

History of the Department of Physics at UWA

Issue No. 8: “The Watheroo Magnetic Observatory”

Presented by John L. Robins

Introduction.

Between 1916 and 1919 a private organization, the Carnegie Institution of Washington, chose to build a Magnetic Observatory in a remote area of Western Australia near Watheroo, about 220 km north of Perth. At first, it might seem strange that such an observatory, built to be staffed and operated by Americans, with the data being sent to America for processing, would play any role in the history of the Department of Physics at UWA but it did, and this came to pass as follows.

In those days, soon after the founding of the University in 1913, resources were extremely meager and initially Professor Ross did not even have teaching laboratories for his undergraduate students and the only physicist other than himself within about 2,500 km was a teacher at the Perth Technical College. Thus when he heard of the proposal for an observatory, complete with scientific staff, to be located in Western Australia he moved quickly to make contact with them and offer his services.

The outcome was that not only did Ross become invaluable to the administrators of the Observatory but also he was able to arrange work experience there for some of his most senior students. Seeing the quality of these students, the Observatory in time began to employ his graduates onto its staff and Ross was able to offer a graduate research program for his most promising students. Indeed, for many students the work carried out at the Observatory served to launch their international scientific careers.

Sources.

The article presented here is an abridged version of a comprehensive report: “To Watheroo and Back: the DTM in Australia, 1911 to 1947” by R. W. Home, which was published in *The Earth, the Heavens and the Carnegie Institution of Washington*, History of Geophysics, Volume 5, Pages 149 to 160.

The abridgement presented here has been designed to highlight those aspects of the Observatory’s operation that involved collaboration with the Department of Physics and its personnel. Readers are urged to consult the full report, which is well researched and contains an abundance of references to original documentation, if they wish to view a comprehensive description of all aspects of the Observatory, its operation, its results and its impact on scientific research in general within Australia.

Kevin Ward, the present owner of the land previously occupied by the observatory, has supplied the photos of the original buildings. Current photos are by myself, John Robins.

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The Watheroo Magnetic Observatory

Based on an article by R. W. HOME,
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This abridged version by John L. Robins
Photos courtesy of Kevin Ward

1. Introduction

When the Carnegie Institution of Washington (CIW) – a private American organization – established its Department of Terrestrial Magnetism (DTM) in 1904, its aim was declared to be "to investigate such problems of world-wide interest as relate to the magnetic and electric condition of the Earth and its atmosphere, which are not specifically the subject of inquiry of any one country, but are of international concern and benefit"

Thus it was that a magnetic observatory would be built at Watheroo in about 1915 and that this observatory would initially be owned by Americans, staffed by Americans and the data collected would be sent to America for analysis. The location of the observatory, about 220 kilometers north of Perth, would be chosen for its geographic location and its isolation from electric and magnetic interference. Remembering that the University of Western Australia was only founded in 1913, the fact that local consultation was not initially entered into is perhaps understandable as there would have been a dearth of scientists in the region when the planning began.

However, as will be seen, the consequences of this Observatory's existence were to be dramatic: the DTM would come to value immensely the cooperation of Professor A.D. Ross, the first Professor of Physics at the University of Western Australia (UWA); Ross would quickly recognize the potential of the observatory as a research training ground for his early graduate students at a time when the University was too young and under-funded to supply such facilities; many UWA Physics graduates would gain experience at the Observatory that would lead to future high profile positions within the international scientific community; and the broadening interaction with Australian scientists would forge the style of scientific collaboration between Australia and America that had previously only existed between Australia and Britain.

It must be emphasized that this report will not tell the story of the Observatory, with details of the work done, the equipment used or the information obtained. It will be restricted solely to showing how the observatory contributed to the development of the UWA Physics Department and particularly its graduate students. Of course, to do this, some general discussion of the Observatory and the DTM staff must be included.

