GEOGRAPHICAL NOTES

LIEUT. DANENHAUER and two of the crew of the ill-fated *Jeannette* have arrived at St. Petersburg, where they were met with a hearty reception. Lieut. Danenhauer has little hope that Capt. De Long and those with him can have survived, though Engineer Melville is searching for them. He speaks of the unsatisfactory nature of the charts of the Lena mouths and that part of the Siberian coast, and states that Baron Nordenskjöld has added little to our knowledge in this respect. But the Baron did not profess to do so, and indeed could not, seeing that his aim was to get over the ground as quickly as possible. The Lieutenant also is not sanguine as to the possibility of opening up trade by the mouth of the Siberian rivers, forgetting apparently that the time of his arrival at the Lena mouth was past the time most favourable for navigation, and the conditions of his arrival were certainly unfortunate.

WRITING on Chinese maps, the *North China Herald* says that the present dynasty has made greater efforts at map-making than any former one, and appears to have been the first to introduce into them lines of latitude and longitude. The old maps of China are very vague and inaccurate, and are not ancient in any sense. Ssu-ma-Chien when compiling his history did not judge it needful to illustrate it with maps, but his commentators have supplied this deficiency, and recent editions of his work contain maps poorly done of China at successive periods. The geographical works of the Han dynasty do not contain maps. The first maps that have been retained in modern editions of ancient books are those of the Sung dynasty, and they seem to be connected with the invention of printing, which dates from A.D. 932. It was the influence of foreign countries that caused the Chinese to enter rigorously into the work of map-making at this period. The Buddhists began to compile works with maps of India and the countries through which lay the routes to India. One of their larger works at this time contains a map of China, of Persia and Rome, according to the geography of the Han dynasty, and a map of India as known to the Buddhists. The Mahommedans followed the latter in teaching their notions of map-making to the Chinese. But all through the Sung dynasty till the 13th century, when the Mongols established their Empire, Chinese scholars possessed but imperfect views of geography, and failed to obtain clear ideas either of foreign countries or of their own in regard to topography. During the Mongol domination many Europeans visited China and brought with them a certain portion of geographical knowledge. No steps, however, were taken by the Government to improve maps and common geographical books, which remained as bad as before. The Chinese had junks in the Indian Ocean from the 5th century, yet in the 16th century we find in maps of that time that Cambodia and Siam are islands; that Java lies west of Siam, that the Greek empire (Fulin), Arabia, and Medina are three small islands a little to the west of Java, and that an immense southern continent fringes the map from a little south of Ceylon to a point not far south of Java, and again farther east. Good maps have only existed since the Jesuit missionaries came to China, and they belong only to the present dynasty. The Emperors Khang-hi and Kien-lung encouraged the survey of their dominions and the construction of good maps. Danville's *Atlas Chinois* is the result in French of the surveys made under Khang-hi by Gerbillon and his companions. All European maps of China rest mainly on those surveys. Among the atlases of the empire, that made by a former governor of Honan province deserves special praise. It is on a large scale. Each square of 200 *li* represents a square degree. Two inches and a half represent 200 *li*. This affords ample space for names, which are freely inserted on the most frequented roads. As a specimen of engraving it is rough, and of course being on wood and done by provincial workmen it cannot equal the copperplate maps which were issued last century from the Government workshops in Peking. But it is in comparison with past times a great advantage to the people to have a map on a large scale for four or five dollars, on which both degrees and miles are marked by a system of chess-board squares with quite sufficient accuracy for ordinary use. For this they are indebted to Khang-hi and the Jesuits.

MR. C. R. MARKHAM has presented to the Geographical Society a long and careful report on the instruction at present supplied to this country in practical astronomy, navigation, route-surveying, and mapping. Although much improvement has taken place since nautical astronomy was placed in the South Kensington programme, still Mr. Markham shows that much remains to be done ere practical instruction in these important subjects is on the footing on which it ought to be in a country whose interests are so dependent on good seamanship. The Council, on the basis of Mr. Markham's report, have made a series of recommendations to the Board of Trade and the Lord-President of the Council; the former are recommended to raise their standard, and the latter to place navigation and nautical astronomy among the science subjects in the New Code. The report and the recommendations deserve serious consideration.

