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CONDUCTED BY . . . . . B. T. A. BELL.

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The Outlook for Phosphates.

The feverish excitement attending the discovery of large phosphate beds in Florida has now somewhat abated, and the facts of the case have become pretty well known, through the published investigations of competent and conscientious experts. It is, therefore, possible to look over the situation with calmness, and to gauge with some degree of accuracy the effects of this new source of supply upon the markets of the world. Among the first questions that present themselves in this regard are those relating to the nature, occurrence and composition of these phosphates and the manner in which they differ in all these respects from the Apatites of our own country; and, although various answers have been suggested by different authorities, the most reliable conclusions can now be drawn from industrial and commercial results. It is necessary in approaching this subject to remember that the phospates of Florida are of two kinds—RIVER and LAND—and it will save some confusion if we at once point out that it is only with the latter that we Canadian miners of high grade apatites need concern ourselves. The gravelly or nodular of the Florida river-beds, or swamps, will bear no comparison with our product for many reasons; the chief being that their percentage of phosphoric acid is too low, and their percentage of iron and alumina far too high to meet the requirements of manufacturers of water-soluble superphosphates. The actual cost of raising them to the surface is represented, and perhaps truly, as being very low, but this is more than counterbalanced by the scarcity of labor and the lack of facilities for transportation; and we are therefore justified in regarding them as a species of gigantic reserve, to be called upon by future generations of farmers when the beds of the well known, equally cheap and accessible, and more esteemed material in South Carolina have begun to languish. According to Dr. Francis Wyatt, the geological formation of the "land" or "rock" phosphate is superposed upon a foundation of much-fissured Upper Eocene limestones, and is made up of extremely irregular pockets, or banks of siliceous, marly, and phosphatic material heterogeneously jumbled together. The pockets are sometimes of immense extent, and at others of only very narrow dimensions. The banks consist principally of boulders, rolled up by the action of water and cemented together by a siliceous mud, hardened by evaporation and exposure. This description being applicable to the entire State, it follows that the Florida phosphates, like those of similar origin in other parts of the world, are nothing if not capricious, uneven and deceptive. As an illustration which we may very fairly consider typical of this uncertainty, we may refer to the published report of an expert chemist and engineer of New York, who was sent to Florida to examine a tract of 5,120 acres of land in the heart of what is called the "phosphate belt." The most attractive indications of phosphate rock were everywhere prevalent; sometimes in the form of huge boulders outcropping on the surface, and more generally in the form of small debris, brought up from below by the industrious male. A thoroughly systematic examination proved that the actual amount of land on the entire tract containing workable deposits of phosphates was only 83 acres, and that this area was not all in one piece, but was made up of small portions varying in size from a few feet to two or three acres. Their depth of phosphate-bearing sands and clays ranged from 15 to 30 feet, and the thickness of the phosphate deposit itself was from 3½ to 27 feet, the average, however, being no more than 8 feet. It was made up of about the following components:—

13 per cent. by weight of large and small boulders of 80% phosphate of lime.
29 per cent. by weight of debris and soft white matter of 60% phosphate of lime.
56 per cent. by weight of sand, clay, flints and waste.

The color, texture and specific gravity of the phosphate varied almost with every pit, and while in some of the beds the higher grades contained only a very small percentage of iron and alumina, in the majority of cases the output was heavily loaded with these injurious constituents. A careful estimate placed the yield at 5,000 tons per acre, of material having the above composition, so that we may reckon on some 650 tons per acre of about 75 to 80 per cent. grade. The desultory manner in which the pockets were scattered over the whole surface of the tract made it a matter of difficulty to place a fair valuation on the 83 acres of land which alone were of exploitable value. It was therefore necessary to acquire 5,037 acres of "dead" land, and to distribute the working over the entire body!

The inconvenience or impracticability—to say nothing of the cost—of establishing such widely distributed quarries, becomes obvious when we take into consideration the methods of exploitation. These phosphates have first to be dug out of the quarry and brought to the surface, carefully selected from the impure adhering matter with which they are connected, thoroughly washed in running water, and finally either dried in the sun or piled up and burnt in kilns! Every one of these operations requires skill, but there is still another of paramount importance which has still to be mentioned. We allude to the final process of selection for foreign shipment, whereby everything under 70 per cent. of lime phosphate, and exceeding 4 per cent. of iron and alumina oxides, are excluded from the piles. Without daily and accurate chemical analyses of the entire output, even expert miners go wrong in this last manipulation and blunders are found to be inevitable, all the more disastrous from the fact that the whole mining cost is thrown upon the higher grades. No market has yet been found for the immense quantities of second and third qualities, which must necessarily be taken from the pits, nor can we see the least chance in the near future of finding an outlet for them. In the first place, there are no facilities for their cheap transportation to points of consumption; and in the second place, they contain so much iron and alumina that in the ordinary process of manufacture no experiments have yet succeeded in making them sufficiently dry for commercial purposes.

These aspects of the question strike us as most worthy of attention, for they immediately suggest that Florida is hampered as a shipper of high grade phosphates by difficulties of great magnitude and importance. Before she can hope to justify her pretensions as a producer of the first rank, or to seriously and permanently influence our markets for good or evil, she must give more distinct evidence of her capacity than has been hitherto forthcoming. There can be no doubt that she is passing through the critical period of her history, and that those interested in agriculture and fertilizers are turning towards her with growing anxiety. This fact, however, only adds emphasis to the questions which have been so often propounded and are still unanswered: Where are her "Bonanza" deposits of high grade rock, and how are they to be exploited at a profit? For our own part we see no ground for the discouragement lately evinced by a few of our Canadian miners, and we do not hesitate to counsel those who have interests in our apatite deposits to preserve their courage and await further developments with confidence and composure. They will yet be called upon to witness the discomfiture of many unfortunates who have allowed themselves to be led away by exaggerated reports and excited first impressions. Florida is still, to a very great extent, an unsettled country; her climate is notoriously malarious in the phosphate belt, and she is subject, besides, to periodical and severe visitations of yellow fever. Her transportation facilities are imperfectly developed and wretchedly managed, and her railroad companies are poverty stricken and incapable of furnishing the rolling stock necessary for the extension of a great industry. Her people are speculative and enthusiastic, but are neither practical nor laborious, and while the negro, upon whom will fall the burden of the mining work, is an unoffensive, cheap and docile servant, he is shiftless and unreliable. We do not make these statements with a view to underrating the importance of a competitor. We are not so blind as to be unable to see the "Writing on the wall;" but we speak thus plainly because after mature consideration and minute enquiry we have concluded that Florida's resources have been grossly exaggerated. According to our information there is a yearly market in European centres for about *150,000* tons of phosphate of lime of 75 to 85 per cent. The buyers impose as a condition of their contracts, that the material