Information for this report has been taken solely from a detailed article by R.W.Home of the University of Melbourne, titled “To Watheroo and Back: The DTM in Australia, 1911-1947” (see reference above). As author of this abridged version, I fully acknowledge that most of

the material below has been copied verbatim from that article without further referencing. Readers are urged to consult the original article, not only for the full story but also for the very detailed sub-referencing of quoted material. Kevin Ward, the present owner of the land previously occupied by the observatory, has supplied the photos of the original buildings. Current photos are by myself, John Robins.

2. The Origin of the Watheroo Magnetic Observatory

Given the DTM's stated aim, which included a need to map the magnetic and electric fields of the earth, it was natural for it to concentrate initially on ocean surveys, at first using a chartered wooden vessel, the *Galilee*, and later employing, until its loss in a disastrous fire in 1929, the specially constructed non-magnetic yacht, the *Carnegie*. Of course, the large areas of the world's oceans over which the Earth's field had not been adequately mapped clearly lay outside the interest of "any one country." On land, however, matters were somewhat more complicated. Nevertheless, in countries where the local authorities had not undertaken magnetic surveys of their territories, the DTM, under its founding director Louis A. Bauer, did not hesitate to move in.



The *Carnegie*

Australia was a principal target of this remarkable program of privately sponsored scientific imperialism, for despite more than a century of European colonization and settlement, much of its vast and often inhospitable land mass remained little known from a scientific point of view. Bauer, with the agreement of the Australians, committed the DTM to making measurements of the three elements of the magnetic field at locations 100 miles apart, on average, throughout the continent. Bauer's report makes it clear that he hoped that, with a grid of observations thus established, the Australians would gradually fill in the intervening gaps.

During the next few years after Bauer visited Australia in 1911, the senior officer assigned by the DTM to the Australian survey, the New Zealander Edward Kidson, travelled widely through many of the more accessible parts of the country and also undertook two major transcontinental expeditions by camel.

Surveys such as these delineated the general shape of the Earth's magnetic field within the region concerned, but they revealed nothing about the time variations to which the field is liable. To determine these, a program of regular observations at fixed sites is required. To this end, in 1915 the decision was taken at the DTM to establish a number of fixed magnetic observatories — initially, nine were envisaged, though in the end only two were erected — to fill the most pressing gaps in the existing international network of observatories. Of the two that were eventually commissioned, one was at Huancayo, Peru, close to the magnetic equator. The other was located near Watheroo, Western Australia, in a position almost antipodal to the magnetic observatory operated by the U.S. Coast and Geodetic Survey at Cheltenham, Maryland, and bridging the huge gap between the existing magnetic observatories in South Africa and Melbourne.

The decision to locate an observatory in southwestern Australia was taken for reasons of general global strategy within the DTM's overall research program. This was a wholly

American project, conceived in and entirely managed from Washington, where all significant data analysis and publication would be undertaken.

When DTM magnetician W. F. Wallis joined W. C. Parkinson in Perth in mid-1916 to seek out a suitable site for the observatory, he brought with him from Washington very definite specifications as to what was required. A site was to be selected between 28° and 36° south latitude and 114° and 118° east longitude. It was to be flat, free from present or future magnetic disturbances, remote from towns with large industrial establishments but accessible enough for communication and supplies, close to sea level but at least 80 km from the coast, with a dry climate, an adequate water supply and no tall trees. For earth-current determinations, space was also needed for installing two cables, each at least 15 or 16 km long, at right angles to each other, with one preferably in the magnetic meridian and the other in the prime vertical. Several possible locations were investigated before the site at Watheroo was selected.

The site selected was on a level section of the vast undulating sand plain that stretches north along the coast from Perth. It lay in uninhabited and very poor and sparsely vegetated country, 17 km west of the village of Watheroo on the Midland Railway. Winter rainfall was reasonable but ground water extremely scarce. The sandy surface of the surrounding plain made access difficult in the early years. Until a road was built in the mid-1920s, a round trip from Watheroo by horse-drawn vehicle took a whole day. In the absence of competing claims to this



The Observatory, probably in its earlier years, looking approx. southwest.

unattractive piece of land, it was granted to the CIW by the Western Australian government for the cost of having it surveyed.

