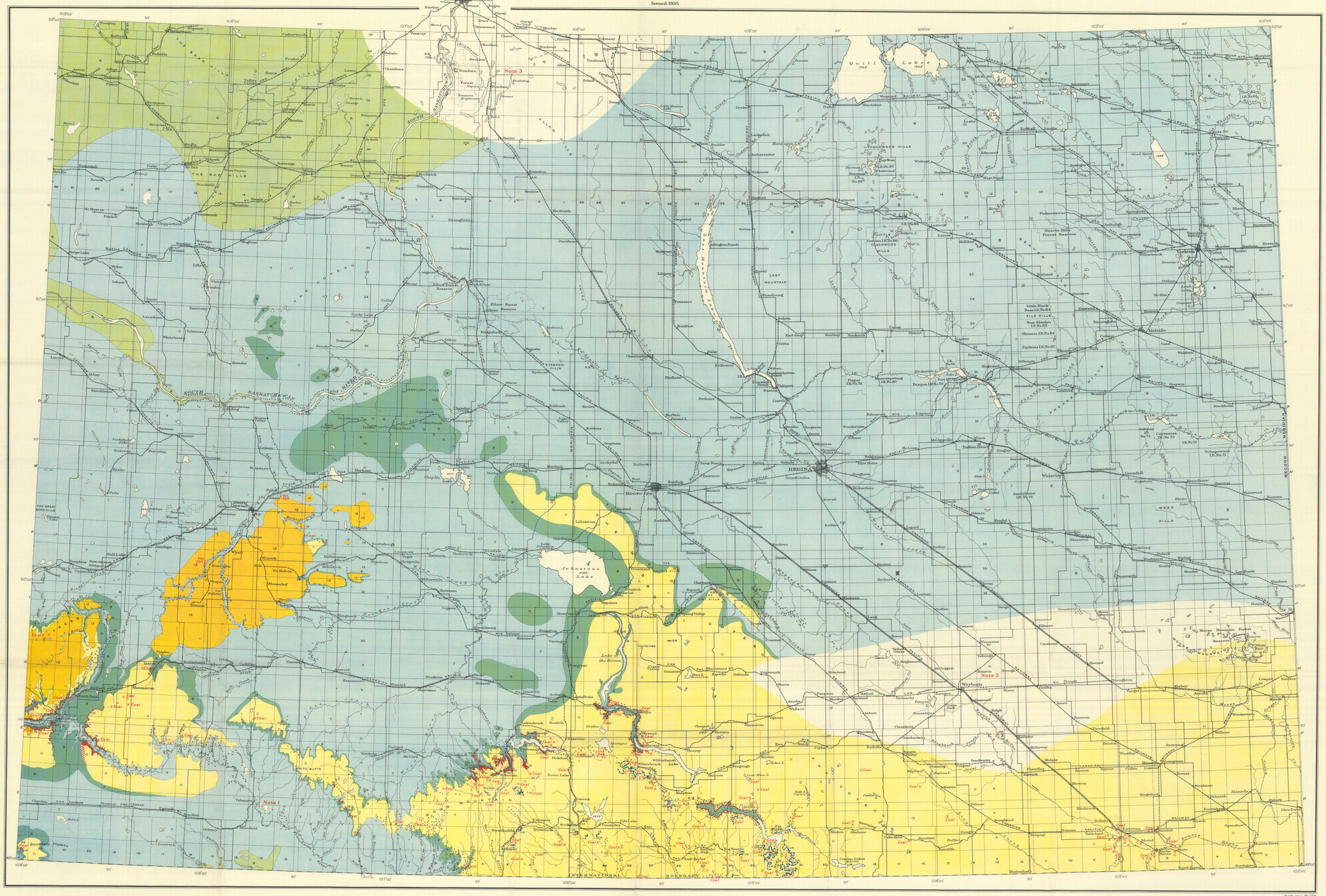
Canada
Department of Mines
HON. W. A. GORDON, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER.
BUREAU OF ECONOMIC GEOLOGY
GEOLOGICAL SURVEY
Issued 1935



Note 1: The beds exposed here show some resemblance to those of the Ravenscrag, but not sufficient to be identified as such.

