

ADELAIDE OBSERVATORY

Its History And Work

FOUNDED BY SIR CHARLES TODD

The Adelaide Observatory, whose future is now under consideration, was founded by the late Sir Charles Todd 77 years ago.

The Observatory has regulated all our clocks, and its time-signals are now sent out as far as Cocos Island and Durban.

State boundaries, long in question, have been determined, proof was supplied from observations of a solar eclipse of the soundness of the Einstein theory, earthquakes all over the world have been recorded, and (among other things), a magnetic survey has been made of South Australia.

By G. F. Dodwell, B.A., F.R.A.S., Government Astronomer.

THE history of the Adelaide Observatory goes back for 77 years, to the time when in 1855, the late Sir Charles Todd arrived in South Australia to take charge of the Post and Telegraph Department, which he so ably directed for more than 50 years, and incidentally to establish a Meteorological and Astronomical Observatory in this State.

At heart Sir Charles Todd was an astronomer and lover of science more than a man of business. As a great American scientist has said, "Once a man is a 'dyed-in-the-wool' astronomer, he can never be anything else. And Sir Charles Todd's training at Greenwich Observatory not only grounded him in a wonderfully efficient system of method and organisation, which he applied so successfully in the postal administration, but also gave him that love for astronomy, the greatest of the sciences, which he retained throughout his whole life.



Late Sir Charles Todd

Began With A Borrowed Instrument.
Upon his arrival in South Australia he at once saw the benefit it would be to an agricultural community to have reliable records of climate and rainfall throughout the State, and to that end he set about the establishment of an Observatory at Adelaide, and also organised a splendid body of country postmasters, who were supplied with rain gauges, barometers, and thermometers, and who gave most valuable assistance in observing meteorological and other natural phenomena. At the Observatory the first astronomical work undertaken was the determination of time from observations of stars with a small transit instrument, formerly used at the Williamstown Observatory, Victoria, and then lent by the Victorian Government for use at Adelaide.

Familiar Building 60 Years Old
Sir Charles Todd's success with the Overland Telegraph Line in 1872 enabled him to prevail with the Government for the erection of a permanent transit room, anemometer tower, and office at the Observatory, and in the following year a fine equatorial telescope, made by Cooke and Sons, of York, England, was obtained, and a special building, the dome was erected for housing it. Besides its scientific use, this telescope has enabled many thousands of citizens of the State to see something of the wonders of the heavens, and at the present time more than a thousand visitors every year avail themselves of this opportunity. The telescope is provided with clockwork motion, controlled by a revolving centrifugal governor, which exactly counteracts the effect of the earth's daily rotation, so that the stars are kept constantly in the field of view. On one occasion, when Lord Tennyson, the State Governor at that time, was visiting the Observatory, he asked Sir Charles Todd what this mechanism was, and Sir Charles, with his well-known love of a joke, replied, "That, Sir, is a revolutionary governor." The dome itself revolves on cannon balls which were cast for the Crimean War, and Sir Charles was fond of pointing out that cannon balls could thus be made use of in the peaceful revolutions of astronomy. The actual occasion for which this valuable instrument was acquired for the State Observatory was the transit of Venus in 1874, and valuable observations of this event were made.

The Disputed Boundary
Another important work of the Observatory in these early days was the determination of the boundary line between South Australia and New South Wales, the 141st meridian, at a point near the north bank of the Murray. The surveyors had found that the northern extremity of the Victorian boundary line was considerably out of the true north and south direction, and they hesitated to continue it north of the Murray. Messrs. Todd and Smalley, the Government Astronomers of South Australia and New South Wales, were commissioned to fix the boundary by astronomical observations and exchange of telegraphic longitude signals, and the work was carried out in 1868.

Sir Charles used to relate that the Commissioner of Public Works at that time was greatly exercised about the necessity of taking much trouble to ascertain the meridian. "Why," he said, "isn't it already marked out for you on the map?" The result, however, clearly showed that the map was wrong, and that the northern end of the Victorian boundary was no less than two and a quarter miles to the west of the true Meridian, thus depriving South Australia of a very valuable strip of country two and a quarter miles wide from the Murray to the sea coast near the mouth of the Glenelg River. Hence arose the celebrated Disputed Boundary Case with Victoria, which was not settled till more than 40 years afterwards, and only then by appeal to the Privy Council. At that time Customs duties were levied by both States at the boundary, and Victoria held tenaciously to the disputed territory in spite of insistent and repeated claims by South Australian legislators.