THE last two parts of the *Deutsche geographische Blatter* contains detailed accounts, by the Brothers Krause, of their researches in the Chukchi Peninsula, accompanied by maps and illustrations; this forms a valuable addition to the information obtained by the *Vega* Expedition. Nos. 2 and 3 of the *Mittheilungen* of the Vienna Geographical Society contains a paper by Herr Ferd. Blumentrit, on the Ancestor-Worship and Religious beliefs of the Malays of the Philippine Islands.

M. MASCART is delivering daily lectures to the naval officers who are to leave on June 1, on the Antarctic Expedition now fitting out at the expense of the French Government. These lectures are delivered at the Parc St. Maur, where instruments have been established. The lecture will be published by Gauthier Villars, after having been revised.

IN the April number of *Petermann's Mittheilungen* M. Ernest Marno gives an interesting account of the barriers of the Bahr-el-Gazal, and their removal from April to June, 1881. Dr. Fera Loïol of Prag contributes a long paper of great interest, with numerous illustrations, on the formation of terraces in the Alpine valleys. Dr. Oscar Drude writes on the botanical exploration of North Africa from Morocco to Barca.

"A VISIT to Madeira in the Winter 1880 81" is the title of two lectures by Dr. Denis Embleton, of Newcastle-on-Tyne, published by Messrs. Churchill. Dr. Embleton, besides giving his own experience, has brought together much information on the islands in all their aspects.

THE Dutch Polar Expedition, which participates in the great International undertaking, will start for Port Dickson on July 1 next. Half the cost is borne by the Dutch Government, the other half having been raised by public subscription. The expedition will return in 1884 if all is well. At the same time the annual Dutch Polar Expedition to the Novaya Zemlya region—the fifth—will start early in May from Amsterdam, commanded by Lieut. Hoffmann. They hope to return in October.

SOME OF THE DANGEROUS PROPERTIES OF DUSTS[1]

THE lecturer pointed out that the dangerous properties of dust with which he proposed to deal were altogether distinct from the subtle, invidious dangers of microscopic dust-motes which pervade the air—dangers the existence and nature of which had been fully revealed by the classical researches of Pasteur, Tyndall, &c.

Compared to those, the dangers which he would discuss were as palpable as are the comparatively gross dust-particles which give rise to them, and yet, although their existence and, to a great extent at any rate, their causes have been known and demonstrated for many years, those who are most directly interested in them and should be most keenly alive to them appear either to have ignored their serious import or to have undervalued the teachings of practical experience and scientific research regarding their causes and effects.

Seven years ago Mr. Abel, in a lecture on Accidental Explosions, delivered at the Royal Institution, directed attention to the fact that solid combustible and especially inflammable substances, if sufficiently light and finely divided to allow of their remaining for a time thickly suspended in air, may on application of sufficient flame to them while so suspended, produce explosive effects; behaving, in fact, similarly to mixtures of inflammable gases or vapours with air, with this difference, that the mobility of the molecules of these insures the ready production of complete mixtures of them with the air, so that combustion, when once established, proceeds almost instantaneously throughout such mixtures, whereas, in the case of a mixture of solid dust particles and air, the rapidity with which combustion spreads

[1] Abstract of Lecture at the Royal Institution, April 28, 1882, by Prof. F. A. Abel, C.B., F.R.S.

