attention was given to it at the time. The coal in this place was 18 yards from the surface, and was a 'standing vein,' having been bent upwards by the great Newtown fault.'

Of a pit at the edge of the Newtown coal, 'about three hundred yards from Lally's Bridge as you go up the stream,' Mr. Edge gives the following particulars:—

'SECTION NO. 3.

		Feet.
5. Soil	*Reassorted Drift*	1
4. Yellow clay		4
3. Blue clay withl imestone-boulders	*Boulder Drift*	81
2. Sand and gravel	*Preglacial Drift*	7
1. Fire-clay		3
		96

'In No. 1, large pieces of round timber, about 5 inches in diameter, seemingly birch or hazel, were embedded; also what seemed to me to be hazel-nuts.'

The *Boulder-drift* hereabouts is unmistakeable, containing numerous polished and well-scratched blocks of Limestone. The 'Book-' or 'Leaf-clay' mentioned in the first section, is clay that was deposited in fine laminæ.

From the foregoing sections, it will be seen that at the Newtown Colliery there was a drift *Preglacial* in relation to the overlying *Boulder-drift*; but whether it existed previous to all the *Boulder-drift* in its neighbourhood, it is impossible to say. Unfortunately, the men that opened these sections were only interested in the underlying coal, and therefore paid little attention to the drift; and as now all the coal at this place is worked out, there is no chance of new pits being opened; but that interesting results may yet be gleaned in that neighbourhood, seems likely from the following facts stated by Mr. Edge:—'About twelve or thirteen years since, a branching coral and shells of mollusca, something like the common cockle, were found 24 yards deep in the drift close upon the coal at the Newtown Colliery; and similar shells were got at the edge of the coal in the Geneva Colliery under 6 feet of drift.' The Geneva Colliery lies a little SW. of the Newtown Colliery.

NOTICES OF BRITISH AND FOREIGN MEMOIRS.

I. PROF. SUESS ON CEPHALOPODA OF THE GENUS ACANTHOTEUTHIS.

PROF. SUESS has prepared for publication a Memoir on the fossil Cephalopods belonging to the genus Acanthoteuthis (R. Wagner). A fine series of well-preserved specimens of the *Acanth. bisinuata* (Brown), obtained from the schists of Raibl in Carinthia, has enabled him to determine the true characters of the genus.

M. Suess has recognized on these specimens, the head with the mandible, the arms furnished throughout their length with a double row of hooks, the ink-bag, the dorsal shield and phragmacone, with the chambers, the ligatures, traces of the siphuncle, and here and there some remains of the mantle. The dorsal shield, hitherto unknown as to its form, presents two concave lobes behind the hyperbolar region. The *alveolus*, distinguished by the abnormal striæ of growth lately noticed by Prof. Huxley as probably belonging to a new type of Belemnites, is considered by Prof. Suess to belong to the genus *Acanthoteuthis.**—*L'Institut*, 5th July, 1865.—J. M.

II. Prof. Unger on the Fossil Plants of Hungary.

PROF. UNGER has presented to the Academy of Sciences of Vienna a Memoir on the Fossil Plants of Hungary and Transylvania, in which he treats specially of those found by M. Stur in the Upper Cretaceous Deposits of Déva, Transylvania. All the specimens are well preserved, so that they can be recognized with certainty as belonging to genera allied to those of the present day; a fact of much importance in the determination of the Dicotyledonous plants of the Cretaceous period.—*L'Institut*, 12th July, 1865.—J. M.

III. On the Group of Feldspars. By M. Tschermak.

THESE minerals, abundantly distributed in certain rocks of the globe, are interesting to the chemist, mineralogist, and geologist, and have been the subject of numerous memoirs. The continued chemical researches on these minerals have increased their complication—substances identical by their physical characters being often found chemically very different; some not assuming a definite character, others inconsistent with a systematic classification—more especially the feldspars, containing both soda and lime. According to the opinion more than once advanced, the feldspars could only be mixtures of isomorphous combinations. M. Tschermak considers that in reality all the feldspars are only mixtures of three substances, which exist in nearly a pure state in adularia, albite, and anorthite.

The potash-feldspars, comprised generally under the name of orthoclase, are regular mechanical combinations of orthoclase and albite, which, however, are not isomorphous, orthoclase crystallizing in the monoclinic and albite in the triclinic system. The constant combination of particles of albite gives rise to forms of dimensions similar to those of adularia; and thus the accession of the albite, although not isomorphous in itself, only modifies very slightly the form of orthoclase.

All the other feldspars are isomorphous mixtures of albite and anorthite, to which, in certain cases, orthoclase is added in small quantities.

* See Geol. Mag., Feb. 1865, p. 67.

The minerals distinguished specifically under the names of labradorite, andesine, and oligoclase, are in reality only terms of a continuous series. Those to which we cannot assign a place in the system are only intermediate terms of this series, which, up to the present time, have not been studied in detail. Two rather rare minerals—namely, Hyalophane, which contains *barytes*, and Danburite, in which *boracic acid* has replaced the alumina—range themselves equally in the group of feldspars.

