells of Tasmania', he gave a practical example of the use of taxonomy, which clearly illustrated the import of such work for him. He explained that in the early history of science the study of freshwater molluscs did not attract much attention from naturalists until its utility was strikingly demonstrated. A young French naturalist specialised in the study of such shells and recorded the 'habits of life' of many species. When the eminent French scientist Cuvier set out to determine the age of the fossil bones found at Montmatre, Paris, the earlier work on the freshwater shells proved a boon. A close study of the shells found with the bones, showed them to be freshwater ones and already described. This association enabled Cuvier to explain the conditions under which the extinct animals of the beds existed. Woods also pointed out that 'much light had been thrown on the conditions of life in the coal formation from the freshwater and land shells found embedded in it' (Woods, 1875).

Before he returned to Sydney in February 1877 Woods enjoyed membership in both the Linnean and Royal Societies of New South Wales. In a move to boost its contributing members, the Royal Society at its meeting on 4 August 1875 conferred honorary membership on a group of well-known colonial scientists: von Mueller, McCoy and Robert Ellery from Victoria; James Hector and Julius von Haast from New Zealand and, in a supplementary list, the explorer Augustus Charles Gregory, F. D. Waterhouse and Woods (Royal Society of New South Wales, 1875). Woods responded to the honour by sending in 1876 a paper on the fossil polyzoa and naming a species for Rev. W.B. Clarke, the vice-president of the Society, and one for Archibald Liversidge, its secretary (Woods, 1876). The newly-formed Linnean Society followed a different system from the Royal Society, and in July 1876, after receiving from Woods a copy of one of his Tasmanian papers, the secretary announced that the Council had elected him a corresponding member. Within a few months he had forwarded the first of many papers which the Linnean Society would published over the next thirteen years.

Though occupied in 1877 in giving Missions in the Sydney, Maitland and Bathurst dioceses Woods strengthened his ties with the two local scientific societies. To the Linnean Society, however, he

submitted the bulk of his papers, some ten of the eighteen published that year (three papers were submitted to each of the Royal Societies of New South Wales and Tasmania and two to the Royal Society of Victoria). Because its *Proceedings* admitted scientific papers only, and promptly published the account of the monthly meetings and the papers read, it suited Woods. Such a policy not only enhanced the chance of securing priority of discovery but made for prestige. In 1878, in the context of a description of the various colonial societies, he remarked

The Linnean Society of NSW publishes more real matter than the Royal Society, all of A[sic] high class, and although not a popular Society yet takes a position amongst all kindred Societies at home and on the continent (Qld. Phil. Soc., 1878).

In addition Woods shared ideas with William Macleay, the Society's president. Both men believed Australian science to have an inadequate base of knowledge on which to make generalisations, and so they promoted the necessity of descriptive work on the local fauna as an initial priority. Macleay, a wealthy grazier and Parliamentarian, exerted a strong influence in the affairs of the Linnean Society and a minute of the Council meeting in January 1884 showed him suggesting changes in the rules of the Society and also giving a list of persons whom he considered should be proposed as Office-Bearers and members of Council for the ensuing year. Among other things these moves by Macleay enabled Woods to continue as one of the vice-presidents. There can be little doubt too that the priest owed his elections as president of the Society for the years 1879-80 to the support of Macleay, after his election as an ordinary member in November 1878

Woods's interests ranged wide. When his friend Ralph Tate in his anniversary address to the Adelaide Philosophical Society on 8 October, 1878 gave an account of the general progress of Natural History knowledge in South Australia he mentioned Woods's work in geology, palaeontology, the mollusca, polyzoa, sea urchins, corals and even in comparative anatomy. Though he criticised some aspects of the census of Tasmanian molluscs by Woods, Tate wrote of his work on corals, 'We have to thank Mr. Woods for throwing light on the subject, and science is deeply indebted to him for what he has effected in this and other departments of Australian Natural History' (Tate, 1878).

