by single individuals, is increasing the need for a national park policy if any large stretches of country are to be preserved for the future in their present state. The American national parks were cited as models, but Mr. Ratcliffe proposed that the national parks in England should be barred to motor cars.

DISCUSSION

HISTORY OF SCIENCE SOURCE MATERIAL IN COLLEGE LIBRARIES

DURING the past few years there has been growing in this country an appreciation of the value of the study of the historic steps whereby the physical sciences have reached their present status. English and European writers recognized the importance of this field of study at a far earlier time. School histories are giving more space to this side of human development and less to military campaigns than formerly. Science teachers have discovered the pedagogic worth of the historic method of instruction. Productive scientists of the highest class have almost invariably found it worth while to familiarize themselves with the beginnings of their particular fields of investigation. At the same time, American writers and teachers have found source material dealing with the history of science in its several branches rather difficult to obtain. The purpose of the present short paper is to suggest one means which possibly may serve to alleviate this condition.

Almost every college library contains a few rather rare books that might be of inestimable value to any one tracing the historical development of the particular science with which they deal. Unfortunately, their existence in this country is practically unknown. For example, an American scholar while in London was told by a prominent book dealer that it was doubtful if a certain work on early surgery could be obtained at any price. After returning home, this American told one of his colleagues, a professor of biology, of his search, and was informed that the library of the college with which they both were connected possessed a copy of the first edition of the desired book. There is little reason for thinking that a similar case might not occur in any college community.

There are several methods whereby rare books may become more widely serviceable than at present. A first suggestion is that science teachers everywhere glance over the bookshelves in their local libraries and list any rare and unusual books that might be even remotely useful to any one studying the rise of the modern sciences. Such lists might be grouped centrally by some agency such as the state academy of science, and copies of these also deposited in some suitable national repository. If such lists could be made fairly complete they would enable many scholars to locate much-needed source material, and they might conceivably find it near enough at home to be able to consult it without any great inconvenience.

Another method that might prove equally efficient if carried out thoroughly would be one in which the initial steps in a nation-wide canvass would be made by a committee to draw up and circulate lists of desired works. This method would not discover the unusual book or manuscript. Probably a combination of both the above schemes would prove most satisfactory.

In following either of these procedures it should be remembered that only in recent years have the various branches of science become sharply differentiated. The present artificial dividing lines may be necessary because of the enormous content of each branch. In spite of these distinctions, it is a matter of common knowledge that the so-called sciences are but parts of one all-embracing study of the world of which we are a part. As one goes back through even a few centuries he finds that specialization as we know it is less and less necessary, and the outstanding man of science is found to be a man of universal knowledge. His experiments and his writings may be contributory in the study of a number of widely divergent branches of the science of the present day. For these reasons, a bibliography for serious use in the study of the history of physical science should include the books, pamphlets and manuscripts that may throw any light whatever on the development of science in any of its divisions.

The suggestions made above really involve the carrying out of an extensive program. The details could be worked out by a suitable committee. However, there are other benefits to be derived than those mentioned. The first to profit by such a survey will be those making the local search. It is well known that a full appreciation of the science of the present depends upon a knowledge of the work and workers of the past. One of the common meeting grounds for the various divisions of science is in a study of their historical development. For this reason, every science teacher should make the maximum use of all local material of this kind. By so doing in his classes he can lay the surest foundations for technical training, and he can impart to his pupils much of real cultural value by enabling them to see what type of contributions to civilization are of lasting worth.

These arguments might be expanded indefinitely, but the purpose of the present paper is to call attention to a great opportunity in the hope that many other writers will offer suggestions out of which the real solution will come. Until the time when some capable organization can take charge of the work, correspondence through the scientific journals might accomplish much, or the present writer will welcome private correspondence which he will undertake to arrange and turn over to whatever organization may prove suitable.

E. H. JOHNSON

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ARE BATHOLITES UP-BULGES OF SIAL?

