

seasons generally exhausts the beds. This state of affairs is one that loudly calls for reform. The wealth of unios that fills our rivers and streams is rapidly being destroyed by ignorant and wasteful methods of pearl-hunting; and either some form of protection is important, or, if that be not possible, a wide diffusion of information as to better methods, and particularly the introduction of the tools used in Germany for opening unios far enough to see if there are pearls contained, without destroying the animal, which may then be returned to the water."

In the clearer streams of the country, the best method of collecting the mussels is by wading into the water armed with a water-telescope and a pair of spring nippers affixed to the end of a stick. The water-telescope consists of a long, light, quadrangular tube open above, and shaped to fit the face (to which it is strapped), and closed below with a glass plate. Dressed in waterproof clothing, the pearl-hunter wades along the bed of the stream in a stooping posture, with the lower end of the tube immersed in the water, by which he is enabled to see the mussels on the bottom, and so to pick them out one by one with his nippers. Fresh-water pearls in general are remarkable for their variety of tints, and nowhere is

#### THE GEOLOGY OF MONT BLANC.<sup>1</sup>

MONT BLANC and its aiguilles present some difficult problems to both petrologists and physical geologists; problems, which, though they have something in common, are to a great extent distinct. The authors, however, have grappled with both. Their monograph, as a study of the petrography of the region, is full of valuable information; but we think they have not been quite so successful in dealing with what it is now the fashion to call the tectonics. This portion no doubt contains much that is valuable, but the physical structure of the *massif* of Mont Blanc has been treated too much as if the latter were isolated instead of being, as is really the case, inseparable from the western and central part, perhaps even from the whole, of the Alpine chain.

As most people are aware, the crystalline *massif* of Mont Blanc is defined by two well-marked troughs, occupied by rocks of secondary age, the more northern being furrowed by the valley of Chamonix, the more southern by that of Courmayeur. Each is bounded on the further side from Mont Blanc by crystalline rock, the former by the well-defined range of the Brevet and



FIG. 1.—Contact of protogine with crystalline schists below the Aiguille du Midi. P, protogine; S, crystalline schists; C, contact.

the variation more marked than in those from Wisconsin. Although white is the most common, almost any colour, from pink, purple, or red, to gold, bronze, and black, may be met with; while even a peacock-blue pearl is on record. The golden and wine-coloured specimens are presumably from the beautiful *Unio dromas*, the only common species with a golden or yellow interior to the shell. Pink appears to be the colour most highly esteemed in America, next to which comes red, and then black; but exceptional colours, like sky-blue, command exceptional prices. So far as shape is concerned, the first place is taken by spherical pearls, after which come hemispherical, or bullet-shaped examples, while oval or pear-shaped specimens follow. As regards the maximum prices obtained for American pearls, the statements are somewhat conflicting and indefinite. It seems, however, to be certain that a spherical pink pearl from Tennessee realised 130*l.*, while a sky-blue pearl from Caney Fork, in the same State, was sold in America for 190*l.*, and subsequently in London for 660*l.* With good luck, there is therefore evidently money to be made by pearl-hunting in the American rivers.

R. L.

the Aiguilles Rouges, the latter by one of more varied character, and, generally speaking, of more bedded aspect.

Of these two marginal crystalline zones, the northern is prolonged to the valley of the Rhone, where it crosses just below Martigny, after which it disappears beneath the sedimentaries of the Western Oberland. The southern passes on to join the Pennine chain to the east of Mont Blanc. The crystalline rock, however, which forms this and the rest of the central *massif*, is more or less fusiform in outline. (The term "amygdaloidal" applied by the authors seems misleading, as its connection with this structure is about equal to that of Monmouth and Macedon.) The central part of the *massif*—though according to them not the very highest rocks of Mont Blanc—consists of a granitoid rock called protogine, formerly said to be composed of quartz, felspar, and talc, and to be the most ancient in the region. The talc is only biotite, more or less hydrous, and the rock intrusive

<sup>1</sup> Recherches Géologiques et Pétrographiques sur le Massif du Mont-Blanc. Par Louis Dupauc et Ludovic Mrazec. (Mem. de la Société de Physique et d'Histoire naturelle de Genève.) Tome xxxiii. Pte 1<sup>re</sup>.