The isomorphous mixtures of orthoclase and albite, and that more complete of albite, anorthite, and danburite, as well as that between orthoclase and barytiferous feldspar, have the atomic constitution shown in the following table :—

Chemical Combinations.	Chemical Formulæ.	Mixtures of Simple Combinations.
Anorthite	$Ca^2\ Al^2\ Al^2\ Si^4\ O^{16}$	Oligoclase, Andesine, Labradorite, &c.
Albite	$Na^2\ Al^2\ Si^2\ Si^4\ O^{16}$	
Adularia	$K^2\ Al^2\ Si^2\ Si^4\ O^{16}$	...Orthoclase, Sanidine, &c.
Feldspar (barytic)	$Ba^2\ Al^2\ Si^2\ Si^4\ O^{16}$	Hyalophane.
Danburite	$Ca^2\ B^2\ B^2\ Si^4\ O^{16}$	

Perhaps it would be convenient to admit for the feldspars of ordinary composition only three genera, that could be subdivided according to the proportions in which the normal species are found mixed in them.—*L'Institut, June* 1865.—J. M.

IV. On Considerable Deposits of Phosphate of Lime at Caceres, Estremadura. By M. R. de Luna.

These deposits are very extensive, and occur on the line of railway from Estremadura to Portugal. The means of transport are very costly in comparison to that of similar deposits. The phosphate of lime attains a maximum of 85 per cent. in the formation of Montanches, six leagues from Caceres and eight leagues from Logrosan, and the minimum is about 50 per cent. M. Luna has also noticed a deposit containing 72 per cent. of $\dot{C}a^3\dddot{P}$, extending over four square kilomètres, about half an hour's journey from Caceres.

The last mines discovered at Montanches are as rich as those of Logrosan. The phosphate is found in the cretaceous strata, and in great abundance in the silicious bed; it presents a fibrous texture, and as the formations do not contain carbonate of lime, it is more readily attacked by sulphuric acid.

Phosphate of Caceres.	Maximum.	Minimum.
Residue insoluble in nitric acid	47·02	21·05
Water	3·00	1·33
Tribasic phosphate of lime	72·10	50·10
Oxide of iron, &c. &c., and loss	3·85	1·55
Montanches.		
Tribasic phosphate	85·03	
Carbonate of lime	10·35	
Oxide of iron—silica	2·40	
Water	2·22	

Comptes Rendus.—J. M.

https://doi.org/10.1017/S0016756800162193 Published online by Cambridge University Press

V. On the Physical History of Meteorites.

By H. C. Sorby, F.R.S.

THOUGH I am most willing to admit that much remains to be learned before we can look upon the following theory as anything more than provisional, yet at all events it serves to unite a great number of facts, and is not opposed to any with which I am now acquainted. I shall describe the facts and discuss the objections to this and other theories in a communication to the Royal Society.

As shown in my paper in the 'Proceedings of the Royal Society,' (xiii. 333), there is good proof of the material of meteorites having been to some extent fused, and in the state of minute detached particles. I had also met with facts which seemed to show that some portions had condensed from a state of vapour; and I expected that it would be requisite to adopt a modified nebular hypothesis, but hesitated until I had obtained more satisfactory evidence. The character of the constituent particles of meteorites and their general microscopical structure differ so much from what is seen in terrestrial volcanic rocks, that it appears to me extremely improbable that they were ever portions of the moon, or of a planet, which differed from a large meteorite in having been the seat of a more or less modified volcanic action. A most careful study of their microscopical structure leads me to conclude that their constituents were originally at such a high temperature that they were in a state of vapour, like that in which many now occur in the atmosphere of the sun, as proved by the black lines in the solar spectrum. On cooling, this vapour condensed into a sort of cometary cloud, formed of small crystals and minute drops of melted stony matter, which afterwards became more or less devitrified and crystalline. This cloud was in a state of great commotion, and the particles moving with great velocity were often broken by collision. After collecting together to form larger masses, heat, generated by mutual impact, or that existing in other parts of space through which they moved, gave rise to a variable amount of metamorphism. In some few cases, when the whole mass was fused, all evidence of a previous history has been obliterated; and on solidification a structure has been produced quite similar to that of terrestrial volcanic rocks. Such metamorphosed or fused masses were sometimes more or less completely broken up by violent collision, and the fragments again collected together and solidified. Whilst these changes were taking place, various metallic compounds of iron were so introduced as to indicate that they still existed in free space in the shape of vapour, and condensed amongst the previously formed particles of the meteorites. At all events, the relative amount of the metallic constituents appears to have increased with the lapse of time, and they often crystallized under conditions differing entirely from those which occurred when mixed metallic and stony materials were metamorphosed, or solidified from a state of igneous fusion in such small masses that the force of gravitation was too weak to separate the constituents, although they differ so much in specific gravity.

(Report of Brit. Assoc. 1864.) Possibly, however, some meteoric irons have been produced in this manner by the occurrence of such a separation. The hydro-carbons with which some few meteorites are impregnated, may have condensed from a state of vapour at a relatively late period.

