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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

RECORDS

1958, No. 54

PROPOSED IONOSPHERIC WORK. PORT MORESBY GEOPHYSICAL OBSERVATORY.

by

J.A. BROOKS

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A B S T R A C T

A brief description of the Port Moresby Geophysical Observatory is given. Plans for, and progress towards, the setting up and operation of the Ionospheric recording Station are outlined.

I. INTRODUCTION

Construction of a Geophysical Observatory at Port Moresby, Papua, was begun in 1957. The Observatory was designed, and is operated by, personnel of the Australian Commonwealth Bureau of Mineral Resources, Geology and Geophysics, Department of National Development.

It is situated in low hilly country approximately 5 miles north of Port Moresby township (see figs. 1 and 2) and consists of two underground vaults which house equipment for recording geomagnetic field variations and seismic phenomena, an absolute magnetic building, and a fourth building which will house ionospheric sounding apparatus and a photographic darkroom.

The observatory site is divided into two sections (fig. 3), the western section containing the buildings for magnetic and seismic recording situated on interbedded eocene cherts and argillites, and the smaller eastern section containing only the ionospheric installations sited on tuffs and flows which unconformably overly the above formations.

It is expected that the Observatory will become fully operative towards the end of 1958 or early in 1959 when all magnetic, seismic and ionospheric recording equipment should be installed.

II. CURRENT POSITION

At the time of writing (June 1958) all four buildings have been erected. The installation of the electrical supply and reticulation system has commenced.

Construction of the antenna system is expected to begin within a few weeks.

Construction of the recorder at the laboratories of the Ionospheric Prediction Service, Sydney, has started and it is expected that delivery will be effected before the end of 1958.

III. PROPOSED IONOSPHERIC INVESTIGATIONS.

(a) Location and Housing of Equipment.

The location of the ionospheric installations with respect to the rest of the observatory is shown in fig. 3, and the site detail in fig. 4. The equipment will be installed in a timber framed building with a cement floor. (See figs. 5 and 6).

(b) Equipment.

The ionospheric equipment will consist of an automatic multifrequency recorder for vertical incidence studies. It is being designed by the Ionospheric Prediction Service, Department of the Interior, and will cover a frequency range of 1 to 25 Mc/s, but initial recordings will only be made from 1 to 20 Mc/s. This is expected to cover all the frequencies at which echoes will be obtained, and will allow expansion of the record. The sweep will take 20 seconds.

The peak power output is expected to be about 5 Kw over most of the range, decreasing slightly towards the high frequency end.

The recorder will incorporate two CRO displays, one for recording and a second for monitoring purposes. The monitor display will use a long persistence tube allowing a complete P'f record to be seen after the sweep.

Recordings will be made on 35mm film by a camera set to run at 36mm per 20 secs.

The built-in programming unit will allow any combination of 5 minute programmes to be effected, or quasi-continuous records (1 sweep per minute) to be made.

The transmitter will be coupled to a delta type antenna orientated NE-SW, and the echoes will be received by a similar array arranged at right angles. (See fig. 4).