in the flanking crystallines. Profs. Duparc and Mrazec give an excellent account of the protogine; its microscopic structure and its chemical composition. It is a granite, varying from moderately coarse to slightly porphyritic, the silica percentage occasionally falling rather below that of an average granite. Enclosures of a more basic rock are found in it, which the authors consider, no doubt rightly, to be included fragments of more ancient material and not segregations. The age of this protogine cannot be exactly determined, but in other parts of the Alps a porphyritic granite, occasionally very coarse, yet bearing some resemblance to it, can be seen cutting the truly metamorphic rocks, called by the writer the "upper schists," which apparently are the newest among the Alpine crystallines. The protogine is flanked on each side by a zone of mica schists and fine-grained gneisses, which accordingly must be older than it, and it includes occasional strips of schist. Of these, some may represent wedged-in fragments of the last-named zones, while others probably are dykes, modified by pressure. The

affected by subsequent pressure. These are certainly later than the Carboniferous beds, and earlier than the lowest Lias, for they occur as pebbles in a conglomerate of that age. Hence these "porphyries," like similar outbursts in other parts of the Alps, probably represent Permian eruptions. The authors think them not impossibly connected with the vein granites, which would assign the latter also to about the same period.

In discussing the "tectonics," the authors give an excellent *résumé* of the facts, so far as the immediate district of Mont Blanc is concerned, pointing out that the fan structure, of which this mass is generally considered to be a type, is not by any means so simple or so well developed as is generally supposed. They consider the central part of the chain to be a vast synclinal with minor secondary flexures between primitive anticlinals to the north and the south. According to one of them, a section across the range exhibits no less than eight anticlinal bands with intervening synclinals. On this view, we cannot venture to express a definite opinion; we think, however,



FIG. 2.—Contact of protogine with crystalline schists below the Aiguille du Midi, seen from the Montagne de la Côte. The schists are at the base of the Aiguille, and of a very dark colour.

whole *massif* is traversed, in some places thickly, with veins of a fine-grained granite, poor in mica (aplite).

The sedimentary rocks associated with the Mont Blanc *massif* belong to two distinct eras. One group occurs but locally; the other has a wide extension, and perhaps was deposited over the whole breadth of this region of the Alps from north to south. The former group belongs to the Carboniferous period. It consists of conglomerates, often coarse, grits, and dark muds (now slates); the latter group forms part of the great Alpine Mesozoic series. At the base, Trias is found; this, however, near the Mont Blanc *massif*, is either feebly represented or absent. It is probably followed everywhere by beds of Rhætic age, but these often cannot be separated from the Lias. In parts of the Alps the series passes gradually upwards into the Eocene; in this district, however, nothing later than some portion of the Jurassic system is preserved. Here and there masses of "porphyry" occur (one with, some without, free quartz), often much

that at present a suspense of judgment would be prudent. But that the structure is far less simple than it was formerly represented to be can hardly be doubted. That great complications exist is not surprising, for the region, like the rest of the Alps, has been repeatedly folded. The authors recognise the following as the principal movements: (1) The Caledonian folding, during which the injection of the protogine occurred. This, we presume, so far as it can be dated, would be earlier Palæozoic, perhaps post-Ordovician. Then came the Hercynian folding, which is supposed to have occurred in early Permian times, and to be connected with the ejection of the "porphyries." The axis of this folding ran slightly north of east. During the Mesozoic times, a subsidence continued, the mountains gradually disappearing, while deposition went on steadily.

Then came the Tertiary movements, by which the present chain was formed. We cannot attempt to discuss this part of the subject, for it is a complicated one,

and the structure of the chain for a considerable distance to the south and the east must be taken into consideration. That great earth movements had preceded the Carboniferous period, and that mountains of a sort existed during it, and that this period was followed by very acute folding, are certain. We think, however, that the folds in this part of Europe (for reasons which have been published elsewhere) ran approximately from N.N.E. to S.S.W. Evidence of this may indeed be found in the district of which the authors are writing. Such flexures may have been the cause of the frequent trend of outcropping masses along almost the whole of the Alpine chain. During the Triassic period, as has often been observed, highlands, if not mountains, must have existed over more than one large area on the present site of the Alps, which afterwards disappeared beneath a wide-spreading sea. Then came the great Tertiary movements which formed the present chain. The authors apparently treat these as one, but most geologists hold that there were two epochs of maximum disturbance separated by one of comparative rest. The "building" of the present *massif* and the neighbouring mountains should have been treated, we think, in greater detail; for there is more than one interesting problem connected with the courses of the main streams, the positions of watersheds, and the localities chiefly affected by the different movements, which are practically unnoticed. Still the memoir, as a whole, is a very valuable contribution to our knowledge of Alpine geology.

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THE BERLIN TUBERCULOSIS CONGRESS  
(1899).<sup>1</sup>

II.

(Section IV. Therapeutics. Section V. Sanatorium Treatment.)