The buildings erected for the observatory were made of local materials but to a standard design developed in Washington for use in all the observatories then projected. Among other things, this meant that space was provided in the living quarters for an extensive heating system, and that the roof was designed to carry a heavy load of snow – an unlikely eventuality in the mild Western Australian winters where snow is never seen! Apart from non-magnetic sand-lime bricks made from local sand for the magnetometer piers, all materials were carted in. Construction was delayed by wartime shortages of men and materials, and it was January 1, 1919 before the observatory officially commenced operations.



The Observers' Residence Building.

The core of the observing program was of course the regular measurement of the Earth's magnetic field – absolute determinations of declination and horizontal intensity, measurement of the inclination, and variations in the field. The observing program also, however, included measuring other geophysical quantities. In 1922, continuous recording began of both positive and negative electrical conductivity of the atmosphere, while atmospheric potential gradients and earth-current potentials began to be recorded in January 1924. Later on, the program was

expanded to include systematic probing of the ionosphere as well. The data obtained were reduced on site, but were then sent to DTM headquarters for analysis. Barometric pressure, temperature and humidity were recorded continuously from the beginning, together with wind speed and direction and daily rainfall.

Having selected the site for the observatory, both W. F. Wallis and W. C. Parkinson remained in Western Australia to oversee its construction. In due course, Wallis became the first observer-in-charge, with Parkinson as his assistant. Later in 1919, however, Wallis returned to Washington, his place at Watheroo being taken by Edward Kidson who had recently been released from war service in the British Army. Two other senior DTM magneticians also served as observers-in-charge during the 1920s. Then the Englishman Parkinson, having spent most of the previous decade on DTM projects in other parts of the world, after a brief stint as observer-in-charge following Kidson's resignation, returned to take charge again in April 1930. Thereafter, except for a three-month break during the summer of 1933-1934, and a much longer break of almost three years in 1936-1938 when he was relieved by another senior DTM magnetician, J. W. Green, Parkinson remained as observer-in-charge until the CIW relinquished control of the observatory in 1947.



Interior of Absolute Observatory



The ionospheric laboratory and antenna system in center, powerhouse at extreme right, and atmospheric laboratory in right background.

Kidson later developed links with the wider Australian scientific community, beyond those depending directly upon his work for the DTM. In January 1922 he resigned from the CIW to join the Commonwealth Bureau of Meteorology at its headquarters in Melbourne. Soon afterwards, he became head of a newly created (and short-lived) Research Division within the Bureau. From this vantage point he played a significant role in the formation of an Australian Branch of the British-based Institute of Physics, an important stage in

the development of a community of physicists in Australia. [This Branch would later become the Australian Institute of Physics.] Later, in 1927, he returned to his native New Zealand to become director of the meteorological service there.

3. Association with the UWA Physics Department

An event of great significance for the observatory in the longer term was the emergence of a new site of local scientific expertise with the opening of the University of Western Australia in 1913. To be sure, this long remained a tiny institution. Nevertheless, the appointment of the first professors constituted a dramatic advance in a society where people with scientific training had until then been few and far between. Among the new arrivals was the young Scottish professor of mathematics and physics, Alexander David Ross (1883-1966), a student in Lord Kelvin's laboratory at Glasgow during the master's final years, who had subsequently worked as a research student at Gottingen and then lectured at Glasgow before being appointed to the chair in Western Australia. In Perth, he found himself without facilities of

any kind for continuing his research, with no advanced students, and with only one other person within over a thousand miles with any extensive knowledge of physics, a lecturer at the local technical college.

The unexpected prospect of having a major geophysical laboratory erected close by was from



Prof. A.D. Ross

Ross' point of view an extraordinary boon, and from the moment Wallis and Parkinson arrived to search for a site, he did everything he could to advance the undertaking. "It is obviously most important that the University should be kept in the closest possible touch with an institution of such an international character," he told the Vice-Chancellor, "and that it should offer what assistance it can". The University Senate concurred, and Ross accompanied Parkinson on several surveying expeditions as the search for a site proceeded.

