ITALIAN SCIENTIFIC EXPEDITION TO MONTE ROSA.

REFERRING to the letter published in NATURE (No. 1307, November 19, 1894), we have been able this year to complete our researches on the waters of the Monte Rosa from the highest summit down to the glacial streams and lakes at about 2000 metres above the sea level.[1] Having carried up to our laboratory on the Lavez Alp (2450 m.) a good analytical balance, some quantitative determinations could be made on the spot. As might be anticipated, the amount of suspended matter in the water of the streams issuing immediately from the glaciers varies considerably not only on different days, but even in the same day. While on a cold, snowy day (August 3), the water of the Indren torrent contained 0·011 gr. (per litre) of sandy detritus, sixty times as much (0·66 gr.) was found on August 10, on an exceedingly warm, sunny day. On a regular summer day, with a mean temperature, the amount of suspended matter in the Indren waters varies from 0·010 gr. in the early morning to 0·09 gr. in the afternoon.

This matter is composed of two kinds of sand: one coarser, which sinks to the bottom in a few hours, and can be severed at once by filtering; and a subtler one, which remains permanently suspended in the waters, passes through the paper, and may only be determined by allowing the water to evaporate and extracting the residue with distilled water to dissolve the soluble salts. The ratio of the two kinds of suspended sand varies with the temperature; the finer one being very scarce, about 14·3 per cent. of the total amount on an average day, rising to 42·0 per cent. when the heat is very great, and when the melting of the ice proceeds with great intensity and speed. This seems to indicate a different origin of the two constituents; the coarse sand being perhaps spread over the surface of the ice fields, and the fine one being enclosed within the glacial masses.

In winter the melting of the glaciers is considerably reduced, and the waters of the Lys, which drain the valley of Gressoney, are nearly clear and transparent.

The amount of dissolved matter—the so-called fixed residue—in the different waters is shown in the following table.

	Milligr. per litre.
Loose, granular ice of the Punta Gnifetti (Signal Kuppe 4561 m.)	16·9
Compact ice of a crevasse at the foot of the Vincent Pyramid (3700 m.)	2·4
Compact ice near the Capanna Gnifetti (ab. 3600 m.)	13·9
,, ,, ,, ,, ,,	8·8
Surface ice of the Garstelet glacier (3300 m.)	1·6
Water of the Salzia lake (2670 m.)	27·2
Water of the Gabiet lake (2339 m.)	25·1
,, ,, ,, ,, ...	23·1
,, ,, Sella spring (about 2250 m.)	30·8
,, ,, Indren torrent (about 2400 m.)	16·1
,, ,, ,, ,, (on a hot day)	21·2

The water obtained from the melting of the ice of the glaciers is the purest of all, in some instances nearly as pure as distilled water. It is very interesting to remark that the amount of dissolved salts in the samples taken in the same glacier, and even in the same spot, is never constant; this shows that the different snow and ice streams which descend from the buttresses of the mountain to form one great ice river, while compressed side by side with the others, still retain their own individuality, and are not confounded together in a uniform mass.

The residues of the waters consisted of sodium and calcium, together with sulphuric and hydrochloric acid; sulphate of lime was prevalent in the lakes and in the Sella spring, the latter showed also the presence of carbonates. Iron (dissolved) was found in traces here and there in the ice-waters. The suspended matter (sand) consisted of silicates with a large amount of iron.

As stated in my letter already referred to, the ice of Monte Rosa contains small quantities of ammonia; the maximum, of 0·3 milligr. per litre, was found in a block of ice at the foot of the great Glacier du Lys, about 2150 m. The waters of streams, lakes, and springs show no ammonia; only during a very hot day the waters of the Indren, which were turbid with an unusual amount of sand, contained a little ammonia, which disappeared in a few hours; the oxygenated compounds of nitrogen (nitrates and nitrites) were absent in every case.

[1] *Giornale della R. Accademia di Medicina di Torino*, anno lviii. fasc. 11, 32 pp.

Muntz and Aubin, as well as Boussingault, came to the same results from the analyses of the meteoric and telluric waters collected above or a little below 3000 metres. The absence of nitric and nitrous compounds in the waters of these heights is perhaps to be explained by the mean elevation of thunderstorms, which generally do not reach the 3000 metres in our zone, and to which the synthesis of those compounds from the elements of the atmosphere is mainly due. But many more accurate meteorological and chemical observations are necessary to confirm this hypothesis on a solid ground.

Among the interesting results of our expedition was the discovery of a substance having all the characters of the cryoconite as described by Nordenskiöld, who first discovered and named it. A fine, black, soot-like, light dust, lying at the bottom of lilliputian wells closely spread over the surface of the ice, was collected on the Garstelet glacier, and might perhaps be found on every flat ice-field whose surface is free from the impetuous little rivulets which wash and carry away everything that come in their way.