Public feeling at one time was so stirred that one hot-headed gentleman endeavored to move Parliament to authorise the seizure of the disputed territory by armed force, at the risk of actual war between the two States. What a lesson this affords for the preservation of Australian unity. The Privy Council decision was accepted without further question by both sides, and the matter of dispute dropped immediately and completely out of sight. In 1911 I was entrusted with the task of re-determining the 141st Meridian near the site of Sir Charles Todd's observations of 1868. This was in connection with the Disputed Boundary Case then before the High Court. The result gave a complete check upon the great accuracy of Sir Charles Todd's observations; and the more modern data concerning the Australian fundamental longitude system, altered Sir Charles Todd's result by only a little less than one-third of a second of time, equivalent to approximately a hundred yards on the earth's surface.

Earliest Wireless In This State
In 1881, when the new transit room, library, and offices were built, and a fine transit circle telescope was added to the equipment. This instrument has been used for the observation of star transits for the daily time service, and also for the measurement of positions of stars in the southern sky. Shortly after the discovery of wireless telegraphy, the Adelaide Observatory became the site of the first wireless installation in Australia for distant signaling. In the year 1900 Sir Charles Todd and his son-in-law, Professor Bragg, now president of the Royal Institution in London, established a station in the Observatory grounds, and were successful in sending and receiving messages between Adelaide and Henley Beach, a distance of five miles. The galvanized-iron shed, in which the experiments were made is still preserved, and made use of at the Observatory. This was a notable achievement in those days. Sir Charles little dreamed, however, that within 20 years wireless longitude signals would be transmitted and received over a distance of 12,000 miles, making it possible to measure the distance on the earth's surface from Greenwich to Australia in one great arc.

First World Radio Girdle

The occasion of this was the determination of our western boundary, the 129th meridian, between this State and Western Australia, and at my request special trial signals were transmitted by General Ferrie from the high-power stations at Bordeaux and Lyons in France, and were successfully received here in November, 1920. The following year they were supplemented by signals from the Washington Observatory, U.S.A., transmitted from the high-power station at Annapolis. The astronomical observations at the boundary were linked up by means of these signals with the observatories at Greenwich, Paris, Washington, Ottawa, Sydney, Adelaide, and Perth, and formed the first complete measurement round the world by the aid of wireless telegraphy.

During Sir Charles Todd's tenure of office there were amongst his Observatory assistants, C. C. Farr, now Professor of Physics at Christchurch, New Zealand; W. E. Cooke, afterwards Government Astronomer at Perth, and later at Sydney; W. J. Denny, now Attorney-General of this State; E. P. Sells, who was a talented artist and draughtsman; R. F. Griffiths, who was appointed Assistant Commonwealth Meteorologist in 1908; E. Bromley, now State Meteorologist, and myself. Sir Charles retired at the end of 1906, and Mr. Griffiths took charge of the work of the Observatory for a year, when the weather services throughout Australia were transferred to the Commonwealth, but the astronomical part of the work was left to the States.



Mr. Dodwell.

The Seismograph

One of the last public acts of Sir Charles Todd, in connection with the Observatory, was to set the new Milne seismograph in operation. This was in June, 1909, shortly after I was placed in charge of the Observatory. It has recorded all the large distant earthquakes throughout the world since then, but fortunately none of a severe kind at Adelaide. Only two have been experienced here of sufficient intensity to cause damage, viz., in 1897 and 1902. After the former of these, an illustrated paper had a cartoon of Sir Charles, representing him amidst flying bricks, &c., busily taking observations, and saying, "Now this is what I call the acme of enjoyment."

Observatory officers have taken part in three total solar eclipses at Brunl Island (Tasmania), Vavau (in the Friendly Islands), and the last one at Cordillo Downs, in the far north-east of this State. A great deal of interest was taken in the last eclipse, as photographs were obtained showing the bending of the star light passing near the eclipsed sun, thus confirming the Einstein theory of relativity. The expedition was made under the joint leadership of Professor Kerr Grant and myself, and was made possible by the generous support of owners of Cordillo Downs Station (the Beltana Pastoral Company), Sir George Murray, and others.