Once the observatory was functioning, new links with Ross and, through him, with the University, quickly developed. Ross, it appears, with no facilities whatsoever for advanced scientific training, thought of using Watheroo as a training ground for his more promising students.

To this end, when the *Carnegie* visited Perth in September 1920, he arranged for her captain, J. P. Ault, to attend a meeting of the University's Student Physical Society at which one of the students, John Shearer, read a paper on the *Carnegie's* work. Ault was sufficiently impressed to write to Bauer about it: "It was a remarkable paper in many ways and showed a keen interest in the subject on the part of the speaker." "From various indications," Ault went on, "I am sure he is anxious to get into the work of the Dept. and I feel that he would make a good addition to the Dept. Prof. Ross is anxious to recommend him, as an Observatory assistant. I am writing this just to let you know that there is a man here available for Observatory assistant in case you decide to appoint a local man".

This was a clever idea, because the proposal suited both sides. For Shearer, there was no other avenue open in Western Australia for pursuing a career as a physicist, and scholarships to take him elsewhere were virtually nonexistent. For the DTM, appointing a competent local man offered substantial savings over sending someone to Western Australia. Hence it comes as no surprise that when a vacancy arose a couple of months later, Shearer was appointed. He stayed at Watheroo for over two years, then used the money he saved from his salary to support his graduate study at Australia's then premier physics school at the University of Melbourne. He subsequently taught physics for many years [until 1962!] at the University of Western Australia.

Shearer was the first of a steady stream of students from Ross' department to spend time at Watheroo. Indeed, from the time of Shearer's appointment in late 1920 until the arrival of military personnel on the site during World War II, all but four of the steadily increasing number of assistant observers employed at Watheroo were Ross' students. Most of the students who were appointed stayed for several years. During the late 1920s, Ross also arranged for up to three senior undergraduates at a time to spend their long summer vacations gaining "work experience" at Watheroo.



John Shearer

Several of the students appointed as assistants in due course pursued postgraduate

qualifications at the University of Western Australia, based on research they had done at Watheroo. In effect, the observatory became Ross' substitute for a graduate school. It gave his students training in research that was simply not available, given the want of laboratory space and equipment, in Perth. For many of them, Watheroo opened a path toward a continuing career in physics.

4. UWA Graduates' Contributions and Careers

In the early years in particular, when the work at Watheroo consisted merely of maintaining the routine magnetometer and meteorological readings, the opportunities for research were very limited. It was a lonely life, and rather tedious. Later in the 1920s, however, the work diversified, and there was more scope for the young Australian assistants to undertake original investigations. For example, routine measurements of atmospheric electrical conductivity began in 1922 and of earth current potentials and atmospheric potential gradients in 1924. Later, in order to clarify the earth-current results, W. J. Rooney from DTM spent seven months at Watheroo from December 1925, making an earth-resistivity survey of the whole area. Problems arose, however, with the atmospheric potential-gradient data, subsequent to Torreson's departure, and this gave two outstanding young graduates of Ross' department who were then on site, J. E. I. Cairns and G. Builder, an opportunity to do more challenging work. Analysis of the first three years' records had led to the suspicion that insulation leaks in the collector were producing systematic errors in the data. Cairns and Builder were given the far from straightforward task of determining whether the leakage was small enough to keep the data accurate within 1 %, as required.

From the mid-1920s, there were also increasing opportunities for work on radio propagation, which the DTM encouraged because of the obvious links with its traditional field of investigation. At Watheroo, radio research was first taken up in 1926 as a spare-time activity by Cairns, who wrote up his results for a Master's thesis that he submitted to the University of Western Australia in 1927. He also presented two papers on his research at the 1926 Perth meeting of the Australasian Association for the Advancement of Science (AustAAS) — the first meeting of the Association to be held in Western Australia — and the DTM subsequently arranged for these, together with a third paper by Cairns arising out of this work, to be published in America. Cairns' project was well conceived to use work already going on at Watheroo. The core of the investigation was a systematic study of fading in broadcast radio signals received at Watheroo. Cairns showed a clear relationship between his data on fading and the observatory's atmospheric potential-gradient records. In addition, he used the results of Rooney's ground-resistivity survey to link a forward inclination of the radio waves with a low-resistivity subsoil. He also recorded the strength, direction, and waveform of a large number of cases of the interference then generally referred to as "atmospherics."

