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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF SUPPLY AND SHIPPING.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

REPORT No. 1949/6.
Geol. Ser. 4



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GEOLOGICAL NOTES ON THE PROPOSED SITES FOR A
NATIONAL RESERVE AT TIDBINBILLA AND A ZOOLOGICAL PARK
IN CANBERRA.

by

L.C. Noakes.

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A. INTRODUCTION.

A site for a National Park Reserve is proposed at the head of the Tidbinbilla River, and a Zoological Park is planned, within the city limits, between the Yarralumla Nursery and the Molonglo River.

The Department of the Interior has requested geological information on these sites with special reference to supply of building stone.

B. PROPOSED NATIONAL PARK RESERVE.
(See Plate 1).

The proposed Reserve lies at the headwaters of the Tidbinbilla River, which flows into Paddy's River and thence into the Murrumbidgee.

The Tidbinbilla valley lies almost entirely within the Tharwa Granite, which outcrops over most of the country between the Murrumbidgee River and the Cotter-Paddy's River divide. The proposed National Park is situated at the western boundary of the Tharwa Granite, and, except for small outcrops of quartzite, the rocks of the area consist of granite.

The quartzite overlies the granite along portion of the Cotter-Paddy's River divide, and small outcrops have been mapped, from air photographs, in the north-west corner of the proposed Reserve and along portion of the western boundary.

Building stone could probably be obtained from both the granite and the quartzite, but granite should provide the better source, as it is likely to be easier to work than the quartzite and would provide a uniform product.

Outcrops of granite in this locality have not been studied in detail, but there is little doubt that sites, at which suitable building stone can be quarried, will be found within or in the vicinity of the National Park Reserve.

C. ZOOLOGICAL PARK.
(See Plate 2).

The proposed Zoological Park lies on the western boundary of the city area and is to occupy the spur of land defined by the "U" shaped bend in the Molonglo River immediately north of the Yarralumla Nursery.

The spur shows moderate relief, with a wide and undulating central ridge, falling to the Molonglo River to the west, north and east.

The area was originally covered by grass with some scattered scrub, but a programme of tree planting has much improved the aspect and has controlled soil erosion, particularly on the western side.

Rock outcrops in the area consist of altered quartz-porphry, with some inliers or inclusions of quartzite, tuff

and phyllite. Beneath the soil and alluvial cover, the altered and weathered quartz-porphry will probably be found to occupy most of the ridge.

Outcrops of the rock occur on the eastern and western slopes of the ridge, but the central portion, from the Yarralumla Nursery north to the River, is almost entirely covered by alluvial material - sand with some gravel, which represents high level terraces and previous courses of the Molonglo River.

The depth of alluvial material, at most places, is difficult to estimate, and auger holes would be required to trace the contours of the original rock bottom. The alluvial material underlying the higher, central, portions of the ridge may be up to 20 feet in depth, in places, with shallower cover on eastern and western flanks of the ridges. The northern end of the ridge is covered by sand, and the depth of this cover is expected to increase down the gentle slope leading into the bend of the Molonglo River.

The rocks outcropping in the proposed Zoological Park do not provide a source of building stone. The quartz-porphry is altered and, in most places, shows close jointing. The quartzite is thinly bedded and present indications are that little quartzite will be found. However, two sources of building stone are known in the Canberra area - the Canberra porphyry and the Black Mountain sandstone. Stone from both sources was used in the building of St. John's Church, at Canberra, and some of the qualities of the Canberra porphyry and the Black Mountain sandstone, as building stones, can be seen by inspecting the Church.

The massive, unaltered, Canberra porphyry is a very hard, tough, rock of sombre colour - in most places dark grey or black. The stone polishes to a dark green or greeny-black colour. The porphyry is an excellent building stone as far as strength and resistance to weathering are concerned, but the colour may be counted as a disadvantage in some buildings and the hardness of the stone would make it more difficult and more costly to work than Black Mountain sandstone.

The Mugga Quarry would be the nearest established quarry, outside the city limits, from which building stone of Canberra porphyry could be obtained for the Zoological Park. It has been reported that building stone was cut from Mugga Quarry some 20 years ago. The distance by road from the quarry to the Zoo would be approximately 8 miles. However, massive porphyry outcrops over a wide area west of the Zoological Park and suitable building stone could, doubtless, be found in one of the porphyry hills within a distance of 3-4 miles.

The Black Mountain sandstone outcrops immediately north of the Zoological Park, on the northern side of the Molonglo River. The relief of Black Mountain itself is due to the resistant nature of these sandstones and quartzites as compared with the shales and tuffs which underlie so much of the City area.

The Black Mountain sandstone provides fair quality building stone, which weathers satisfactorily and should not be difficult or costly to cut. However, judging by the outcrops and established quarries, the stone is not as uniform in colour and hardness as the well-known Hawkesbury Sandstone, and quarry sites should be carefully chosen to avoid bands of shale. The colour varies from grey through brownish-red, brown and fawn to near white, and the average colour appears to be a light fawn. The diversity of colouring is probably due to the influence of surface weathering.

There are at least three small quarries on Black Mountain, but these lie within the City limits. A site for a quarry, in which building stone could be cut, could probably be located on the south-western slopes of the Mountain, just outside the City

limits. The stone could be carried either by motor truck - a distance of 3-4 miles via the ford crossing the Molonglo west of the Zoo, or if the quarry were situated sufficiently high up the slope, could be transported by aerial ropeway across the Molonglo River to the north end of the Zoo.