Note 2: The geology of this part of the area is not yet fully understood. The possible extension of the Eastend, "Sand 5" Whitemud and Lower Ravenscrag beds from the west and the Ravenscrag beds from the east into this area, and the relationship of the Bearpaw beds, may or may not belong to the Whitemud formation.

Note 3: It is probable that the Lea Park shale, which underlies the Belly River formation, occurs in a part of this area.

PHYSICAL FEATURES

The region is a series of plains nearly flat, undulating, or in places hummocky, and somewhat higher west of the Missouri coteau than east of it. The plains are trenched by the valleys of the main streams and in the south by dry abandoned valleys, like Big Muddy valley. The highest plains form the tops of the Cypress hills (about 1,300 feet above the bordering plains) and of Wood Mountain upland.

GENERAL GEOLOGY

Most of the area is mantled by glacial drift that conceals the underlying Tertiary and Mesozoic sediments. As shown by crosses on the map exposures of bedrock are confined largely to the river valleys and coulées and, chiefly in the south, where badland topography occurs. Outcrops are particularly numerous in the Frenchman, Big Muddy and parts of the Souris valleys and in the coulées and creeks heading into the Cypress Hills and Wood Mountain uplands.

The Tertiary, Mesozoic and underlying strata are nearly horizontal. The older known sediments are found only in boreholes. They are identified mostly by their microfaunas. The oldest are marine, light coloured limestones, dolomites, cherts and dark shales, of Devonian age. Carboniferous sediments may be present in the southwest. Later Paleozoic and early Mesozoic (Triassic) sediments are lacking. Jurassic beds, 0 to about 440 feet thick, consisting of marine grey shales and nonmarine variegated shales underlie much of the area. They are overlain by Lower Cretaceous sediments about 270 to 530 feet thick consisting of sand, shales and some coal above that are at least in part nonmarine, marine shale in the middle, and shale and some sand, possibly nonmarine, below. The Upper Cretaceous, dark grey Alberta shales, 580 to 1300 feet thick, mostly or altogether of Upper Cretaceous age.

Succeeding the Alberta shales are the marine dark shales of the Lea Park, 810 or 860 to 1140 feet thick. Over them are the Belly River beds (8), partly marine and partly nonmarine. In the Boundary well, in the southwest they consist of nearly 900 feet of nonmarine sand, shale and some coal; in the Rush Lake well on the South Saskatchewan there is about 370 feet of marine shale and nonmarine sand and sandy shale with coal; and marine fine sand and nonmarine sand, sandy shale and a thin coal seam occur at Herschel, in the Souris valley. Nonmarine sandy shale and sand beds but 6 to a question whether such beds should be mapped as Belly River or as Bearpaw or Marine shale. Belly River beds are overlain by the marine, dark grey shales, with local sand beds, of the Bearpaw (7), difficult to measure and probably varying considerably in thickness. Seven hundred feet is an estimate, but it may be more or less in places. In the east, where the Belly River strata merge mostly into marine shale there is a thick series tentatively named Marine shale (8), equivalent to the Lea Park, Belly River and Bearpaw beds.

The Eastend (9) is a transition zone between the Bearpaw below and the Whitemud (10) and Ravenscrag (11) above. It consists typically of yellowish to yellowish green, very fine to superfine sands, with flat ironstone concretions. The thickness is very variable, from about 30 to 100 feet. At Willows, at the west end of Willowbunch lake, and at Claybank, Sand E, consisting of medium to fine sand and shale, may be a local phase of either the top of the Eastend or the basal part of the Whitemud and is mapped with the Eastend. Where the Whitemud is absent, the Eastend may in places have been mapped as Ravenscrag or the basal Ravenscrag as Eastend. The Whitemud consists chiefly of refractory and semirefractory clays and sandy clays with roots, fossil leaves and other evidence of nonmarine origin. The thickness varies very much, from about 10 to 75 feet. Where thin, as at Twelvemile lake, the thickness on the structure section is exaggerated.