through it depends upon the state of division of the solid, and the abundance of its distribution through the air. Under the most favourable circumstances, the rapid combustion or explosion of such a mixture is of a comparatively moderate kind, as it has to spread from one isolated particle to another. With highly inflammable solids, the rapidity of combustion under such conditions is greatest, because, as each particle burns it also evolves inflammable vapour, and is enveloped in flame which produces corresponding effects upon the immediately adjacent particles. In order to ensure rapid and complete transmission of flame through a mixture of inflammable dust and air, it is essential that the former should be present in great abundance, for the foregoing reasons, and that it should therefore be considerably in excess over the supply of oxygen in the air. The facility with which, under these conditions, flame may be transmitted by a dust-and-air-mixture, with a rapidity calculated to produce more or less violently destructive effects, according to the scale upon which the combustion occurs and the degree of confinement of the burning mixture, has been abundantly demonstrated by accidents, many of them very disastrous, which have occurred in works where large quantities of inflammable dust are unavoidably produced. Thus, in the grinding of sulphur, the inflammation of dust of that substance, consequent upon the over-heating of a shaft-bearing, has produced an explosion sufficiently violent to destroy the chambers within which the operation was conducted. In cotton mills, the accidental ignition of finely divided cotton fibre floating in the air has led to the very rapid spread of conflagrations throughout extensive buildings. Even in a factory where the spent madder, or guaracine, is ground, whereby a much less inflammable dust than that of cotton is produced, an important explosion occurred a few years ago. But the most numerous and extensive calamities of this kind have taken place, and are still of frequent occurrence, in flour and rice mills. Many such explosions, or very rapidly spreading conflagrations, occurring in different parts of the continent and here, prior to 1872, appeared enveloped in mystery, until their probable cause was indicated by an Austrian observer, and soon afterwards made clear by Dr. Watson Smith, and especially by the careful inquiry which Messrs. Rankin and Macadam instituted into the very serious and fatal explosion which occurred at the Tradeston Flour Mills, in Glasgow, in 1872. The origin of this explosion was conclusively traced to the striking of fire by a pair of millstones, through a stoppage in the feed of grain, the results being the ignition of the mixture of flour-dust and air by which the mills, inclosed in a chamber, were surrounded, and the rapid spread of flame to the mixture of dust and air which filled the conduits leading to the exhaust box, which communicated with the several other mills and with the stive-room. In this way flame was so quickly transmitted through and to various channels and confined spaces in different parts of the building as to produce violently explosive effects almost simultaneously in different parts of the buildings. Messrs. Rankin and Macadam ascertained that accidents of this nature had increased in frequency since exhaust arrangements (for collection of the fine flour) had been adopted in the more extensive mills. The precautionary measures suggested by them were, the adoption of efficient precautions for preventing the stoppage of the feed to the millstones, the exclusion of naked flames from the vicinity of these and the dust passages, and the construction of the exhaust boxes and stive-rooms as lightly as possible, and their location outside the main buildings.

The liability to the development of fire or of heat sufficient to char or inflame portions of flour by the stoppage of the feed of grain, appears from all accounts to be extremely difficult to guard against, and to have been the cause of many serious calamities even since the Tradeston explosion, examples of which are the great explosion of six mills at Minnesota in 1878, when eighteen lives were lost and much property was destroyed; and the fatel and destructive explosion of a flour mill at Macclesfield in September last, which has been made the subject of a Report to the Home Office by Mr. Richards, of the Board of Trade. It appears to be the opinion of experienced men in the trade that, although special attention to the feed arrangements may reduce the number of explosions, this cause of accident is almost impossible to guard against; while on the other hand, many fires or explosions, ascribed to it, have been due to the employment of naked lights in mills near localities where the air is laden with flour-dust. Considering that flour- and rice-mill-owners have to bear the the burden of very heavy rates of insurance, it is to their interest, independently of their responsibilities as the guardians of the lives of their workmen, to adopt most stringent regulations and efficient precautionary measures for abolishing this source of danger, and to devote their energies to the application of improved arrangements for reducing the quantity of dust which passes away from the millstones and from other parts of a flour mill.

The important part played by coal-dust, which exists in greater or less abundance in coal-mines, in aggravating and extending the injurious effects of fire-damp explosions, was originally pointed out early in 1845 by Faraday and Lyell, when they reported to the Home Secretary the results of their inquiry into an explosion which occurred at Haswell Collieries in September, 1844. That Report, which was published in the *Philosophical Magazine* for January, 1845, dealt exhaustively with the cause of the explosion, and the means by which a recurrence of such a calamity might be guarded against, and the latter subject was again discussed by Faraday in a lecture delivered at the Royal Institution in February, 1845, and in a letter published directly afterwards in the *Philosophical Magazine*. It is pointed out in Faraday and Lyell's Report, that in considering the extent of the fire from the moment of the explosion, fire-damp must not be supposed to be the only fuel, for that the coal-dust swept up by the rush of wind and flame from the floor, roof, and walls of the working would instantly take fire, and, in support of this statement, they refer to considerable deposits of dust in a partially coked condition which they found adhering to the faces of pillars, props, and walls where the explosion had occurred and the fire had extended. An examination of these deposits showed that the coal was deprived more or less completely of its bituminous constituents, and they concluded from this that the exposure of the dust to the flame of the exploding gas-mixture gave rise to the generation of much coal-gas from it, the carbon, or coke, remaining unburnt only for want of air.