An immediate analysis of the cryoconite could not be made; I sealed the dust up on the spot in little glass bottles, which were opened later in my laboratory in Turin, when I found that putrefactive processes had taken place; gases, traces of skatol (or indol) together with a fatty (butyric ?) acid had been formed, and the iron—which might have been originally in a metallic condition—was dissolved as ferrous salt, showing the want of oxygen in the air of the bottle.

The presence of organic living matter in the cryoconite is confirmed by the results of an examination of the cryoconite made by Dr. Belli, of the Botanic Institute: he found in the cryoconite:—

Algæ: (Diatomaceæ). *Pinnularia* sp., *Navicula* sp., *Frustulia* sp. (?)
(Cyanophyceæ) *Oscillaria*, sp.
(Chlorophyceæ) *Pleurococcus* sp., *Chroococcus* sp., *Hematococcus pluvialis*, Kh.
Fungi (Bacteriaceæ) *Bacillus* sp., *Bacterium* sp.
,, (Ascomycetes) spores with echinated episporium, difficult to be determined.
Gymnospermæ—Pollen of Coniferæ (Abietineæ ?)

Besides pappi of Compositæ (?) or of Graminaceæ or Cyperaceæ, threads or trychoms belonging to feathery seeds (*Salix*, *Epilobium*, *Clematis* (?).

Of the cryoconite 16 per cent. is organic matter, 3·5 per cent. iron, and the remnant detritus of different minerals.

A study of the distribution of micro-organisms in the ice and waters of Monte Rosa has also been made, and will be shortly published.

PIERO GIACOSA.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

MR. F. W. BURSTALL, Demonstrator of Mechanical Engineering at King's College, London, has been appointed Professor of Civil and Mechanical Engineering at Mason College, Birmingham.

THE London University Commission Bill, which would have passed through the House of Commons this session if all parties had been willing to permit it, has been withdrawn, the Church party having claimed the insertion of a clause embodying a fragment of the Tests Act.

THE action of the North Riding of Yorkshire in adding millinery to the list of technical subjects aided by the funds at their disposal, can hardly be commended. It was not for the purpose of teaching such empirical arts as this, that the Technical Instruction Acts were passed.

THERE does not seem to be a great demand for instruction in technical subjects in Cambridgeshire. At the recent meeting of the County Council a comparative failure of the lectures in agriculture had to be reported, and, following this, one member of the Technical Instruction Committee was understood to say that he supposed the money must be got rid of, but that he did not think it would do sixpennyworth of good! There yet remains much for the advocates of the teaching of natural science to do.

AMONG recent announcements we notice the following:—Dr. Schleiermacher to be Professor of Electro-technics in the Technical High School at Karlsruhe; Dr. Schuberg to be Extraordinary Professor of Zoology in Heidelberg University; Dr.

A. C. Abbott to succeed Dr. Billings in the chair of Hygiene in the University of Pennsylvania; Dr. Franz Hofmeister to succeed the late Prof. Hoppe-Seyler as Professor of Physiological Chemistry in Strassburg University; Prof. P. Jacobsohn to be General Secretary of the German Chemical Society; Drs. Josse and Kämmerer to be Professors of Engineering in the Technical High School of Berlin; Prof. Schmidt, of Stuttgart, to be Director of the Weather Bureau at Würtemburg.

THE Technical Education Committee, in their report to the recent meeting of the Nottinghamshire County Council, called attention to rather an unlooked-for difficulty which had presented itself in connection with their Dairy Institute. It appears that the butter made there is in such request that they had a demand for 1000 lbs. per week, and were actually producing as much as 500 lbs. in this period. The temptation is to convert the institute into a butter-factory, and so into a money-making concern; but the Council supported the Committee in their recommendation that it would be altogether inadvisable to sacrifice the educational interests of the institution to such pecuniary considerations, and that, as in the past, the first aim of the staff must be the instruction of the students.

IT may be thought that the experimental stage in the administration of the Customs and Excise grants to education has been passed, but recent reports seem to negative this idea. The Lancashire committee report that they have been able to allot only eight out of ten science scholarships, the candidates showing a greater preference for the study of art. The Organising Secretary for the Lindsey division of Lincolnshire tells of 868 candidates for technical examinations this year as compared with 1012 last year. We hope that this does not mean that the novelty is wearing off, and that the serious demand for instruction of this kind is really less than had been anticipated. However this may be, there can be no doubt of the wisdom of the grant of £150 by this Council to the Nottingham University College for the year 1896-7.

AT the recent general meeting of the Association of Directors and Organising Secretaries for Technical and Secondary Education the following resolutions were adopted: (1) "That, in the opinion of this Association, it is desirable to ask the Government to receive a deputation to urge upon them the importance of bringing in a Bill early next session dealing with the subject of Secondary Education." (2) "That it is inexpedient to give grants to any non-county borough for building or equipment except upon the terms that such grants shall be returned in the event of such borough becoming a separate educational authority." (3) "That this Association protests against the action of the Science and Art Department in making changes in its grants and regulations for the conduct of its classes without giving due notice to or consulting the local authorities who are so vitally interested in the efficiency of these classes, and particularly urges that the regulations contained in Form 306 be postponed until the issue of the Directory for 1897-98."

