COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

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PRELIMINARY REPORT ON

AEROMAGNETIC SURVEY OF GIPPSLAND OFF-SHORE AREA (1956)

by

P.E. GOODEVE

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I L L U S T R A T I O N

Plate 1. Sketch map of areas surveyed.

1. GENERAL.

An aeromagnetic survey by DC3 aircraft VH-BUR was conducted over the coastal and off-shore region of Gippsland in Victoria during the period 26th March to 2nd June, 1956, using Bairnsdale aerodrome as base. This region adjoins and overlaps slightly the East Gippsland region which the Bureau surveyed previously (Mc Carthy, 1952) with the aeromagnetic method.

P.E. Goodeve, Senior Geophysicist, was in charge of the party, which comprised geophysicists A.G. Spence, R.M. Carter, M. Kirton and J.D. Pinn, assistant geophysicists W.A. Porta and A.F.S. Young, four radio technicians, one geophysical assistant, a mechanic, a stationary engine driver, a clerk and a computing assistant.

2. OPERATIONS

The aircraft was fitted with an AN/ASQ8 airborne magnetometer and Speedomax recorder, and employed Shoran radar navigation. A vertical strip camera was operated at coastal crossing points and over land.

The survey region, which is shown on the attached sketch plan of the area, was covered by a grid of straight north-south flight lines flown on plotted Shoran co-ordinates, with a one-mile separation between lines. The survey was divided into four areas and four separate Shoran beacon set-ups were used. The first area flown (area B) was controlled by beacons at Little Tower and Mt. Nowa Nowa, the second (area A and its eastern extension) by beacons at Mt.Nowa Nowa and Mt. Cann, and the third (area C) by beacons at Slades Hill and Little Tower. A fourth smaller area (area D) was controlled by beacons at Hoddle Hill and Slades Hill. A total of 11,100 miles of traverse plus 1,600 miles of tie-lines were flown over an area of 9,500 sq. miles, extending from longitude 146° to longitude 149° 30', and from the coast to approximately 50 miles out to sea. Altitude was maintained at a nominal 1,000 feet above sea level by reference to a barometric altimeter. This is the same elevation as that used in the previous survey (McCarthy, 1952). A magnetometer sensitivity of 500 gammas full scale on the Speedomax recorder chart was employed.

3. RESULTS.

The results described below are essentially preliminary and the positions given are only approximate because the instrumental observations had not been completely analysed at the time this report was written.

Area A.

This area extends from 5 miles west of Lakes Entrance to 2 miles east of Cape Conran, with an easterly extension (with short traverse lines) to 11 miles east of Cape Everard. It shows a magnetic pattern typical of the whole of the off-shore area. Southwards from the coast, a steady increase in field intensity is observed, this being possibly the normal latitude change. However, in the eastern part of the area, the field levels out about 6 to 8 miles from the coast and is almost constant for 10 to 12 miles before increasing again. The extent of this zone of constant field intensity decreases towards the west until a gently increasing gradient from north to south appears, with a slightly greater rate of increase about 18-20 miles out from the coast.

An area of general magnetic disturbance was recorded at the coast and just off-shore near Point Ricardo, west of Cape Conran. A small positive anomaly of 50 gammas was found over the sea about 7 miles from the coast approximately south of Orbost.

A well-defined anomaly also occurs about a mile inshore on six traverses between Lake Tyers and Kalimna. It has a maximum amplitude

of 150 gammas, and extends over 3 miles. It appears to be centred about half-a-mile north-east of Lakes Entrance.

In the easterly extension, there are two well-defined anomalous features. One is in the form of a ridge of high intensity, 300 gammas above the general level, oriented east-west. It crosses Cape Everard and extends from about 5 miles west to about 4 miles east of the Cape. This anomaly coincides approximately with the granite outcrop at Cape Everard. A second, broad anomalous ridge enters the area 25 miles from the coast, south of Tamboon Inlet, and continues in a general west-north-west direction across about 8 traverses, then in a general westerly direction for another 8 traverses. The anomalies are very broad (5-10 miles wide) throughout, with peak values ranging from 250 to 500 gammas.

A narrow anomaly about 2½ miles wide, with a peak value of 500 gammas, was recorded 17 miles south of Pearl Point. On the northern portions of traverses from Tamboon Inlet towards the west there are magnetically disturbed areas but the anomalies are small. A very clearly defined anomaly of 175 gammas was recorded 4 miles inland, near Tamboon Inlet; it is possibly associated with the granite which crops out there.