I therefore conclude provisionally that meteorites are records of the existence in planetary space of physical conditions more or less similar to those now confined to the immediate neighbourhood of the sun, at a period indefinitely more remote than that of the occurrence of any of the facts revealed to us by the study of Geology —at a period which might, in fact, be called *pre-terrestrial.*

BROOMFIELD, SHEFFIELD: *July* 1865.

VI. ON THE MICROSCOPICAL STRUCTURE OF MOUNT SORREL SYENITE, ARTIFICIALLY FUSED, AND COOLED SLOWLY. By H. C. SORBY, F.R.S., F.G.S., &c., of Sheffield. (Proceedings of the Geological and Polytechnic Society of the West Riding of Yorkshire, 1863–64, pp. 301–304.)

MR. SORBY thus describes the Syenite of Mount Sorrel:— 'The rock operated on is a mixture of reddish felspar, clear green hornblende, and quartz, along with some opaque minerals, evidently in a greatly altered state, perhaps originally pyrites or magnetic oxide of iron. The felspar is in very distinct crystals, but has often caught up much hornblende; and the quartz fills up the spaces between the other minerals, or is curiously crystallized along with the felspar, so as to form a microscopic "graphic granite," or "hebraic felspar;" and it is especially important to bear in mind, that the quartz contains very many *fluid-cavities*, nearly filled with water, as described in my paper in the Quart. Journ. of the Geological Society (vol. xiv. p. 453); and, in accordance with the principles therein explained, they indicate that the rock was consolidated under a very great pressure.' These *fluid-cavities*, he adds, 'show the spontaneous movements of the bubbles which they contain better than those I have seen in any other rock.'

Of this Mount Sorrel Syenite, Mr. J. G. Marshall, F.G.S., melted large quantities, allowing it to cool very slowly; and of this material Mr. Sorby examined microscopically thin slices, comparing its structure with that of various kinds of igneous rocks in their natural state, and after having been fused and slowly cooled. After detailing the characters observed in the artificial rock, Mr. Sorby remarks that, as the hornblende melted more easily than the quartz and felspar, and as a portion of the mineral rose upwards, the whole was not thoroughly incorporated. Nevertheless this circumstance is not, he says, enough to account for the difference between the original and the fused rock, as seen also in the experiments of M. Delesse; but 'an explanation must be sought for in the very different circumstances under which they were formed.'

The fused and cooled mass is quite unlike syenite or granite, but has a resemblance to some of the stony masses obtained by fusing basalt and basaltic lavas. 'The presence of water, an intense pressure, and a far more gradual cooling, all of which we are unable to imitate successfully, probably suffice to explain the total difference in the structure of the natural and the artificial products. At the same time,' adds Mr. Sorby, 'the making of such experiments, and the microscopical examination of the resulting masses, are likely to lead to a far better knowledge of igneous rocks than we at present possess.'—T. R. J.

REVIEWS.

I. Manual of Geology. By the Rev. S. Haughton, M.D., F.R.S., &c. London: Longmans, Green, and Co. 1865. 8vo., pp. 360.

IN 1862, Prof. Haughton had a reporter to take down a literal and verbatim report of a course of lectures on Geology, and these he now without alteration or emendation, publishes as a Manual of Geology. Has the science been standing still during that period? Was there nothing to add or to alter in 1865, to the prelections of 1862? But, granting that by some mysterious second-sight the Professor did foresee the recent discoveries—that he conjured up the strange spectre of the Archæopteryx, and clearly saw the Laurentian Eozoön, we scarcely think that the very words of a lecture to a class are likely to be the best for a manual for the student's private study. The hasty composition, the vague statements, and the rough-and-ready illustrations which necessarily belong to the extempore discourse, are too apparent in every page of this volume. And we cannot divine what the dissertation on the structure of honeycomb, with the history of the various opinions relative thereto from Pappus downwards to Haughton, has to do with an exposition of Geology. It would be unfair, however, to the learned author, were we not to add, that the student of Geology will find many things worth his careful attention in this volume. For instance, many will prize the volume because it contains a reprint of Prof. Haughton's translation of Durocher's important essay on Comparative Petrology. Our great regret, however, is, that Prof. Haughton, instead of producing a really valuable manual, in which he could have incorporated many of his original and useful observations and generalizations—a work that would be deserving a place alongside of the admirable volumes of Prof. Green on the Protozoa and Cœlenterata in the same series—has satisfied himself with sending to the press the reporter's version of his extempore lectures.

II. Ice-caves of France and Switzerland. A Narrative of Subterranean Exploration. By the Rev. G. F. Browne, M.A. London: Longmans, Green, and Co. 1865. Pp. 315.

THE desire for novel adventure which urges the members of the Alpine Club up the sides of virgin mountains, has led Mr. Browne to acquaint himself with eternal ice in the dark recesses of natural Glacières, where more gains to science may be expected, and less danger to limb demanded. Very little was known about

https://doi.org/10.1017/S0016756800162193 Published online by Cambridge University Press