THE fact that 2000 doctors met together and discussed for two days the treatment, using this term in its broadest sense, of phthisis will, to the observant layman, be of evil omen. When a number of remedies or methods of cure for one disease are all guaranteed by their advocates as being efficacious, the attitude that one at once adopts is one of scepticism. How many doctors would meet together to discuss the treatment of primary syphilis, a disease which can be cured, and how long would it take them to do so if they did? In a multitude of counsellors there may be wisdom, but in a multitude of treatments there is rarely a cure.

The subject-matter of this Section was very fittingly opened by a paper of Dr. Curschmann's (Leipzig) on the curability of phthisis. In the narrow anatomo-histological sense, phthisis is rarely if ever cured; in the clinical sense, however, we can often accurately speak of a cure as having taken place, since the local signs in the lungs not only become arrested, but a certain amount of repair takes place, and the attacked individual becomes practically normal. The majority of cases of cure, however, are relative. In these cases, the local disease, although not coming to an absolute standstill, is of such a nature as to allow of the general condition of the patient remaining good.

The congress listened with great attention to a paper read by Prof. Kobert, of Rostock, on the medical treatment of tuberculosis. The results formulated by the author were of especial value, since they were not confined to his own clinical experience at Görbersdorf, but were derived from a series of inquiries addressed by him to general practitioners and lung specialists throughout Europe—200 in number. These specialists and practitioners had treated during 1898, the year to which the inquiry related, 50,000 cases of tuberculosis. The most interesting of these results are as follows: (1) that we

have in our possession no drug which exerts what may be termed a specific action in tuberculosis; (2) that the early stages of phthisis can sometimes be met and cured without medicine of any kind; (3) in acute cases of phthisis, the fatal termination is neither avoided nor appreciably hindered by any kind of medicinal treatment; (4) that in the majority of cases of consumption medicinal treatment along with hygienic treatment is of the greatest possible use in allaying and easing cough, keeping up nutrition, and exerting a controlling action on the tubercle bacillus and its products. Dr. Brieger (Berlin) read a paper upon the treatment of pulmonary tuberculosis by means of tuberculine and allied methods. The author regarded Koch's tuberculine as of distinct value in cases of pure pulmonary tuberculosis, asserting that in several cases an active tuberculous process had by its means been brought to a standstill.

A valuable communication upon the climatic treatment of phthisis was made by Sir Hermann Weber; but since this was reported at length in the *British Medical Journal*, no further mention will be made of it here. A paper of great interest was read by Dr. Dettweiler (Falkenstein), the subject being the hygienic, dietetic and sanatorium treatment of phthisis. Dr. Dettweiler, being the chief physician to one of the largest private sanatoria in Germany, spoke upon this subject out of the fulness of his experience. The author, after emphasising the fact that in phthisis we had to deal, not with a local condition, but a symptom complex, considered in how special a manner a sanatorium could meet the individual requirements of each case, and that by this means alone—viz., meeting every special want or symptom of the patient as it arose—could we hope to be successful in our treatment. It was not from open air, baths, exercise, alcohol, or feeding that we were to expect a "cure," but from the co-operation each day, according to the state of the patient, of all these means. Prof. Winternitz (Vienna) discussed the hydrotherapy of phthisis, and was followed on this subject by Dr. Carl Schütze. Dr. Höltscher (Mülheim) read an interesting paper on the treatment of phthisis by guaiacol carbonate and creosotal. The author, after giving a short *résumé* of the results of the continued use of guaiacol, emphasised the fact that this method must be used in conjunction with forced feeding, especially in so far as concerns proteids. The guaiacol is eliminated in combination with sulphur, and the sulphur thus used can only result from the breaking down of proteid material; hence the importance of the strength of the patient being maintained by a plentiful supply of proteid material in the food. Dr. Cervello (Palermo) described his method of treatment, which consists in the inhalation of a formic aldehyde gaseous compound. Prof. Landerer gave the results he had obtained by the injection of cinamic acid (Zimmtsäure  $C_6H_5-CH=CH-CO_2H$ ). This substance, according to Prof. Landerer, acts by causing an increased leucocytosis, especially in the regions affected by the tubercular process. The action of many other antiseptics in tuberculosis was also considered, including iodoform and glycerine (Dr. R. Hammerschlag) and Izal (Dr. Tunncliffe), a few preliminary observations with the latter drug tending to show that it acted, as would be expected from its composition, similarly to guaiacol and creosote.

The serum treatment of tuberculosis was discussed by Prof. Maragliano (Genoa). This investigator's interesting researches in this field have already attracted considerable attention. The author, after having postulated from his own and Behring's researches the existence of tuberculous antitoxines and their presence in the blood of normal animals and man, stated that the quantity of these could be increased by injection. The injection of such antitoxines rendered animals partially or entirely immune to injections of tuberculous material, and lessened in man the reaction to tuberculine (Koch?). He further

<sup>1</sup> Concluded from p. 109.