

The Caledonian Basement.

Reply to Per Holmsen.

By

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Per Holmsen finds it necessary to publish some critical comments on my paper *The Nature of the Basement Contact, Studies in the Trondheim Region, Central Norwegian Caledonides* (Ofte Dahl, 1964), "in order to avoid a profound misunderstanding of the nature of the problems presented". I find this statement surprising. In my paper it was clearly stated that all geologists who have earlier discussed the observed conformity between the basement and the overlying Eocambrian or Cambro-Silurian sediments have considered this a pseudo-conformity, due to Caledonian tectonic movements. Another possibility, namely that the Precambrian rocks were essentially flat-lying in this central part of the Norwegian Caledonides when the Cambro-Silurian sedimentation started, was presented as a tentative hypothesis for discussion. This was done for two reasons, firstly because this possibility has not been discussed at all, and secondly because my own field observations and earlier published descriptions make this tentative hypothesis quite probable at the present time. No confusion possible! I fail to see the reasons really why Holmsen publishes his opinions on the present problems; it would be self-evident if he had new views, but he repeats the earlier views, or if he presented exact and new field evidence, but he only gives half a page of generalization-type description, to be commented on below. Holmsen is right in stating that I am not well acquainted with the actual relations over the small area that he particularly knows well, the Oppdal-Surnadal district. My field experience is more comprehensive in the northern part of the larger region in consideration, and my tentative hypothesis was nicely supported by the results of Dr. Janet Peacey (1964), whose results I did not know about when I wrote my article.

Many of the facts that Holmsen discusses in his critical comments seem rather irrelevant to me. The meat of Per Holmsen's comments is really the description of my locality No. 2 or rather a description of the characteristics of the basement below the flagstone in this locality. His description covers half a page, but I find the equally long description of the same road sections by O. Holtedahl (1938, p. 36-37) excellent and more to the point than that of Holmsen. Everybody agrees that the foliation is of Caledonian origin, but Holmsen also thinks that the banding of the gneisses is Caledonian. I disagree and think it is of primary origin for reasons already stated. This is really the important point in my previous paper and this point is overlooked by Holmsen.

It may be well to repeat that my suggested hypothesis does not stem from disregard of the predominating theory (tectonic pseudo-conformity) as Holmsen puts it. That theory is well taken care of in important publications by O. Holtedahl, H. Holtedahl, T. Strand, I. Th. Rosenqvist, and others, earlier referred to, and need not be repeated by me. However, Holmsen's conclusion that I must be wrong, may be true in a way he has not considered. If we had large-scale thrust movements at the base of the Cambrian or Eocambrian rocks, this movements could have dragged the Pre-Cambrian gneisses along the thrust contact to such an extent that their primary banding now parallel the thrust rocks to a considerable depth. Exactly this interpretation was advanced by Brace (1958) from New England, and he also cites similar cases from other regions. Brace concludes that his banded gneisses can barely be anything but meta-sedimentary in origin and finds field evidence for a major drag along the contact. So far, I hesitate to consider this hypothesis more probable for the region in question for the reason that the best obtainable map pictures do not point to such a solution. These maps are by Foslie (1958-60) from the Grong area, by Peacey (1964) from the Tømmerås anticline, and by Hernes (1955) from the Surnadal syncline. When a map with description of the Oppdal-Sunndal area is published, it will be possible to re-evaluate the situation and possibly discard my suggested theory, - at least for this area.

General support of my views is given by Ivar Hernes who has recently published an article «Die kaledonische Schichtenfolge in Mittelnorwegen» (N. Jb. Paläont. Mh. 1965; H. 2, p. 69-84). Hernes has found that the gneisses of the Surnadal-Sunndal area (west of Oppdal) represent a metamorphosed sequence of supracrustal rocks, concordantly (or nearly so) underlying the Cambro-Ordovician sequence. The same situation is suggested for the Oppdal area.

References.

- Brace, W. F.* Interaction of basement and mantle during folding near Rutland, Vermont. *Amer. Journ. Sci.*, 256, 1958, p. 241-256.
- Foslie, S.* Geologic quadrangle maps Sanddøla, Nordli, Sorli, Jævsjø, Bjørkvassklumpen. *Norges Geol. Unders.* 1958-1960.
- Hernes, I.* Geologisk oversikt over Molde-Kristiansundsområdet. *Det Kgl. Norske Vidensk. Selsk. Skr.* 1955, Nr. 5, 17 p.
- Holmsen P.* On the nature of the basement contact. Critical comments to Chr. Oftedahl. *Norges Geol. Unders.*
- Holtedahl, O.* Geological observations in the Opdal-Sunndal-Trollheimen district. *Norsk Geol. Tidsskr.* 18, 1938, p. 29-53.
- Oftedahl, Chr.* The nature of the basement contact. *Norges Geol. Unders.*, 227, 1964, p. 4-12.
- Peacey, J. Springer.* Reconnaissance of the Tømmerås Anticline. *Norges Geol. Unders.*, 227, 1964, p. 13-84.