For his efforts, the University of Western Australia in 1928 awarded Cairns its recently endowed Hackett Research Scholarship, which enabled him to travel to England for further research training as a Ph.D. student at the University of Cambridge. Following his degree, he was reengaged by the DTM as observer-in-charge of the Huancayo Magnetic Observatory, 1931-1934, after which he returned to England to make a career as a research physicist with the electronics company, E.M.I. Ltd.

The meeting of the Australasian Association in Perth in August 1926 in fact marked the beginning of what appears to have been a policy initiative of the then observer-in-charge, H.

F. Johnston, to establish more regular contacts between Watheroo staff and the wider community of physicists in Australia. Johnston attended the Perth meeting with Cairns and also presented a paper. He likewise attended the next meeting of the Association, at Hobart in January 1928. There was evidently some dissatisfaction among the physicists present at the Hobart conference, for during the meeting they resolved to hold a separate conference of their own, in Canberra, later in the same year (Conference of Australian Physicists, 1928). Johnston was unable to attend this, but he and another of Ross' former students who was now employed at Watheroo, F. W. Wood, submitted a paper on the calibration of the atmospheric potential-gradient records, while Cairns and Builder reported on their investigation of leakage from the collector.

Johnston apparently suggested that Australia's newly founded Council for Scientific and Industrial Research (CSIR), through its Radio Research Board, should follow up Cairns' work by installing a directional atmospheric recorder on loan at Watheroo.

Early in 1929, Johnston had been struck down by a sudden attack of appendicitis that led to his being hospitalized for a time. There was no time to arrange a replacement, and the running of the observatory had had, perforce, to be left in the hands of the most senior of the young Australian assistants then working at Watheroo, F. W. Wood. Under his direction, its affairs, Johnston reported, went on "splendidly". Later that year, W. C. Parkinson's scheduled arrival to replace Johnston as observer-in-charge was delayed for several months by his involvement in the salvage operations following the destruction of the *Carnegie*. Now, mindful of Wood's successful management earlier in the year, the DTM authorities in Washington did not hesitate to reappoint him as acting observer-in-charge until Parkinson arrived. Wood was later designated to represent the observatory at the third Conference of Australian Physicists, held at Sydney in August 1931. He stayed at Watheroo until the end of 1932 before going to King's College, London, to work under E. V. Appleton. He returned to Australia later in the 1930s to become a research officer with the Radio Research Board.

During the summer of 1933-1934, whilst Parkinson took leave from the observatory for several months, only one of the young assistants then on the staff had been there for more than a few months, and he did not occupy an established position. Hence, rather than appointing him acting observer-in-charge, the then DTM Director, J. A. Fleming, arranged for Professor Ross himself to be seconded from the University to take over.

This was, in fact, but a public manifestation of how the DTM had come to rely on Ross for help and advice, as well as for a steady supply of observatory assistants. He had visited the observatory regularly from its foundation, and on at least one occasion had undertaken a formal inspection on Washington's behalf. In Perth, he provided hospitality and introductions for DTM staff, and lobbied officials and government ministers on the DTM's behalf whenever problems arose — as they often did with Customs authorities in particular, who were prone to assess heavy customs charges on the specialized equipment being brought in for the observatory, despite a standing agreement that no such charges should be levied. The Department's annual report invariably included an effusive acknowledgement of the support he had provided during the year. Later in the 1930s, when personal problems threatened for a time to disrupt the work of the observatory, it was once again to Ross that Fleming turned for an independent assessment of the situation.

