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W. H. BRYAN, M.C., D.Sc., and F. W. WHITEHOUSE, Ph.D., M.Sc.

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THE ESTABLISHMENT OF A SEISMOLOGICAL STATION IN BRISBANE, QUEENSLAND.

By

W. H. BRYAN, D.Sc.

Geology Department, University of Queensland.

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The Establishment of a Seismological Station in Brisbane, Queensland.

BY W. H. BRYAN, D.Sc.
Geology Department, University of Queensland.

[Read before the Royal Society of Queensland, 25th October, 1937.]

DURING the past there has existed very little local interest in seismology. This lack of enthusiasm for a science that elsewhere has many ardent students is almost certainly due to the fact that perceptible earthquakes are of rare occurrence in Queensland. Thus since the establishment of the University of Queensland twenty-seven years ago there have been only two noteworthy earthquakes within the State. The first of these occurred in 1918, and was investigated by Hedley[1] some years later. The second, which took place on 12th April, 1935, and which has been described by Bryan and Whitehouse,[2] was of sufficient intensity to arouse considerable popular interest. In a statement made in the public press at this time, the writer deplored the fact that there was no seismograph in operation within the State and urged the necessity of establishing a seismological station in this part of Australia.

Following this appeal a gentleman who wishes to remain anonymous, but who was an early student at the University of Queensland, generously offered to provide the money necessary to purchase a Milne-Shaw Seismograph (No. 58).

Subsequent to the acceptance of this generous offer the Council for Scientific and Industrial Research was approached with the request that a second similar Milne-Shaw instrument be obtained in order to make the proposed station of greater value and more self-contained. This request was favourably received and a second instrument (No. 60) thus secured.

THE SITE.*

The temporary site selected for the station in which these instruments are housed is in the basement of the new University Library. This position has many things to recommend it, the principal being its convenience, for it is closely adjacent to the Department of Geology, from which the station is controlled. The chief adverse factors are the absence of solid rock on which to base the foundations (the Library building having been erected on a relatively unconsolidated river terrace alluvium), and the nearness to the city. But since many excellent stations are successfully operating under somewhat similar conditions these objections were not thought sufficiently strong to warrant the selection of a less convenient site.

The most suitable part of the basement having been selected, it was bricked off to form a light-proof and draught-proof room with a reasonably equable temperature.

The exact position of the site was carefully fixed by Mr. F. James. M.Sc., Lecturer in Surveying at the University of Queensland, as Latitude 27° 28′ 41″ S., Longitude 153° 1′ 52″ E., Elevation 15 metres.

Mr. James was also responsible for fixing the direction of the meridian within the seismograph cellar.

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[1] Trans. Roy. Geog. Soc. Qld. Vol. 1, p. 151, 1925.

[2] Proc. Roy. Soc. Qld. Vol. 49, pp. 106-119.

* The permanent site of the station will be within the University of Queensland grounds at St. Lucia, where eminently suitable conditions should be found when the University is finally established there.

THE FOUNDATIONS.

The two instruments are set up on a single foundation designed by the writer in co-operation with Mr. N. L. Thomas, of the Government Architect's Department.

The foundation consists of a solid monolith of concrete weighing approximately 9½ tons. It is not reinforced in any way, and the concrete was poured as one continuous operation. The foundation is L-sharped, one side of the L being carefully aligned on the meridian and the other side at right angles to this. The whole concrete monolith is sunk 2 feet into the earth, is independent of and free from the foundations of the building, and is separated from the concrete floor of the cellar by a dry moat 5 inches wide and 8 inches deep.

THE SEISMOGRAPHS.

The instruments consist of a pair of Milne-Shaw horizontal pendulum seismographs with electro-magnetic damping. Each instrument has been adjusted to a period of 12 seconds, a damping ratio of twenty to one, and a magnification of 250.

Of the instruments as set up No. 58 registers the north-south component and No. 60 the east-west component.

The recording system is an optical one, the record being received on special Bromide B paper secured to a drum which is operated by a clockwork mechanism.

THE TIMING ARRANGEMENTS.

The time signals appearing on the record are controlled by a synchronome clock with half-minute impulses, alternate pulses of which are selected by another synchronome mechanism to give minute breaks on the record, each with a duration of 3 seconds. The hour is recorded as the first of three half-minute signals. The daily error in the station time is determined by comparing it by means of a radio receiving set with Eastern Australian Standard Time as broadcast by Station 4QG.

Corrected times are finally converted to Greenwich Mean Time for purposes of record.

CONCLUSION.

The trials already conducted have on the whole been most satisfactory. Local disturbances obtrude themselves only when heavy hammering is being done on the floors and walls of the still incomplete building that houses the station. On the other hand, those records of earthquakes that have been recorded are very satisfactory on account of their clarity, and more particularly in the ease with which the initial impulse of the preliminary waves can be marked off from the microseisms.

The station is in touch with other earthquake observatories in Australasia and elsewhere, both directly and indirectly, through the Seismological Research Committee of the Australian and New Zealand Association for the Advancement of Science.

Situated as it is on the margin of the actively seismic Pacific basin, this new observatory should play an important part in international seismology, more particularly as it helps to bridge the large gap in the chain of circum-Pacific stations that hitherto has existed between Sydney and Java.