BOTANICAL RESEARCHES

One of the areas in which Woods received no mention from Tate in 1878 was in botany. He had collected plants for von Mueller in Penola and later in Tasmania, and while on the island worked with the Rev. William Spicer, a competent botanist (Woods, 1876b). His comeback paper, "Notes on the Physical and Zoological Relations of Australia and Tasmania", in 1874, dealt with some botanical aspects. In June 1878 he had made a special trip from Parkes to Sydney to read before the Royal Society his ideas on 'Tasmanian Forests: their Botany and Economical Value' (Woods, 1878a). This paper was one of the earliest attempts to stress the importance of conservation in Tasmania, and Woods's final words have a contemporary ring:

The only way to prevent the wholesale destruction of the timber will be by proclaiming reserves or State forests as has been done in Victoria....The matter is one which the Legislature should deal with promptly or the forests of Tasmania, peerless and priceless as they once were will soon be things of the past.

Woods spent 1873 in Queensland and made the acquaintance of botanist Frederick Bailey. He returned to that Colony in November 1878 for one month, and in March 1879 he and Bailey jointly published an extensive list of the Flora of Brisbane (Bailey & Woods, 1879). An impressive essay, by Woods, on the relation of the Brisbane flora to other plant zones in Australia introduced their census paper. A year later the pair co-operated to 'furnish a contribution to Australian Mycology (fungi), and so far as possible to popularise the subject with a view to stimulate enquiry'. They gave short notes on the genera and more remarkable species so that naturalists could recognise specimens without having to consult an extensive library (Woods & Bailey, 1880). But Woods in Botany was far more than a Bailey collaborator. His series of five articles on 'Botanical Notes on Queensland' in 1882 clearly showed his capability. It illustrated also that for him the naming of species contributed only the first step in the scientific process. He wrote:

Now that the grand work of describing and cataloguing has been accomplished by the illustrious botanists Bentham and Mueller, humbler laborers may step in to add to the account of knowledge: This is the purpose of the present notes.

His accounts formed one of the first written on the vegetation of Queensland, and highlighted his outstanding powers of observation, his methodical manner of working and his attempts to explain and understand what he saw (Johnston, 1988).

Von Mueller (1890), while he expressed doubts as to Woods's reliability as a plant taxonomist also remarked that it would be unjust to expect from him accurate knowledge of all native plants, his real strength being geology'. But the priest did have strengths in botany and he contributed significantly to botanical knowledge in Australia and later in Malaysia.

ARTESIAN WATER AND SANDSTONES

At times it seemed as if the scope of Woods's involvement knew no limits. Sometimes his interests touched on matters of possible economic significance. In the conclusion of his paper 'On the Relations of the Brisbane Flora', for example, he stressed the utility of pursuing investigations into the useful qualities, industrial and medicinal, of that flora, and suggested lines of enquiry. Years earlier he had written too on the possibility of finding underground water supplies in arid areas. Though the first well in the Great Artesian Basin was only sunk in 1878, in February 1867 Woods had argued that if, as he believed, the springs of the interior resulted from underground drainage, then the 'the whole of the Lower Darling, the country about the Barcoo, Danbury Ranges, Sturt's Desert etc., could be *splendidly watered by means of artesian wells*'.

W.E. Abbott, a grazier from Wingen, proposed (correctly, as it proved) in 1882 that the extensive clays overlying the artesian water had been deposited in a sea. Woods precipitated a controversy when he demanded fossil evidence of such a sea:

Great oceans don't come and go, and leave no traces behind them. It is such figments which have retarded, and still retard, geology. We have no more right to presume that an ocean existed in any place without positive geological evidence of its former presence than we have to assent that there have been cities in the interior (Syd. Morning Herald, 1882).

In his second and final letter Woods rather patronisingly referred Abbott to his forthcoming paper on the 'Hawkesbury Sandstone' and trusted that the gentleman would 'see in it something that will assist him in forming sound views of the origins of those deposits which cover the underground waters of the

Darling'. Abbott, in his replies supposed that all knowledge would be summed up in the priest's coming paper to the Royal Society and promised:

Of course I will read, and endeavour to derive from it all the hoped for advantages, but in anticipation of the eventful day on which is to be brought forth the result of the labour of so many years, I may say that unless it throws more light on the formation of the Hawkesbury sandstone than the aerial dust theory does on that of the Darling watershed, I shall have to remain in a state of blissful ignorance.