The period of deposition of the Whitemud beds was separated from that of the Ravenscrag by an interval of erosion when, in many places, part or all of the Whitemud, together with in some places, even part or all of the Eastend, was removed. The Lower Ravenscrag (11) is of latest Cretaceous age. It consists mostly of sombre-coloured clay or shale and greenish sand, with numerous beds of lignite, fossil leaves and the remains of the land mammal *Thoatherium*. The thickness varies from about 30 to 190 feet. The Upper Ravenscrag (11) is of Paleocene, i.e., very early Tertiary age. Unlike the Lower Ravenscrag it contains numerous seams of lignite and, in the southwestern and south central parts of the Regina sheet, consists of a grey facies below and a buff or pale yellowish facies above. The grey facies includes grey, greenish grey and yellowish sands and silts and mostly sombre-coloured shales. The buff facies includes yellowish or buff sands and silts, and grey shales. High in the buff facies is the Willowbunch member (11A), with refractory and other clays. In the east around Estevan, in the Souris valley, are coal-bearing sands and shales which are at least partly higher than those mentioned above and include the highest and latest of the Upper Ravenscrag, or Paleocene beds, in southern Saskatchewan. Fossil remains of fish, crocodiles and turtles have been found, but none of dinosaurs. An interesting freshwater invertebrate fauna is known and two floras have been collected. The thickness is probably more than 500 feet.

Later Tertiary sediments were deposited on an erosion surface of the Ravenscrag and earlier formations. Southeast of Swift Current late Eocene gravels and sands rest on the Bearpaw and Eastend and are overlain by the Cypress Hills (12) conglomerate and sand of Oligocene age. In the Cypress hills the Cypress Hills beds rest on the Ravenscrag formation. On the Wood Mountain upland, the Wood Mountain (13) gravels, of Miocene age, rest on the Ravenscrag formation.

MINERAL RESOURCES

Refractory and semirefractory clays and sandy clays occur in the Whitemud formation and the Willowbunch member of the Ravenscrag formation. On the average they are most refractory in the east, i.e., at Willows etc. These clays are suitable for the manufacture of firebrick, locomotive tile, stoneware, sanitary ware, sewer pipe, facebrick, vitrified products, etc., (see Summary Report, 1930, Part B).

Workable seams of lignite occur in the Upper Ravenscrag and in the Souris field, they have been worked on a small scale only. Some important coal localities are shown on the map.

Volcanic ash occurs in the Bearpaw formation near Waldeck, over the Cypress Hills conglomerate in Sec. 18, Tp. 13, R. 5, W. of 3rd Meridian, and in the Ravenscrag formation at St. Victor. It is used in the manufacture of cleansers.

Conditions are not unfavourable to the occurrence of gas or gas and oil if suitable structures are present. The general structure so far as known is simple and, except in the southwest where it is not yet known, the strata for the most part possess gentle east or north dip. Owing to the almost universal mantle of drift, the detail structure of most of the area is unknown (see Economic Geology Series Report No. 5).

Sodium sulphate occurs in solid deposits or as brine in undrained or partly drained basins. Among the occurrences are those of Frederick lake, Tp. 12, R. 26, W. of 2nd Meridian; Snakehole lake, Tp. 16, R. 18, and 19, W. of 3rd Meridian; Vincent lake, Tps. 14, and 15, R. 20, W. of 3rd Meridian; Regina Beach, Tp. 20, R. 19, W. of 3rd Meridian; Chaplin and Reformatory lakes, Tp. 5, R. 25, W. of 2nd Meridian; Coteau (Sybouts) lakes, Tp. 1, R. 18, 19, and 20, W. of 2nd Meridian; Salt (Cayton) lake, Tp. 4, R. 21, W. of 2nd Meridian; and Little Manitou Lake, Tp. 32, R. 24, 25, and 26, W. of 2nd Meridian (see Mines Branch Report No. 646, also Map 647).

Of these deposits two are being operated at the present time namely Frederick lake and Shoe (Horseshoe) lake, and development work is being done at Coteau (Sybouts) lakes with a view to future production. Other lakes in the region contain three or more a number of other alkali deposits which in time may become producers.

Salt is produced from brine pumped from a depth of 3400 feet in the Simpson well.

MAP 267A

REGINA SHEET

SASKATCHEWAN

Scale, 1/500,000 or 1 Inch to 8 Miles

Miles 0 5 10 15 20 25

Kilometres 0 10 20 30 40 50

62 & 72
NOT TO BE TAKEN FROM LIBRARY
NE PAS SORTIR DE LA BIBLIOTHÈQUE

Publication, N° 2271

72
(Regina En)
267A
267A
This map has been produced from a scanned version of the original map
Reproduction par numérisation d'une carte sur papier