DTM staff visiting or transferring to Watheroo were invariably ordered to make contact with him at an early stage. For example, the official instructions issued to L. V. Berkner for his

extended visit to Watheroo in 1938 included the exhortation, "Please take the first opportunity you have to call on Professor A. D. Ross at Perth, who has been of so much help in our work at Watheroo". Likewise W. C. Parkinson was told, when he was reassigned to Watheroo later in the same year, "I have no doubt that while you have been in Perth you will have called on Prof. Ross to renew your old acquaintance and to assure him again of the appreciation of the DTM of the valuable assistance he has given us throughout the life of the Observatory. In view of the many years of contact with Prof. Ross we should spare no effort to maintain and keep alive his interest which has been so helpful to us in Western Australia".

Ross was the person principally responsible for the formation of a body of professional physicists in Australia under the aegis of the British-based Institute of Physics, and he worked constantly to bring the observers at Watheroo into the fold. Not only did he encourage their participation in AustAAS congresses and in the national conferences of physicists that were held regularly from 1928, he also encouraged those whom he regarded as qualified to join the Institute of Physics. And it was doubtless also he who arranged Parkinson's nomination as a foundation member of the ambitiously styled but short-lived Royal Society of Australia at its formation in 1932. Some years later, when a Western Australian Division of the by then officially constituted Australian Branch of the Institute of Physics was formed, Ross arranged for Parkinson to be elected its first Chairman.

During 1929 and 1930, Geoffrey Builder was engaged on establishing a shortwave radio link between Watheroo and Washington. Eventually, he built for this purpose a 250 W transmitter with crystal frequency control. He left the observatory, however, in August 1930, preceding Wood to King's College, London, where he did a Ph.D. under Appleton's supervision. At Watheroo, the radio work was taken over by R. G. Curedale. There were obvious practical benefits in establishing this radio link. Yet there was also a scientific rationale for the observatory's growing engagement with radio research. As Cairns' study had demonstrated from yet another perspective, there were clear connections between the propagation of radio signals and the Earth's magnetic and electric fields.

The investigation of the ionosphere had also become a major focus of research for the Australian physics community following the establishment of the Radio Research Board in late 1926. The DTM's decision in 1931 to install ionospheric recorders at its Huancayo and Watheroo observatories therefore inevitably led to new links developing between Australian researchers and Watheroo. The instrumentation evolved rapidly, however, and in 1938, Berkner spent several months visiting Watheroo from DTM headquarters in Washington, installing new equipment for continuous automatic multifrequency recordings. This visit, in 1938, brought the DTM researchers and the Australians even closer together.

As reported above, Berkner had been exhorted in 1938 to make early contact with Ross, which he did, and cordial relations were soon established between them. Ross was sufficiently enthused by Berkner's project that for virtually the first time since arriving in Perth in 1913, he thought to begin some research of his own. Furnished with a small grant from CSIR for equipment, he sought Berkner's advice, prior to his departure, as to what he might do. Berkner suggested some useful observations that Ross could make on the reception in Perth of the ionosonde signals emitted at Watheroo. In the event, however, Ross was unable to devote enough uninterrupted time to the work and it did not lead to any publications.

5. The Demise of the Observatory

At the January 1939 congress in Canberra of the Australian and New Zealand Association for the Advancement of Science (ANZAAS), which was the successor organization to AustAAS, Berkner took an active part in the "very lively" discussions on the ionosphere, which had arisen out of a controversy with D. F. Martyn and colleagues at the Radio Research Board, over the use or otherwise of the Lorentz polarization term when considering the reflection of waves from the ionosphere. Berkner later spent a month in Sydney where, not only was this matter resolved, but even close ties between the Radio Research Board and Watheroo were formed and extensive plans for future work were drawn up.