The Black Mountain sandstone, used in the building of St. John's Church, appears to have come from small quarries 600 feet south of the Reservoir on Black Mountain. The stone from which the steeple and the north end of the church was built was apparently well selected and probably shows Black Mountain sandstone at its best.

However, some of the sandstone towards the southern end of the building was not so carefully selected and shows less uniformity, shaley partings and other undesirable features.

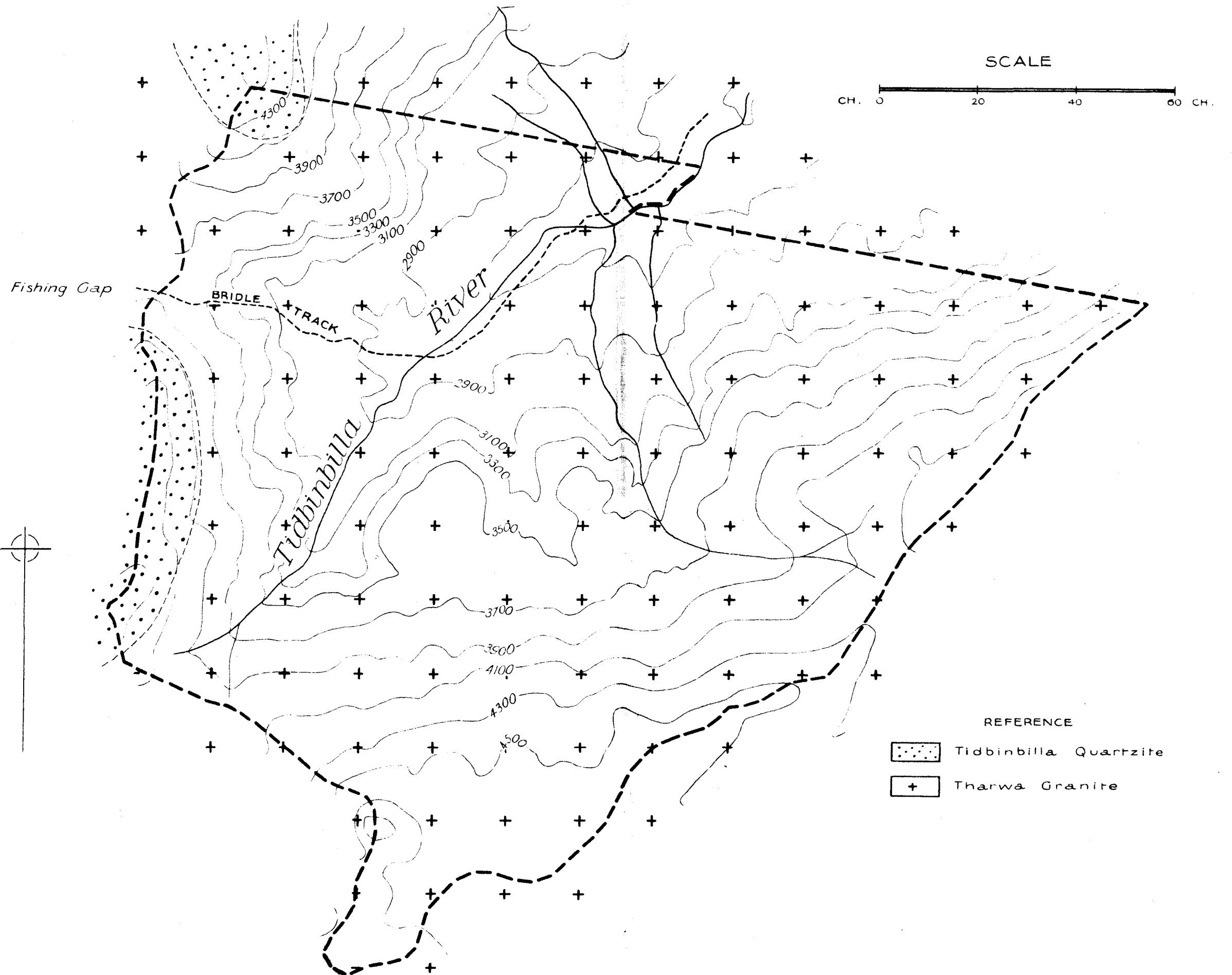
It may be of interest to note that the sandstone veneer, used in St. Andrew's Presbyterian Church, Canberra, came from Gosford, N.S.W., and shows the uniformity in texture, colour and hardness which is characteristic of so much of the building stone quarried from the Triassic sandstones of the Sydney area.

Lyndal Moulton
(L.C. Noakes)
Geologist.

CANBERRA.
14.1.49.

PROPOSED NATIONAL PARK RESERVE A.C.T.

AREA ABOUT 2000 ACRES



GEOLOGICAL PLAN OF PROPOSED ZOOLOGICAL GARDENS and environs CANBERRA SCALE

CH. 0 20 40 CH.

BLACK MT.

Reservoir

CITY

ZOOLOGICAL

PARK

Molonglo R.





Ford

Plantation
and
Nursery

Soil Covered

Gauge Weir

REFERENCE

-  Alluvial Material
-  Black Mountain sandstone & quartzite
-  Slates, ruffs, sandstones, and limestones.
-  Quartz Porphyry.

DISTRICT

Forestry School

Westridge

Brick
Works
and
Quarry

YARROLUMLA TRIG.

to Canberra

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Nov. '48.