THE able report to the National Research Council by F. F. Grout and a discussion in Washington recently have revived in my mind a question that has been there a long time. Are the granite batholiths up-bulges of the sial layer some ten kilometers thick of which the earthquake waves have informed us, or are they intrusions of more modest dimensions—phacolites, perhaps, such as are suggested by the work of Balk and Buddington[1] in the Adirondacks? Does the coarseness of their grain throw any light?

In the theory of the coarseness of grain as affected by the rate of diffusion (of heat or mineralizers) which I developed in 1894–1896[2] which is abstracted in Fairbanks' recent book[3] I found that there should theoretically be a central belt of uniform cooling and grain, in which the size of grain did not vary with the distance from the margin. For the grain I obtained a formula:

$$E = \frac{kc}{\pi a \sqrt{u}}$$

That is, the average linear dimension of the grains (E) increases proportionally to the "power of crystallization," which depends on the composition, etc. (k), and to the linear scale of the phenomena, *e.g.*, the thickness of an intrusive sheet and its contact zone (c), but decreases with the square root of the diffusivity (a^2) and the difference between the conditions (temperature) at which crystallization takes place and those of the country rock (u). The initial conditions of the magma are not a factor! They may be much hotter.

In small aplite dikes the grain is fine because (c) is small. But in the pegmatites we may find extremely coarse grain which I take to be because (u) is small.

[1] New York State Museum Bull. 281, 1929.

[2] *Bull. Geol. Soc. Am.*, 8: 403, etc., 1897, also 14: 394–5.

[3] "Laboratory Investigation of Ores," Chapter VI, p. 123.

That is, the country rock is hot and the magma is full of mineralizing juice so that the crystallization temperature is low.

But so far as my experience goes, and that of such friends as Larsen and Laforge, in a normal even-grained hypidiomorphic batholite of granite there is a rather narrow range of grain, say from 0.2 cm to 2 cm, usually about 0.8 cm. From the character of the quartz we know that (u) is less than 825° C. and probably is about 400° or possibly may get down to 200°. Its square root is then 20 $\pm$. The square root of the diffusivity is about 0.07. From certain cases where the size of the granite dike or boss may be inferred I judge that is something like antilog -5 ± 1, which is quite a range to be sure, but puts limits to (c). For a normal anchieutectic granite (using Vogt's term) k can not vary enormously except with the mineralizing water present, an increase of which will tend to lower (u) and also the viscosity, in other words increase (k). Thus the limit in the coarseness of their grain (hypidiomorphic and not protoclastic) would seem to put a definite limit to the depth and size of granite batholiths. I should like to have colleagues test the matter. The larger the granite batholiths are the greater the (c). The deeper they are the greater the country rock temperature and so the less the (u). In both cases the greater would be the grain. It looks as though the granites we see could hardly be direct up-bulges of a crystallized ten kilometer layer, as Van Hise used to urge and I would rather like to believe.

I will quote from a letter just received from Professor A. Holmes:

> My experience in Mozambique and knowledge of other areas like Finland by their literature suggest to me that batholiths can not be very deep, because no sign of them is to be found in the levels of the crust deeply denuded by long exposure and uplift. The rocks there are all gneisses veined through and through with thin granitic veins.

ALFRED C. LANE

ANOTHER CAPTURE ON THE NEW JERSEY COAST OF THE BASKING SHARK, CETORHINUS MAXIMUS

ABOUT 2 A. M., June 5, 1930, two fishermen (Carl Holgerson and Edwin Gustafson, of Monmouth Beach), in fishing their gill net about 15 miles south by east of Long Branch, found a large shark tangled up in it. The shark had so many fathoms of net rolled around it that there seemed nothing to do but tow it to shore and there after daylight salvage what they could of the net. After two hours' work they succeeded in getting a double half hitch of three-quarter-inch rope around the snout of the shark, and