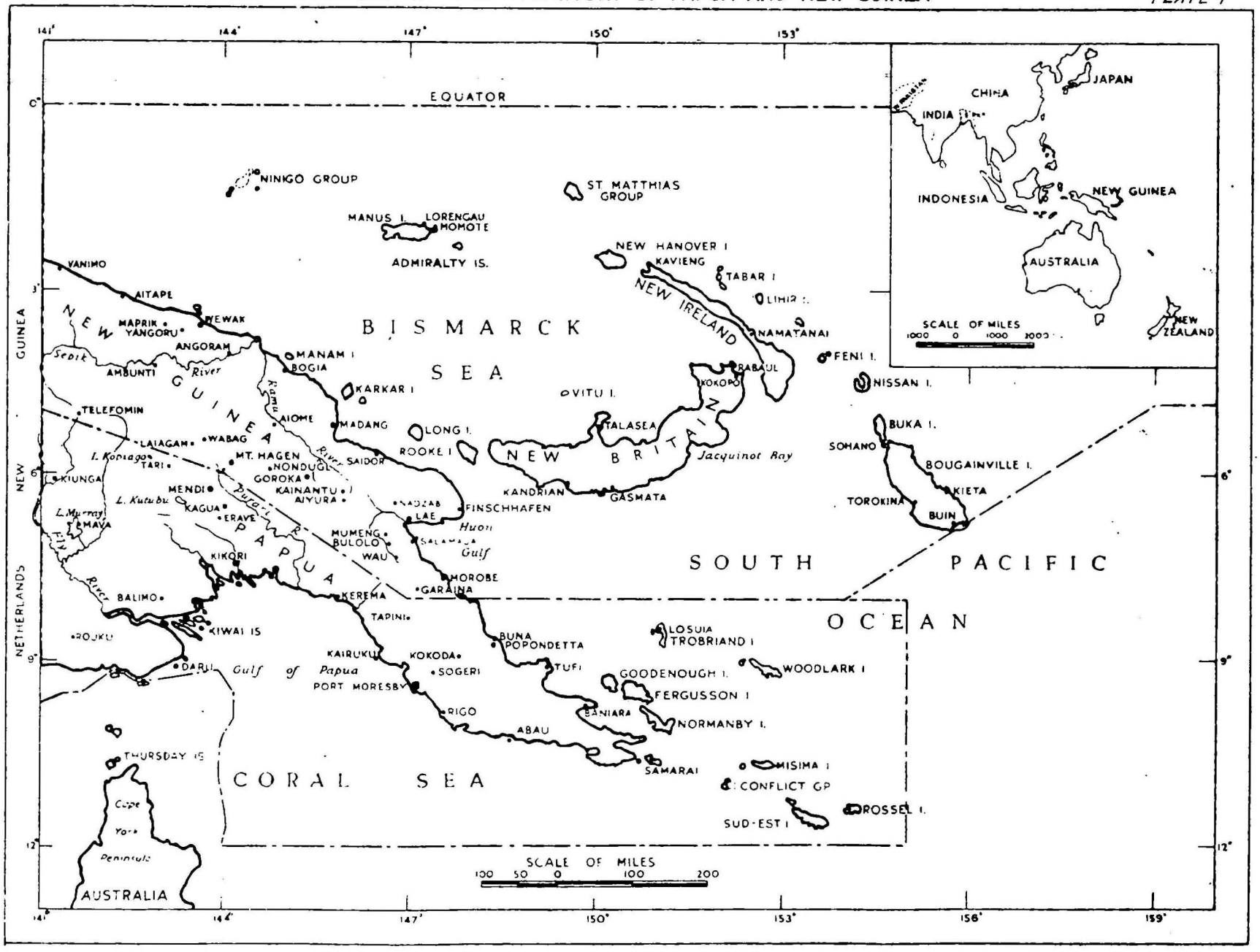
(c) Programme of Investigations.

A regular programme of vertical incidence soundings will commence as soon as the equipment is installed late in 1958. The sequence of soundings will be in accordance with recommendations of the URSI/AGI Special Committee on World Wide Soundings, and the following parameters will be scaled from the records: foF2, foF1, foE, foEs, fbEs, h'F2, h'F, h'E, h'Es, Es type, f min, M(3000)F2, M(3000)F1. f-plots will be prepared for RWD's and SWI's.

All results will be forwarded to the Ionospheric Prediction Service, N.S.W. Australia, who will arrange publication and distribution of the data.