Ten years after the publication of Faraday and Lyell's Report, M. de Souich, an eminent French mining engineer, published, as original, some very similar observations made by him on examining the effects of a coal-mine explosion at Firminy; he noticed, moreover, that men near the pit's mouth had received burns, while others who were in the workings near the seat of the explosion, but out of the main air current, escaped unhurt, and he ascribed this to the action of coal-dust in carrying flame along the principal air-way. Later on, De Souich extended his inquiries into the part played by coal-dust in explosions, and the subject was afterwards pursued from time to time in France by Verpilleux and other authorities in mining engineering, and especially by M. Vital in 1875, when an explosion occurred at Campagnac, the destructive effects of which appeared to him in a great measure ascribable to coal-dust. Vital made experiments upon a very small scale for the purpose of ascertaining whether flame, such as that projected into the air of a mine by the firing of a charge of powder, in a very strong blast-hole, was increased in size by the presence of suspended coal-dust; and soon afterwards Mr. W. Galloway commenced a series of experiments of a similar nature, but upon a larger scale, which he has continued from time to time up to the present date; while Messrs. Marreco and Morison, in connection with the North of England Institute of Mining Engineers, and a committee of the Chesterfield and Derby Institute of Engineers, have also contributed valuable experimental data bearing upon the influence exerted by coal-dust, not merely in increasing the magnitude of explosions resulting from the ignition of mixtures of fire damp and air, but also in propagating or even actually developing explosions, when only small quantities of fire-damp are present in the air of a mine, or where fire-damp is believed to be entirely absent. The conclusion to which Mr. Galloway was led by his earlier experiments was to the effect that coal-dust, when thickly suspended in air, had not the power to originate an explosion, or to carry on to any distance the flame from a blown-out shot, but that the presence in the air of such small quantities of fire-damp (2 per cent. and under) as an experienced miner would fail to detect by means of his Davy lamp, with which the gas is generally searched for, would impart to a mixture of coal-dust and air the property of burning and carrying flame. But he held the view at the same time, that a fire-damp explosion in one part of a mine might be propagated to some extent by coal-dust raised by the effects of the explosion in parts of the mine where no fire-damp existed. Marreco, on the other hand, considered that the results of certain experiments made in the entire absence of coal-dust, by firing shots in air travelling at some considerable velocity, and containing coal-dust thickly suspended in it, warranted the conclusion that coal-dust also might, under certain conditions, originate an explosion as well as carry it on to some considerable extent. The results obtained by the corresponding experiments of the Chesterfield Committee appear to support this view, and Mr. Galloway has also, by his later experimental results, been led to the same conclusion, and considers that the results of his examination into the effects produced by some of the most serious of recent coal-mine explosions (at Penygraig, Risca, and Seaham) demonstrate that those explosions were chiefly, if not entirely attributable to coal-dust.

Notwithstanding the considerable light that was thrown on this subject so far back as 1845 by Faraday and Lyell, and the accumulation of experimental and other observations relating to the action and effect of coal-dust in colliery explosions, these have not until quite recently received the attention which they merit at the hands of mine owners, and many of those in authority connected with coal-mines. Evidence collected by the Royal Commission on Accidents in Mines, from mine inspectors and leading mining engineers (and published with the preliminary Report of the Commission), show the preponderance of opinion to be against the view that explosions could originate, or be to any great extent propagated, by coal-dust, in the absence of fire-damp, though the belief is entertained by many that the coal-dust may be credited with an extension or aggravation of explosions caused by fire-damp. On the other hand, there is a great tendency exhibited always to ascribe explosions which do not admit of satisfactory explanation, by an accidental failure of ventilation or other evident causes, to a sudden disengagement, or outburst, of fire-damp, such as is of no uncommon occurrence in fiery mines, and is sometimes very serious in its magnitude and duration. That such outbursts, following upon falls of roof and the firing of blast holes, have been the cause of many disastrous explosions, there can be no doubt, but, in some instances, the conclusion that an explosion had been due to this cause, is based npon assumptions and upon very doubtful evidence. Under any circumstances, it is extremely difficult to realise how sufficient gas to produce an explosive atmosphere, can be conveyed, even by the most powerful currents, from the seat of such a sudden outburst to far distant portions of the mine, to which the burning effects of an explosion have been found to extend, within the period believed to have elapsed between the first outburst of gas and the ignition of an explosive atmosphere formed in its vicinity. On the other hand, the evidence of severe burning, after an explosion, such as could not be produced by the rapid explosion of a gas-mixture alone, and the deposition of partially burned coal-dust in distinct parts of a mine, distant from each other and from the point to which the origin of the explosion has been traced, seem to leave no doubt that coal-dust has played an important part in many of the explosions which have of late been subjected to rigorous investigation.