Magnetic Survey

Another work which has been carried out in recent years is the magnetic survey of the State. These observations are very useful to the Admiralty, in helping to correct the charts used in navigation round the Australian coast, and they have also brought to light some remarkable disturbances of magnetism in various parts of the State due to geological and mineral formations. The largest of these is in the northern part of Yorke Peninsula, and has been ascertained to be caused by a very large deposit of magnetite, almost pure oxide of iron. Perhaps in days to come, this may have commercial value, being so near to Adelaide, or it may be found to have other minerals associated with it, which may be of value.

An interesting incident in connection with the magnetic survey occurred at Paradise, where the river during a flood carried away a large slice of land on which stood a pumping house with a valuable engine and a large quantity of piping. Everything completely disappeared and was buried by flood debris. The owner had invoked the aid of a local diviner, but without success. The magnetic instruments, however, indicated the exact spot where the engine was. It was afterwards recovered, and Professor Grant, who shared in the observations, was similarly successful in locating the piping by means of a special electrical apparatus which he devised.

Big Work Now In Progress

Besides the magnetic survey, which has been extensively carried on, an important work undertaken during the last two years at the special request of international authorities is the investigation of the variation of latitude, in conjunction with La Plata Observa-

tory, in the Argentine Republic. As is well known, the earth's rotation upon its axis is not a simple motion, always exactly the same, but there is a slight wobble, giving rise to periodical slight variations of latitude. It is the business of astronomers to investigate this movement, the cause of which is not yet fully known, and very sensitive instruments and methods are necessary. The instruments were specially lent by the International Latitude Commission for use at Adelaide Observatory, and the continuation of this work for a period of ten years was undertaken.

A most important phase in the history of the Observatory was entered upon 18 months ago, when it was brought into affiliation with the Adelaide University, for teaching purposes, and also for the future development of astronomical research in this State. What a great field of work is to be covered in connection with the southern skies! The northern hemisphere is well provided for, and observations of the northern stars have been going on for centuries, but the observatories of the southern hemisphere are few and far between. The Australian observatories, in carrying out the work which is in their charge, need the support which the universities can give, and it is gratifying to know that, so far as Adelaide is concerned, that support is being given by those who are "leaders of the people by their counsels, and by their knowledge of learning meet for the people, wise and eloquent in their instructions."

BIG PARTY FOR OTTAWA

Personnel Announced WOMAN SECRETARY

Canberra, April 26.
Full details of the personnel of Australia's delegation to the Ottawa Conference were announced by the Prime Minister today. In addition to the Ministerial party, comprising the Treasurer (Mr. Bruce), and the Minister for Customs (Mr. Gullett), and the four business advisers and an industrial adviser already announced, seven officials, including a woman secretary, will accompany the delegation.

- The official list is:—
Professor A. E. V. Richardson, Director of the Waite Institute, of South Australia, who will be marketing expert.
The Deputy Controller of Customs (Mr. Abbott), who will advise the delegation on tariff matters.
Mr. J. F. Murphy, Chief Investigation Officer of the Development Branch, who will be secretary to the delegation, and to Mr. Bruce.
Mr. L. E. Stevens, of the Commerce Department, who will assist Professor Richardson.
Mrs. Grant, who will be private secretary to Messrs. Gullett and Bruce.
Mr. A. E. Moore, a Customs Department and tariff expert, who will cooperate with Mr. Abbott.
Mr. F. Carter, of the Commerce Department, who will give clerical and secretarial assistance to the delegation generally.
The business advisers are Messrs. R. W. Knox, S. McKay, H. W. Osborne, and F. H. Tout. Mr. M. P. Duffy is the Labor adviser.

Sir William Mitchell, Vice-Chancellor of the University of Adelaide, had intended to leave for London by the Strathaird, but was obliged to change his plans. It is his intention to leave for England next month by way of America, and he expects to return to South Australia early next year.

Professor Bernard Heinze, Mr. J. A. Steele, and Mr. J. Sutton Crow, of the Faculty of Music at the University of Melbourne, Colonel L. R. Thomas, registrar of the University of Tasmania, and Mr. Frederick Hutchins, registrar of the State Conservatorium of Music, Sydney, will leave by the Melbourne express today for Adelaide to attend the annual conference of the Australian Music Examinations Board, which will be held at the Elder Conservatorium.