Area B.

This area, which extends from 5 miles west of Lakes Entrance to Lake Denison, shows a clear pattern resembling that of Area A, with a marked intensity increase to the south, probably due to increasing latitude. However, on the most easterly 20 lines, a maximum was recorded at 35-45 miles from the coast. On some traverses, this maximum is followed by a minimum towards the southern end (the traverses are 70 miles long here.)

An anomaly occurs about 60 miles south of the western half of Lake Victoria. This anomaly measures about 5 miles between maximum and minimum and has an amplitude of 110 gammas. The remainder of Area B is magnetically quiet and no rapid changes of the type to be expected from relatively shallow structures were recorded. Owing to the irregular shape of the area, the traverses covering the western half of it range in length from 60 miles to only 35 miles.

Area C.

The northern boundary of this area extends from the eastern coast of Wilson's Promontory to Lake Denison and the southern boundary extends farther to the east. In this area also the increase in field strength with changeof latitude is predominant. There are two small anomalies (about 25-50 gammas) over the sea but the main anomaly is one of 100 gammas, which was recorded on four traverses, about 4 miles due south of Port Albert. In the survey of Area C, the flight lines in the south-eastern part of the area overlapped Area B, and the anomaly 60 miles south of Lake Victoria was again recorded.

A prominent feature occurs in the western part of the area. In the 10 most westerly traverses, the profiles show a decrease of about 100-150 gammas in field strength, extending from about 5 miles inland to about 10 miles out to sea. Furthermore, at both ends of this "depression", there are belts of anomalies which extend to about 8 miles inland at the northern end and 15 miles to sea at the southern end. The anomalies in the north are the more pronounced but are all small.

Area D.

This area was planned to cover Corner Inlet, Waratah Bay and the intervening neck of Wilson's Promontory. The area, though small, is magnetically interesting and contains many prominent anomalies. These follow three well-defined trends.

One anomaly on the northern part of the border between areas C and D shows a ridge of magnetic intensity striking east-west. About 1 mile south of Welshpool this anomaly has a value of 225 gammas, and

about 2 miles to the west of that point it has a maximum peak value of almost 300 gammas and a width of 1½ miles. Two miles farther west the maximum value is about 100 gammas.

A second anomaly lies about 2½ miles north of the one mentioned above, and continues in a westerly direction for a distance of ten miles along the northern shore of Corner Inlet. This is a very prominent anomaly, with a maximum amplitude of nearly 500 gammas and a maximum width of about 2½ miles.

A third prominent feature was recorded at the southern extremities of the four most westerly traverses. The anomaly apparently continues to the west, beyond the boundary of the area surveyed. It is 3 to 3½ miles wide but has two peaks, one of which is very much greater than the other. On the two most westerly traverses the main peak has a value of 500 gammas and a width of 2 miles.

An interpretation of the results of this survey will not be possible until the final contour maps of total magnetic field have been prepared. It should be possible then to obtain some idea of the boundary of the basin and the thickness of the sediments.

4. REFERENCE.

McCarthy, E., 1952 — Notes on Aeromagnetic Survey of East Gippsland. Bur. Min. Resour. Aust., Records 1952, No. 14.

PLATE I

146° 147° 148° 149° 150°

37° 38° 39°

TRUE NORTH
11°
MAGNETIC NORTH

Mt Elizabeth
Mt Tara
Mt Little Dick
Mt Taylor
Mt Lookout
Mt Nowa Nowa
ORBOST
Mt Raymond
Mt Cunn
Tamboon Inlet
BAIRNSDALE
Bairnsdale Airfield
Lake Tyers
Lake King
Point Ricardo
Cape Conran
Pearl Point
Cape Everard
Kalimna
Lakes Entrance
Lake Victoria
Lake Wellington
Little Tower
Forestry Tower
Lake Denison

AREA A (EASTERN EXTENSION)

AREA A

AREA B

Lays Hill
Port Albert
Staples Hill
Welshpool
Haddle Hill
Little Snake Is
CORNER INLET
Snake Is
AREA D
Waratah Bay
Cape Liptrap
Wilsons Promontory

AREA C

SEA LIMIT OF SURVEY

SCALE IN MILES
16 0 16 32 48

1956 GIPPSLAND OFFSHORE AEROMAGNETIC SURVEY, VH-BUR

SKETCH MAP OF AREAS SURVEYED

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