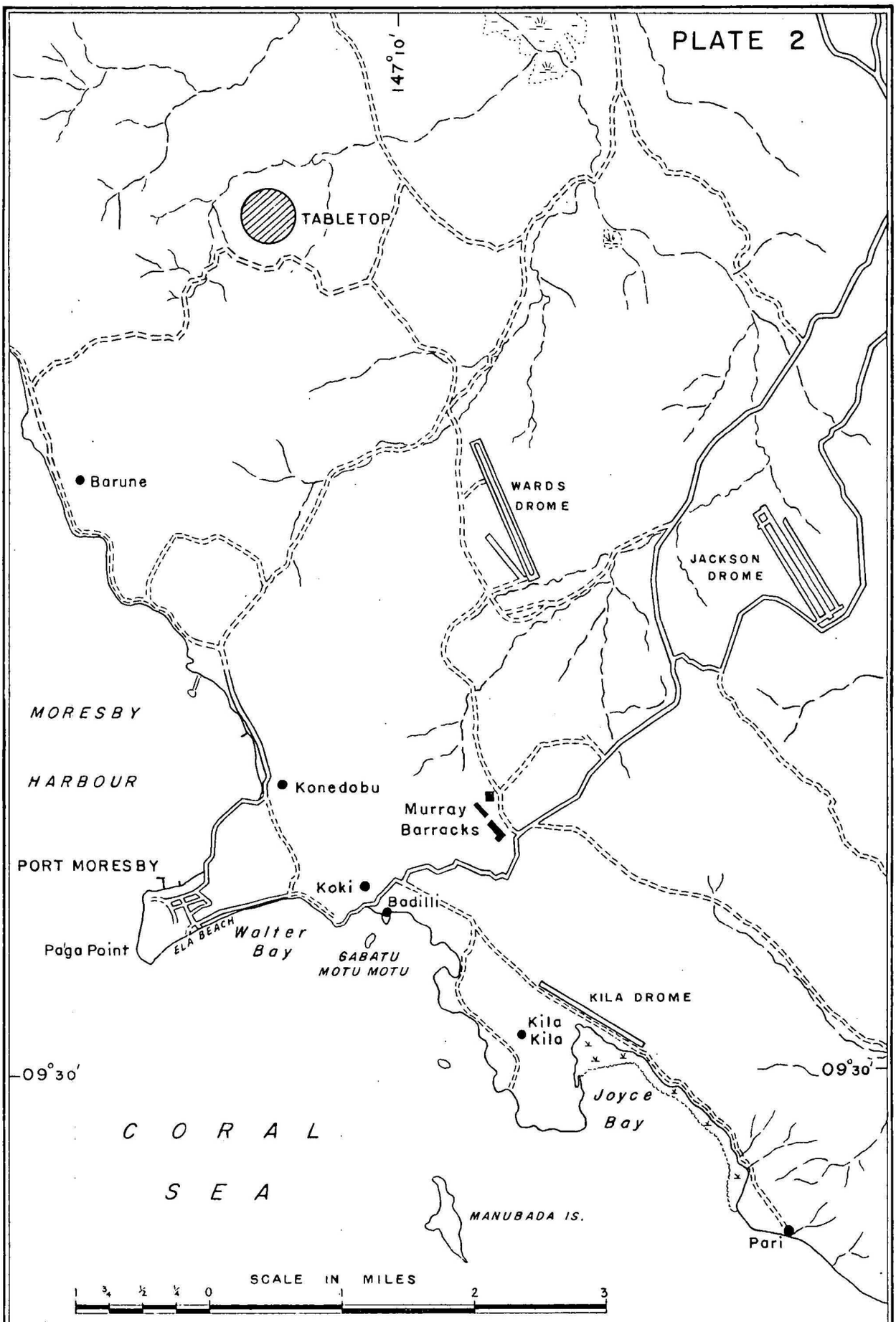
MAP OF THE TERRITORY OF PAPUA AND NEW GUINEA

PLATE I



G 82-65

PLATE 2



GEOPHYSICAL OBSERVATORY SITE, TABLE TOP, PORT MORESBY

LOCALITY MAP

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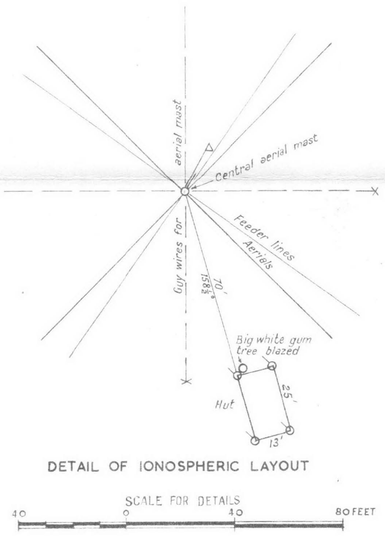
PLATE 3



GEOPHYSICAL OBSERVATORY SITE,
TABLE TOP, PORT MORESBY

SKETCH PLAN
LOCATIONS OF PROPOSED BUILDINGS

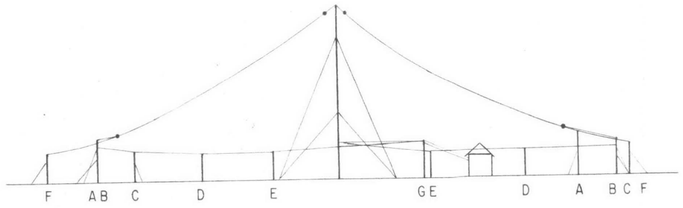
BASED ON TAPE AND COMPASS SURVEY, FEB. 1956

SCALE IN FEET
200 0 200 400 600

ALL BEARINGS ARE MAGNETIC

J. G. Crosby
GEOPHYSICIST

Geophysical Section, Bureau of Mineral Resources, Geology and Geophysics G82-66



AERIAL ARRANGEMENT

SCALE IN FEET
50 0 50 100

IONOSPHERIC AERIAL ARRAY

NOTE: All bearings magnetic.

