ARGUMENT FOR CRETACEOUS INSTEAD OF DEVONIAN PLUTONISM IN THE BROOKS RANGE, NORTHERN ALASKA*

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ABSTRACT

Recent workers have interpreted a Devonian age for the plutonism along the core of the Brookian orogen, based on zircon-dating and fossil-bearing blocks. However, this reinterpretation of the previously inferred Cretaceous age for Brooks Range plutonism does not fit with: (1) field evidence for post-Devonian emplacement of at least one body; (2) accumulation of 90-Ma felsic pyroclastic layers in successor basins on both flanks of the fold belt; (3) Cretaceous synorogenic metamorphism that culminates along the axis of plutonism; and (4) Cretacous plutonism on the Seward Peninsula and in the Ruby geanticline, along the southeast flank of the Koyukuk Basin.

Plutons in the Baird and Schwatka Mountains intrude, among a variety of rocks, carbonates as young as Middle Devonian; those intrabasinal deposits were part of a thick platform sequence accumulated across a broad epi-continental sea that persisted for most of the Paleozoic and was bordered on the south by an Archaen, shield-like, high-energy provenance during at least Late Devonian and Mississippian time. One pluton (Shishakshinovik) postdates the basal-clastic deposits of the Ellesmerian sequence, which began, during the Mississippian, to transgress the plain eroded across the Late Devonian Ellesmerian uplift because: (1) an altered zone on the north flank of the pluton seems to cut siliclastic beds with late Paleozoic fossils and itself consists of stretched quartz clasts in a matrix of sericite and rare feldspar that look to be foliate "granitized" phases of quartzite and conglomerate in the superjacent Mississippian Kekiktuk Conglomerate; (2) a band of less foliate and more leucocratic plutonic rock within the Kekiktuk near one contact suggests intrusive relations; (3) a wholly leucocratic felsic band locally marginal to the pluton resembles a concordantly intrusive border phase; and (4) some of the rocks in the altered zone, as well as a "button" schist flanking the Kaluich stock, resemble the felsic schists in the copper belt to the south, which are interpreted as shallow phases of the plutonism and therefore likely to occur along the intrusive margins of the plutons as well.

Devonian emplacement of the plutons seems almost precluded by: (1) evidence that the stratigraphic cover would have been too thin to contain Late Devonian intrusions; (2) three-dimensional coincidence between the plutonism and the core of Cretaceous orogeny, whereas the Ellesmerian (Devonian) orogen and intrusives have been drilled in basement a few hundred kilometers to the north; (3) the axis of old plutonism seems to trace eastward then southward to northern and western Yukon Territory; and (4) failure to recognize any reflection of Late Devonian plutonism in the coeval and palinspastically neighboring settings, such as the late Paleozoic carbonate/molassoid-wedge/carbonate or carbonate/carbonate realms, in which accumulated the sequences now allochthonous upon the plutons (Mayfield and others, 1983).

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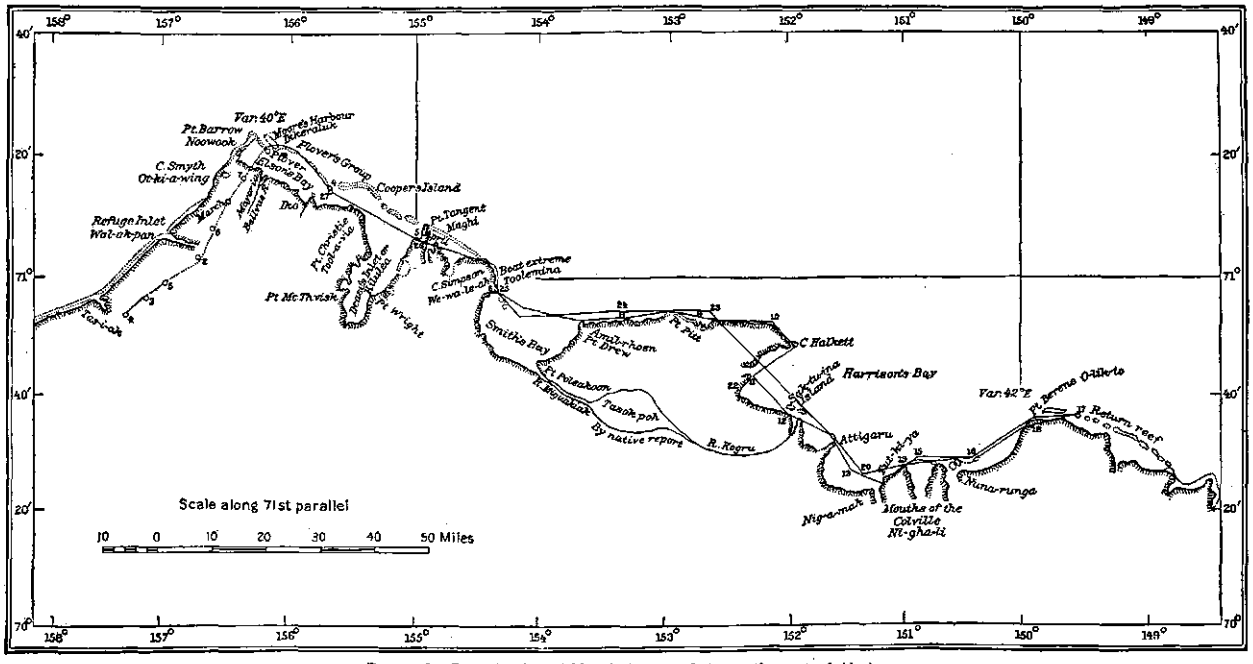

FIGURE 6.—Reproduction of Maguire's map of the north coast of Alaska.

Leffingwell, E. deK., 1919, The Canning River region, Alaska: U.S. Geological Survey Professional Paper 109, p. 81.

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