THE Organising Secretary for Technical Instruction in the county of Shropshire, in reporting a diminution in the amount of work done in different parts of the county during the past session, observed that it "is ascribable to the vote of the Council in May 1894, by which the fund for technical instruction was reduced to the extent of £3000." This lessening of the grant has been more particularly felt in the towns where the best work was being done by science and art committees. The interruption of a systematic course of training is not, he finds, so serious in rural districts. The diminution complained of is the more to be deplored since already it has been found that the work of the Committee has been productive of practical results, particularly in the ornamental iron and tile manufactories and in the china works of the county. We notice that this Council has provided for the training at suitable institutions of six women as certificated midwives, and that the women have been selected with the view to their being able to follow the calling in parts of the county where there is most need for the services of such skilled nurses.

THE County Committees in charge of technical instruction will do well to take notice of the letter received from the Science and Art Department by the Clerk of the Cornwall County Council, which decides a point of some interest. The letter, which is in reply to a query from the Clerk, runs as follows:—"I am directed to acquaint you that the Department, having already consulted the Local Government Board on the question of the provision of prizes by local authorities, is of opinion that the Cornwall County Council cannot properly apply funds placed at their disposal for the purposes of technical education to awarding prizes (through the medium of local committees) at competitions in agricultural processes to persons other than those who have been taught in classes under the control of, or aided by, the County Council." This decision will prove very salutary, we should think, in view of some of the claims which have been made; for instance, from some districts payments for luncheons, refreshments, ale, spirits, &c., have been demanded—things we should have thought nobody would have supposed connected with technical education.

SCIENTIFIC SERIAL.

Ciel et Terre of July 16 contains an article by M. A. Lancaster, of the Royal Observatory of Brussels, on the intensity of tropical rainfall. There are many points in that zone where the yearly rainfall exceeds 120 inches; such amounts clearly indicate more or less continuous falls of great intensity. The author quotes various excessive amounts observed in periods of twenty-four hours and less, but we extract only a few of the principal falls, reduced to a period of one minute and expressed in inches:—Hong Kong, ·047; Buitenzorg, ·049; Newcastle (New South Wales), ·071; Lahore, ·095; Brussels, ·114; London (Camden Square), ·167. These figures show that the falls of rain in the tropics are not more intense than the extraordinary falls in our own parts, but the former generally exceed the latter in duration; hence the much greater absolute quantity recorded in equatorial regions.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 3.—M. A. Chatin in the chair.—Study of the diamond-bearing sands of Brazil, by M. H. Moissan. From 4·5 kilos. of sand, only 2 gr. of material free from silica was obtained, and this was found to contain a small quantity of gold, platinum and graphite, together with a minute amount of diamond, partly black and partly transparent.—On the oxidation of the organic material of the soil, by MM. P. P. Dehérain and E. Demoussy. At temperatures slightly above 100° the organic material of soil is rapidly burnt by the oxygen of the air. This oxidation still goes on, without any organisms being present, at 40° to 60° C., and hence in hot climates the soil would become sterile from this cause.—On a hybrid from *Ovis tragelaphus*, by M. A. Milne-Edwards.—An extension of the application of the law of equivalence of energy in biology, by M. A. Chauveau.—Remarks on a note of M. A. Lœwy on definite quadratic forms, by M. L. Fuchs. The theorem in question is a special case of a theorem given in a memoir published in the *Sitzungsberichte* of the Berlin Academy.—The conditions under which the deposits of phosphate of lime have taken place in Picardy, by M. Gosselet. It is regarded as established that these phosphatic deposits were formed at very slight depths.—On the integration of simultaneous partial differential equations, by M. E. von Weber.—On a class of isothermal surfaces depending on two arbitrary functions, by M. A. Thybaut.—On the error of refraction in geometric levelling, by M. Ch. Lallemand. The formulæ given in a preceding paper are for practical purposes given in a graphical form.—On the non-refractibility of the X-rays by potassium, by M. F. Beaulard. A prism of potassium gave no appreciable deviation of Röntgen rays, the index of refraction differing from unity by a quantity less than 1/10,000.—Nitrogen and argon in fire-damp and in gas from Rochebelle, by M. Th. Schlœsing, jun. The gas left after removal of methane and carbon dioxide, consisting of argon and nitrogen, on absorbing the latter gave amounts of argon varying from 1·09 per cent. to 3·27 per cent. of the mixture. These figures show that this argon does not come directly from the air, but it is still possible that it may have come indirectly by solution in water, in which argon is the more soluble.—On the specific heat of sulphur in the viscous state, by M. J. Dussy. The specific heat of viscous sulphur is distinctly higher in the viscous than in the liquid state. If the total quantity of heat lost by 1 gr. of sulphur in passing from a temperature T to 0° C. is plotted against the temperature, there is a distinct change of curvature at about 230° C.—Contributions