The strong impression entertained by many, during the inquiry into the great explosion at Seaham Collieries, in September, 1880, that coal-dust might have had much to do with the accident, and that the explosion was possibly even entirely due to the ignition of coal-dust by a blown-out shot, in the absence of any fire-damp, led to Mr. Abel's being requested by the Home Secretary to make experiments with samples of dust collected in the mine, and to an extension of these experiments to dust collected from collieries in different parts of the kingdom where explosions had occurred.

The results of experiments conducted with great care and on an extensive scale at a colliery in Lancashire, where a constant supply of fire-damp was brought to the pit's mouth from a so-called blower, confirmed the fact demonstrated by M. Vital and Mr. Galloway, that the propagation of fire by coal-dust, when thickly suspended in air, is established or greatly promoted by the existence, in the air, of a proportion of fire-damp, which may be so small as to escape detection by the means ordinarily employed (such for example as exists in the return-air of a well ventilated mine).

It was also established that a mixture of fire-damp and air approaching in proportion those required to be explosive, would be ignited by a flame if only a small proportion of dust were floating in it. Further, it was demonstrated that, although those dusts which were richest in inflammable matter, and most finely divided, were the most prone to inflame and to carry on flame, in the presence of small quantities of fire-damp, some dusts which contain coal only in comparatively small proportions were as sensitive as others much richer in inflammable matter, and that even certain perfectly non-combustible dusts possessed the property of establishing the ignition of air- and gas-mixtures which, in the absence of dust, were not ignited by a naked flame. This action of non-combustible dusts appeared to be due to physical peculiarities of the finely-divided matter, and to be perhaps analogous to the contact-action well known to be possessed by platinum and some other bodies, whereby these bring about the rapid oxidation of gases which, in their absence, may exist intact in admixture with oxygen or air.

Many experiments were tried with sensitive coal-dust from Seaham and other collieries, for the purpose of ascertaining whether results could be obtained supporting the view that coal-dust, in the complete absence of fire-damp, is susceptible of originating explosions and of carrying them on indefinitely, as suggested by some observers, but, although decided evidence was obtained that coal-dust, when thickly suspended in air, will be inflamed in the immediate vicinity of a large body of flame projected into it, and will sometimes carry on the flame to some small extent, no experimental results furnished by these experiments warranted the conclusion that a coal-mine explosion could be *originated* and carried on to any considerable distance in the *complete absence* of fire-damp. Some experiments made in a large military gallery at Chatham showed that the flame of a blown-out shot of 1½ lb. or 2 lb. of powder might extend to a maximum distance of 20 feet, while in a very narrow gallery, similar to a drift-way in a mine, the flame from corresponding charges extended to a maximum distance of 35 feet. These distances are considerably inferior to those which flame from blown-out shots has been known to extend, with destructive results, in coal-mines, and there appears no doubt that, in the latter cases, of which the lecturer gave examples, the flame was enlarged and prolonged by the dust raised by the concussion of the explosion. But, in these examples (with charges of 1 lb. of powder), the flame did not extend much beyond a distance of 100 feet, and therefore the power of the dust to carry an explosion or flame in these cases was limited. It was found, in experiments with the large Chatham gallery, in which the flame from a blown-out shot reached, in the absence of dust, to a maximum distance of 20 feet, that, when the atmosphere was thickly laden with a highly inflammable coal-dust, from Seaham Collieries, the flame was carried on to nearly double, and in one case a little more than double, the distance.

Although it may be very doubtful whether coal-dust, in the *complete absence* of fire-damp, can be credited with the production of extensive explosions, as has been recently maintained by some, there can be no question that, in the presence of only very small quantities of fire-damp, it may establish and propagate violent explosions; and that, in the case of a fire-damp explosion, the dust not only, in most instances, greatly aggravates the burning action and increases the amount of after-damp, but that it may also, by being raised and swept along by the blast of an explosion, carry the fire into workings where no fire-damp exists, and thus add considerably to the magnitude of the disaster. The supposition that extensive coal-mine explosions may be produced by coal-dust alone, in the complete absence of gas, necessitates the fulfilment of conditions which cannot but be at any rate very exceptional, but its acceptance is unnecessary to add to the formidable character of coal-dust as a source of danger and an agent of destruction in mines. The possibility of dealing with the dangerous dust in mines should therefore be as much an object of earnest work as has been the improvement of ventilating arrangements in mines.