GEOPHYSICAL OBSERVATORY SITE
TABLE TOP, PORT MORESBY

IONOSPHERIC INSTALLATIONS

SCALE IN FEET
40 0 40 80 120

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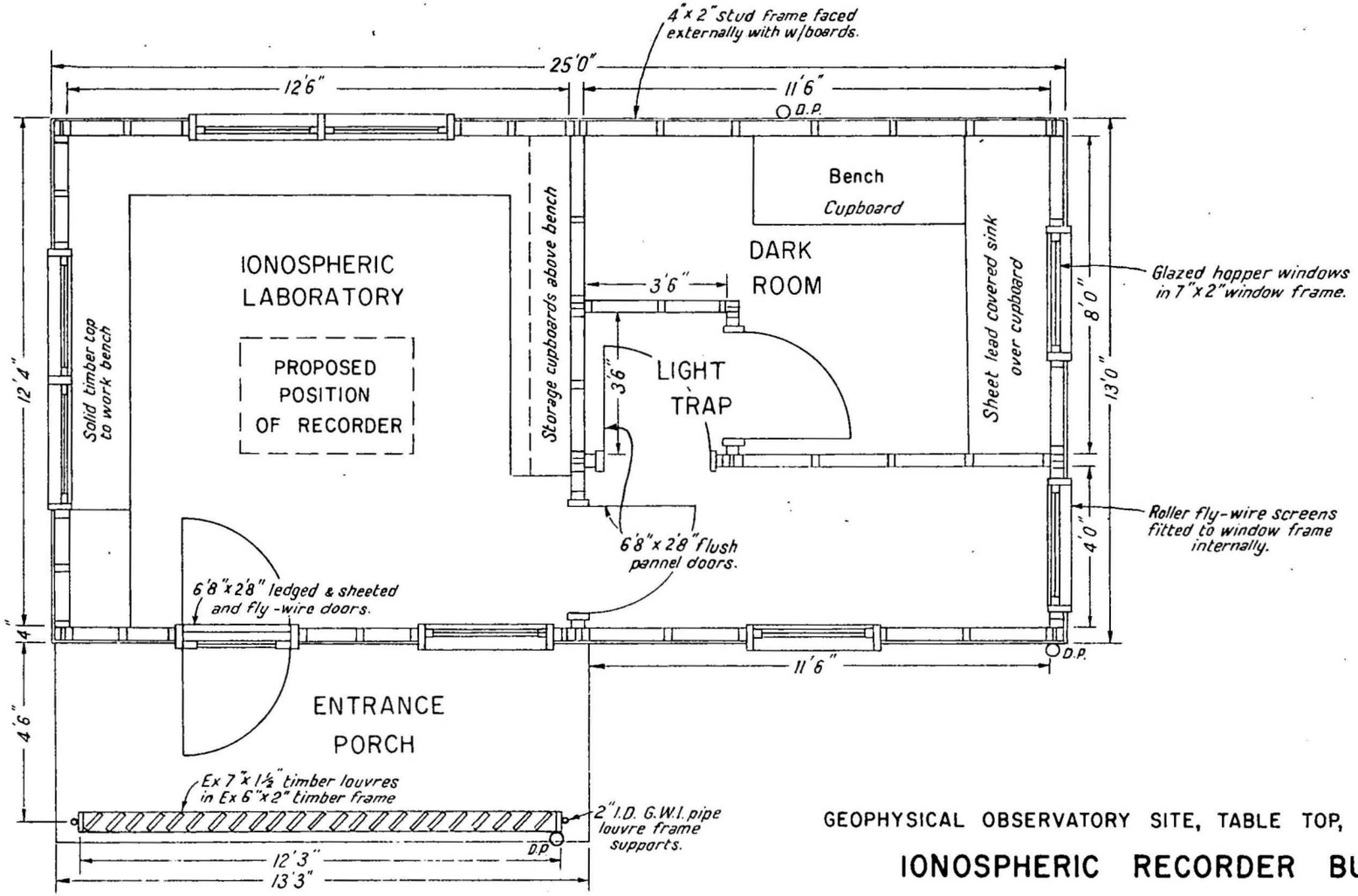

GEOPHYSICAL OBSERVATORY SITE, TABLE TOP, PORT MORESBY

IONOSPHERIC RECORDER BUILDING

FLOOR PLAN

PLATE 5

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PLATE 6

IONOSPHERIC RECORDER BUILDING

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