Not long afterwards, F. W. Wood, who was by now in Sydney working for the Radio Research Board, was sent to Watheroo to obtain details of the new ionospheric recorder. Unfortunately, however, much of the momentum generated by the Martyn-Berkner collaboration was dissipated by the gathering storm clouds in Europe. Within days of Berkner's departure, Martyn was sent without warning to England in response to an urgent telegram from the British government, to be given highly secret information about Britain's vital new electronic weapon, radar, to carry to Australia. Then, on his return, he was given the task of setting up a top-priority secret new laboratory within CSIR, the Radiophysics Laboratory, to do further research on this. To staff the Laboratory, he hired most of the leading workers from the Radio Research Board, deflecting them at one stroke from the fundamental ionospheric physics research on which they had previously been engaged, and into a situation where collaboration with the DTM was no longer feasible.

Commencing with a request from the Department of Air in December 1940 for regular information on the day-to-day state of the ionosphere, the observatory then became engaged in a new form of collaboration. A similar request was made at the same time to Mount Stromlo, in the hope that predictions could be made that would permit the Australian Air Force to maintain its long-distance radio communications network without interruption. Data from these two observatories, together with data from the Radio Research Board's recorder at Liverpool, near Sydney, became critical ingredients in the worldwide wartime ionospheric prediction service that was later established by the Allied nations

By 1943 the scientific staff at Watheroo had shrunk to just Parkinson and his son, W. D. Parkinson, who had completed his degree at the University of Western Australia shortly before. To keep the meteorological and ionospheric observations going, Australian Army and Air Force staff moved onto the observatory site, and W. D. Parkinson was employed partly on this work and on only a part-time basis by the CIW to help maintain its traditional program of work.

Shortly after the war ended, J. A. Fleming retired as Director of the DTM and was replaced by Merle A. Tuve, who promptly undertook a comprehensive review of all the Department's activities, including the observatory program. Now, in line with plans made when the program was first conceived, the decision was taken to offer the DTM's observatories at Watheroo and Huancayo, together with all their equipment, to the Australian and Peruvian governments, if they continued the observing program.

In Australia, there was by this time a considerable cadre of expertise in geophysical research, and the transfer was able to go ahead without difficulty, as from July 1, 1947. This pool of geophysical expertise existed because early in 1942, with Australia's links with most of its

traditional suppliers cut off due to the war, the federal government extended the search for mineral resources nationwide. Ultimately this led to the formation in 1946 of a new agency, the Commonwealth Bureau of Mineral Resources, Geology and Geophysics, which recruited onto its staff a strong group of geophysicists, most of whom had previously had experience on the Northern Australian and wartime surveys and some of whom had also worked, before that, on the Imperial Geophysical Experimental Survey. It was this new Bureau that took over operational control of the Watheroo Observatory when it was transferred to the Australian government in 1947.

The observatory at Watheroo was maintained under Australian government control until 1959, at which point its functions were transferred to other sites closer to Perth and the Watheroo site was abandoned.

6. Epilogue

Visitors to the site today will find only ghostly reminders of the Magnetic Observatory.



The present-day remains of the Variation Observatory Building

When relinquishing the site in 1959, the Australian Government sold all of the removable building by auction to local farmers who carted them away. The land was purchased by Robert John Ward, who owned an adjacent farm. With the land came only the original grand residential building and the Absolute and Variation Observatory buildings. The present owner, Kevin Ward, has, over the years, requested help from the Government to maintain these buildings, but without success and it is saddening to see the piles of collapsed timbers, which are all that remain of those last observatory buildings.

Kevin Ward continues to use the land as part of his farm, as inherited from his father, whilst his wife Bev runs a residential horse riding school, "Family Affair". They are currently engaged in the monumental task of restoring the large and impressive original observers' residence building. It has been completely re-roofed and the first floor has been converted to a comfortable dormitory area whilst work continues on the ground floor.



The refurbished Residence Building in its present day role of farmhouse and riding school.

When driving past this site today it is difficult to comprehend that a large collection of buildings were once scattered about the area, constituting an observatory set up by a private American foundation – an observatory whose staff fostered links with Australian scientists across the country that in turn lead to the development of Australian-American cooperative research; an observatory which Professor Ross was as able to use as a graduate research laboratory for his fledgling UWA Department of Physics; and indeed an establishment which his best students would use as a springboard from which to launch themselves into the international community of professional physicists.