Abbott's taunt highlighted a practice of Woods. He often claimed legitimacy for his conclusions on the grounds of the time spent investigating a problem and/or on the number of specimens he had examined. Thus his explanation of the geological history of the south east of South Australia was the fruit of years of observations, of the sifting of data and of a comparison of his results with the findings of the geological survey of Victoria (Woods, 1866b). His case for no recent glaciation in Australia, as initially outlined to the members of the Royal Society of Victoria in 1867, rested on the evidence of thousands of fossils and shells which had passed through his hands over a period of more than two years. Then when he advocated a reduction of from eight to four species of the genus *Risella* in 1876 he reasoned on the basis of 'some hundreds, ...nay thousands of shells' which he had examined over many years, not only from Tasmania, but from all colonies. Similarly, in his paper on the Hawkesbury Sandstone in 1882 when discussing one line of evidence for his argument in favour of an eolian origin for the deposit, Woods asserted that he had microscopically examined 'all sands from all the rivers and creeks' he had come across (Woods, 1882a).

The Catholic *Freeman's Journal* (1882) described the 'Hawkesbury Sandstone' as one of the most important contributions to colonial geology to appear in recent years, and published verbatim Woods's fourteen points on the origin of the deposits. It believed the accounts given by Woods in the paper of 'long experiments and microscopic examinations of sand', the references to works and authorities in France, Germany and Great Britain and the scope of the paper, all bespoke a long study and commitment on the part of the author.

'Altogether', the report concluded, 'the paper ... had a wonderful effect in stirring up geologists generally, and the Royal Society in particular, into life and activity'. The following week at the adjourned meeting of the Royal Society 40 members attended and heard both C.S. Wilkinson and Professors Stephens and Liversidge respond to the ideas presented in the paper and Woods's reply to their objections.

Christopher Rolleston, the Society's president, at the General Meeting in May 1883 acknowledged that Woods had contributed the most important papers of the 1882 session and singled out the one on the geology of the Hawkesbury Sandstone:

which from the novelty of its conception, the variety of facts and observations by which his theory was supported, the clearness with which the facts were set forth and the masterly ease which characterised the treatment of the theory propounded, is a most interesting and valuable contribution to the Society's Transactions.

GOVERNMENT CONTRACTS AND ASIAN TRAVELS

As Woods's reputation as a geologist grew, governments in South Australia, Queensland and New South Wales engaged his services. In Queensland he surveyed the tin fields at Herberton in 1881 and wrote on the Colony's coal resources in 1883. South Australia had made use of his expertise in his Penola days and again, on his return from Asia in 1886, employed him to investigate mineral resources in the Northern Territory. His book, *Fish and Fisheries of New South Wales*, (1882b) which he wrote for the New South Wales government, won a diploma at the Fisheries Exhibition in London and a gold medal in Amsterdam in 1883.

Sir Frederick Weld, Governor of the Straits Settlement, and a friend of Woods, invited him in 1883 to investigate the mineral resources of the Malay Peninsula. This invitation arrived at an opportune time, for Woods's main source of financial support was not so readily available to him. The coming to Australia of religious orders, such as the Redemptorist priests (in 1882), devoted to preaching parish missions, made bishops independent of the services of priests such as Woods. So with prospects for mission work declining Woods gladly accepted Weld's offer and sailed from Brisbane for Singapore on 14 August 1883. Though he only expected to be away about six months he stayed almost three years in South East Asia.

During those three years Woods (1884a) wrote on his travels for the *Sydney Morning Herald*, and some short pieces for the London journal, *Nature*, (Woods, 1884b), as well as a few papers for the Straits Branch of the Royal Asiatic Society (Woods, 1885), but he contributed only one article to the Australian scientific periodicals. The Linnean Society published his 'Report on the Geology and Physical Geography of the State of Perak' in December 1884. His many other observations made in Malaysia, Japan, Borneo, the Philippines and other places, and copiously recorded in his notebooks, had to await his return to Australia for processing.

