

the relative amount of the mineral crystallizing out at different times during the crystallizing period. Hence from top to bottom of the diagram is a picture of the succession of minerals which *theoretically* should be met with in any lode channel in Cornwall at increasing depths. Similarly, if the granite is regarded as occupying a space towards the lower left-hand corner of the diagram, then the successive lines to the right *theoretically* represent the minerals which crystallize out in lode channels situated at successively greater distances from the granite surface.

Conversely, as the geo-isotherms do not remain stationary during the cooling of the granite mass, but become successively lowered throughout crystallization of the lode minerals, the diagram is also a picture of the order of mineral deposition at any point in the lode channel during crystallization of the lode solutions. Hence, theoretically, and in actual fact, it is quite possible for minerals of successively cooler temperatures of crystallization in the lode solution to be deposited ultimately at even the lowest depths of a lode channel and in the vicinity of the high temperature minerals, provided the geo-isotherms sink low enough, and the lode channel remains porous enough to allow permeation of solutions and crystallization throughout. This fact is often lost sight of by authors, the geo-isotherms apparently being regarded as practically permanent during mineral deposition. It is also because of this fact that the more usual tables of mineral succession lose their significance. Different authors may give divergent tables merely because they happen to have studied different parts of even the same lodes, whereas if attention were given to the *range* of crystallization of each mineral, there would be closer agreement.

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#### CHANGES IN THE OXIDATION OF IRON IN MAGNETITE.

*Sir:* In the May issue of the *Journal* Geoffrey Gilbert raises the question whether "oxidized magnetic" or "ferro-magnetic

ferric oxide," as Sosman and Posnjak originally named it, occurs in nature. I can assure him that it does, and in very large quantities.

I have recently been studying the so-called "titaniferous magnetite" forming great stratiform segregations in the upper part of the norite zone of the Bushveld Igneous Complex. It soon became apparent that in some of the most strongly magnetic varieties of the ore magnetite is absent, its place being taken by a very strongly magnetic form of ferric oxide that, except for the color of its streak, has all the properties of ordinary hematite.

I was fortunate in being able to get confirmation of my views as to the identity of the mineral from no less authority than Professor H. Schneiderhöhn, to whom I submitted specimens.

The magnetic ferric-oxide is in intimate intergrowth with ilmenite which occurs both in megascopic grains and minute oriented lamellae.

The specimens examined were all taken from the outcrop or immediately below it. It is probable, therefore, that the mineral is a product of the normal atmospheric weathering of magnetite. It will, however, only be possible to obtain confirmation of this inference when ore from the same segregations is obtainable from below water-level.

According to the investigations of Sosman, Posnjak and Miss Twenhofel, the interesting form of ferric oxide under discussion appears to be identical in atomic structure with magnetite, but has the chemical composition and the physical properties of hematite. To distinguish it from that mineral, and from martite, it is desirable that it should have a distinctive designation. "Ferro-magnetic ferric oxide" is too long. "Oxidized magnetite" is misleading, as it contains no ferrous oxide.

I would suggest *maghemite*, but am quite prepared to withdraw this if anyone can suggest something more suitable.

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