The actual removal of dust-accumulations being in most instances impracticable, the laying of the dust by an efficient system of watering the mine ways, is a matter deserving serious attention. Although in some instances such a measure is not readily applicable, without injury to the workings, it has been already proved in some districts to be unobjectionable and susceptible of very beneficial application. The employment of deliquescent substances (calcium chloride, sea-salt, &c.), in conjunction with watering, has also been advocated and tried to some extent with success.

The elaboration of really safe and sufficient methods of getting coal where blasting by powder is now resorted to, and of removing the harder rock in the working of drifts, &c., where fire-damp may exist, must most importantly contribute towards the diminution of danger arising from the accumulation of dust in mines, both by avoiding the projection of flame into the air, and by avoiding powerful concussions, whereby dust is raised; and the lecturer referred in conclusion to the various plans, in addition to coal-cutting machines, which had been devised to dispense with powder, or render its employment safe. The use of compre sed air had been attended by some measure of success, and the dispersion of water, used as tamping, by the explosion of a powder charge in the form of a spray, had been shown to have frequently, though not reliably, the effect of drowning the flame developed by the explosion. The employment of water-columns, by which the force developed by the detonation of dynamite was uniformly transmitted throughout the entire length of the hole, had been proved, by experiments in coal-mines in Lancashire, and special test-experiments at Cardiff, to render that material very suitable for coal-getting, and at the same time to render blasting possible without liberation of flame. Lastly, the employment of cylinders or cartridges of compressed quicklime, according to a simple system elaborated by Professors Smith and Moore, was referred to as ranking before all other methods of getting coal, yet proposed, in point of simplicity, cost, and above all, safety, and the lecturer described operations witnessed by himself with this system of coal-getting at Shipley Collieries. In concluding, Mr. Abel exhorted those interested in, or entrusted with the working of coal-mines, to spare no pains to test rigorously and fairly the merits of any processes or methods of affording promise of dispensing with the employment of powder in the ordinary way, and thus of securing protection to the miner against combined dangers of fire-damp and dust.

THE INFLUENCE OF TEMPERATURE ON CERTAIN SEEDS

On regarding seeds of our hardy trees which are sown in autumn, and which do not germinate before the return of spring, we feel forced to admit that however the other conditions may vary, the cause which causes the germination in the commencement of the fine weather is the rise in the temperature, and one is equally tempted to think that the higher the temperature, as long as this rise does not equal that which would destroy the seeds, the more active and pronounced would be the germination. Nevertheless this is not by any means always the case, at any rate in the seeds of the walnut and almond trees. Anxious to germinate some of these seeds in winter, Prof. H. Baillon thought to obtain a more rapid development in a warm house, in which the temperature varied within the twenty-four hours from 15° to 25° (59 – 77 F.), than in a cool house in which during the same time the temperature varied between 5° and 15° (41 – 59 F.), but the trial proved a failure. In the cool-house, in the course of six weeks, the walnuts had stems of about two decimetres in height, whereas the most advanced of those in the warm house had only stems of from two to three centimetres in the fully developed leaves. The experiment was several times repeated. The same quality of earth, and the same quantity of water was used, and the results were the same. After a space of two and a half months the greater part of the nuts sown in the warm house had only roots occasionally well developed, but little or no caulome outside the fruit. Moreover, the greater part of the walnuts which germinated in a house, where there was good bottom-heat, had roots which did not behave like those of walnuts, germinating in the cool house and without bottom heat, the tap root of the latter grew well in length before any egress of the plumule, whereas the tap-roots of those grown in the warm house were early arrested in their development, and this through growing in a very friable soil, consisting of moist sawdust, much less resisting than the sand or the earth of the cool-house, in which the tap-roots developed so well. This was very nearly the same with the almonds, and would seem to point to the fact that in the case of some seeds there is no advantage to be gained by forcing them. Some, like *Eranthis hiemalis*, at whatever period they are sown in the open air, will develop themselves at a fixed time, as it does in January (H. Baillon in No. 39 of the *Bulletin Periodique de la Soc Linn. de Paris*, January, 1882.)

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

Prof. Henry Alleyne Nicholson has been appointed to the chair of Natural History in Aberdeen, vacant by the removal of Prof. Cossar Ewart to Edinburgh.

Dr. Sorby, F.R.S., has been elected president of Firth College, Sheffield.