LAST YEARS AND AN ASSESSMENT

The end of his scientific career at 533 Elizabeth Street Sydney, paralleled its beginning at Penola. In Penola, physical distance and isolation made him dependent on colleagues. Deteriorating health from 1887 proved even more of a constraint for not only did he require the help of others for specimens and books, but also for the physical act of writing. His letter of 3 January 1888 to William Archer in Melbourne summed up his situation:

I have been an invalid for now nearly a year having almost lost the use of my hands and feet ... It seems to me that my active work is done ... I am ... employing my time when well enough in revising my notes of travel, writing a little on the same subject in the Herald beside a few scientific papers and trying to prepare a work on the Malay Archipelago which the government is to aid in publishing. This as you may imagine fills up my time pretty well but I need hardly say my working hours are not long nor always to be depended on.

Though he worked on, his promise of a second part to 'Geographical Notes in Malaysia and Asia' never eventuated. The publication of lengthy papers on the non-marine mollusca and the vegetation of Malaysia as well as on the fisheries of South East Asia in the *Proceedings of the Linnean Society on New South Wales* (1888b&c) gave recognition to the fact that the proposed book on the Malay Archipelago would not be written. The Royal Society, too, received its share of his efforts. He submitted an essay in 1888 on the mollusca of Australia and won the Society's Medal and prize of 25 pounds. A few months later, his controversial paper 'The Desert Sandstone' appeared in its journal.

Woods died on 7 October 1889. He was a scientist of 19th century dimensions, almost a Renaissance type, and true to that type his involvements ranged wide, and he often carried on his investigations with a broad sweep approach. The various scientific societies lamented his death for he was a prolific contributor to their proceedings. Professor Ralph Tate (1890) of Adelaide University summed up the sentiments of many of the tributes paid to Woods:

No heavier loss has this year befallen the Scientific Societies of Australasia than the death of this naturalist. Not only was he one of the foremost Australasian naturalists, but to very many of us he was far more as a dear personal friend, a delightful companion, and a skilled adviser. ... Though at all times a scientific enthusiast, he was nevertheless the devoted priest, and as a preacher he was acknowledged to be singularly earnest and powerful - his fine presence and elocutionary power intensifying his influence. As a scientist his life became a part of the scientific progress and history of Australasia, labouring with equally good results in Geology, Botany, Palaeontology and Zoology.

One unidentified obituarist believed that 'if young Australia possessed any aspirations beyond the development of brawn and the deification of sport', then the memory of Woods's life and achievements would be acknowledged and esteemed by all for many a year to come. Yet the memory of Julian Tenison Woods slipped into oblivion and not even the attempt of Richard Helms to immortalise him by naming, in 1896, a peak in the Snowy Mountains, Mount Tenison Woods, succeeded, for the name fell into disuse.

At the conclusion of *Geological Observations in South Australia*, his pioneer geological work, Woods spoke of the great enterprise called Geology ('science' could validly be substituted for 'geology') and likened its pursuit to the construction of a building. The following Symposium papers consider some of the building blocks which Julian Tenison Woods, 100 years ago and more, fashioned, from the materials he had at hand, to add his contribution to the edifice of science.

Words he wrote in 1878 stand true not only for his time but for today and for the future and put all endeavours into perspective:

It is a great temptation to young observers to glorify themselves at the expense of the mistakes of their predecessors, or on the superior knowledge which has accumulated since their time. But they

little realise how very large is the debt that we owe to these men, and how their labours, incomplete or faulty as they may have been, represent an amount of care, study, industry, and zeal that we cannot easily command at the present.

So without falsifying history by either an uncritical adulation of the past or by dismissing parts of the past as irrelevant this mini-symposium explores something of science's debt to Julian Tenison Woods, priest and scientist, 1832-1889.

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