The Nottingham University College Committee have appointed Mr. Wm. Garnett, of St. John's College, Cambridge, to the Professorship of Mathematics and Physics, at the College, vacant by the resignation of Prof. Fleming.

SCIENTIFIC SERIALS

American Journal of Science, April.—The wings of pterodactyles, by O. C. Marsh.—Sandstones having the grains in part quartz crystals, by A. A. Young.—Notes on American earthquakes, No. 11, by C. J. Rockwood.—Notes on the electromagnetic theory of light, No. 1, by J. W. Gibbs.—The "timber line," by H. Gannett.—Simple method for calibrating thermometers, by S. W. Holman.—Notice of Fisher's "Physics of the Earth's Crust," by C. Dutton.—Physiological optics, No. III., by W. L. Stevens.—Great dyke of Foyaite or Elœolite-syenite in North-Western New Jersey, by B. K. Emerson.—Notice of the remarkable marine fauna occupying the outer bank off the southern coast of New England, No. 51, by A. E. Verrill.—Determination of phosphorus in iron, by J. L. Smith.

Journal de Physique, March.—On the electro-chemical equivalent of water, by M. Mascart.—Studies on the psychrometer, by M. Angot.—Electric Lighting (concluded), by M. Foussereau. Determination of the ventral segments of sonorous tubes by means of manometric flames, by M. Hurion.—Compensator for measuring electromotive forces, by M. Slouguinoff.—On phosphorographs of the solar spectrum, by M. Becquerel.

April.—On a simple law relative to natural magnetic double circular refraction, by M. Cornu.—Determination of the illuminating power of simple radiations, by MM. Crova and Lagarde.—Measurement of potentials corresponding to determinate explosive distances, by M. Baille.—Study on the combustion of explosive gaseous mixtures, by MM. Mallard and Le Chatelier.—New dry sensitive thermometer, by M. Michelson.

Sitzungsberichte der physkalisch-medicinischen Societät zu Erlangen, 13 Heft, November, 1880, to August, 1881.—On the action of the milk-juice of *Ficus carica*, by A. Hansen.—On the artificial production of double-formations in chickens, by L. Gerlach.—On intra-thoracic pressure, by J. Rosenthal.—On the law of dispersion, by E. Lommel.—A polarisation apparatus from platincyanide of magnesium, by the same.—The germinal plates of Planaria, by E. Selenka.—Contributions to the theory of binary forms, by M. Noether.—Observations on the composition and exchange of material of the electrical organ in the torpedo, by T. Weyl.—On a new way of permanently fixing small anatomical objects for the purposes of demonstration, and preserving them without use of alcohol, by L. Gerlach.—On the compression of drugs, by J. Rosenthal.—On the influence of chemical agents on the amount of assimilation of green plants, by T. Weyl.

Rivista Scientifico-Industriale e Giornale del Naturalista, January 31.—Mode of rendering the Holtz machine more active, by C. Marangoni.—The radiometer and school experiments, by C. Rovelli.—On a Querquedula new to Italy, by A. Fiori.—New applications of the pneumatic method for rapid desiccation of large Orthoptera, &c., by P. Stefanelli.—Preparation of Hemiptera, by G. Cavanna.—Contribution to the study of anthropology of the Southern Provinces, by M. del Lupo.

February 28.—Nephoscope of P. F. Cecchi.—On the synthesis of various organic acids, by Drs. Bartoli and Papasogli, through electrolysis of water and of acid on alkaline, &c., solutions with carbon-electrodes, by P. Guasti.—Differential apparatus for determining the ozone in air, by D. Tommasi.—Observations on the habits and the development of *Æschna cyanea*, Müll., by P. Stefanelli.

March 15.—On *Lebia turcica*, Fab., by F. Piccioli.—Lombard palæontology; fossil fauna of Lombardy, by A. Stoppani.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti, vol. xv. fasc. iv.—On some fossil insects of Lombardy, by F. Sordelli.—Some theorems on the degenerate forms of ellipsoid of Culmann, by G. Jung.—The double quadratic transformation of space (continued), by F. Aschieri.—Geometrical construction of the universal transformation of the third order, by E. Bertini.

Fasc. v.—Reduction of integrals of algebraic functions to integrals of rational functions, by C. Formenti.—What are the most simple and sure means of radical cure of hemorrhoidal varices? by A. Scarenzio.—Aberrations of the sexual sentiment