ledge may be arrived at from the readings of the dry and wet bulb thermometers under different atmospheric pressures. Ben Nevis, with its two observatories, one at the top, the other at the foot of the mountain, would, with a third half-way up the hill, afford unique facilities for the prosecution of this all-important hygrometric inquiry, which would, however, require considerable additions, for the time it is carried on, to the observatories' present appliances and staff."

*St. Elmo's Fire and Thunderstorms.*

"Cases of St. Elmo's Fire are not infrequent occurrences on Ben Nevis. The cases observed have mostly occurred during the night, and during the winter months from September to February. A careful discussion of these cases shows that the weather which precedes, accompanies, and follows has quite peculiar characteristics not only on Ben Nevis but also over the West of Europe generally; indeed, so well marked is the type of weather, and so notorious is it for its stormy character, that it is familiarly known at the observatory as 'St. Elmo's weather.' It is further observed that in almost every case another cyclone, with its spell of bad weather, follows the particular cyclone on the south-eastern side of which St. Elmo's Fire is observed.

"The winter thunderstorms are observed under the identical weather conditions under which St. Elmo's Fire occurs; that is, they invariably occur on the south-east side of the cyclone's centre, with the easterly passage of which they appear to be intimately connected. The thunderstorms and cases of sheet-lightning of Ben Nevis are essentially autumn and winter occurrences, 70 per cent. of the whole having occurred from September to February."

*Electric Currents.*

"Prof. C. Michie Smith has shown that on the edge of a dissolving mist the potential is lower than the normal, but higher on the edge of a condensing mist. Now, almost always when the top of Ben Nevis becomes clear for a short time, a strong current comes up the telegraph cable, while as soon as the summit is again enveloped the current is reversed. The connection between the moisture of the atmosphere and the earth currents is still further shown by the rainfall. During a fall of rain or snow the current nearly always passes down the cable; and in the case of a sudden shower the current has sometimes driven the mirror of the galvanometer violently off the scale. A cessation of the rain or snow generally has an exactly opposite effect. If it be assumed that the summit of Ben Nevis takes the potential of the masses of vapour covering it, and if we consider the earth-plate at the base as the earth, or zero of potential, it is obvious that the results confirm the theory advanced by Prof. Michie Smith, a conclusive proof of which would be of the greatest importance in investigations connected with thunderstorms."

*Dust Particles in the Atmosphere.*

Observations of the numbers of dust particles in the atmosphere have been made by means of the dust-counting apparatus devised by Mr. John Aitken in 1889. The results show a well-defined diurnal period, the number of particles being above the average in the afternoon, and below it in the morning.

"From the whole of the observations on Ben Nevis, the mean is 696 per cubic centimètre, the maximum being 14,400, while on several occasions the minimum fell to 0. In a large number of observations made by Mr. Aitken at Kingairloch, on the west shore of Loch Linnhe, the average number was 1600 particles per cubic centimetre; in London he found, on one occasion, 100,000, and this number was exceeded in Paris."

Many other investigations of a high scientific value have been made by the Ben Nevis observers, and the observations have furnished matter for discussion to a number of meteorologists. But though much has already been done, it is evident from the reports issued by the directors of the observatory from time to time that still more important results can confidently be expected.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE seventh session of the Edinburgh summer meeting ended on Saturday. As regards number of students and scope of studies this meeting is still on the increase. Among the scientific courses may be noticed contemporary social evolution, by Prof. Patrick Geddes, comparative psychology by Prof. Lloyd Morgan, bionomics by Messrs. J. Arthur Thomson and Norman Wyld, history and principles of the sciences by Prof. Cargill Knott, Prof. Geddes, Mr. Bosanquet, and others, physiology of nutrition by Dr. Louis Irvine, a regional survey of Edinburgh and neighbourhood by Mr. J. G. Goodchild, Dr. Beard, Mr. Robert Turnbull, and Mr. S. H. Capper. A healthy sign is the attention given to practical work; thus the afternoon classes of botany, zoology, and geology were wholly practical. The less strictly scientific part of the month's miniature curriculum shows an almost equal development, indeed, so many excellent subjects were offered to the students that it must have been difficult to choose a course of study. Whatever the course selected, however, there is no doubt that the students derived considerable benefit from it.

THE following list of successful candidates for Royal exhibitions, national scholarships, and free studentships, has been issued by the Department of Science and Art:—National Scholarships for Mechanics—William Buchan (Glasgow), Frederick C. Lea (Crewe), James Eagles (Bury, Lancashire), Richard H. Cabena (Glasgow); National Scholarships for Chemistry and Physics—Albert Howard, (Much Wenlock, Salop), Francis R. Penn (Northampton), Andrew N. Meldrum (Aberdeen), William A. Bradley (Lee, Kent), Robert H. Jones (Manchester); National Scholarships for Biological subjects—Arthur O. Allen, (Walthamstow), Robert Sowter, (Brighouse, Yorks); National Scholarships—Charles F. Smith (Glasgow), John B. Chambers (London), John W. Hinchley (Lincoln), Henry J. Loveridge (Southsea, Portsmouth), Bernard C. Laws (Southsea, Portsmouth), Henry T. Davidge (London), Joseph B. Butters (Brighton), Henry H. Clements (Anahilt, Co. Down), Christopher Oathett (Burnley), William Macdonald (Manchester), William N. Platt (Chester); Royal Exhibitions—George S. Blake (Manchester), William H. Atherton, (Newcastle-on-Tyne), Ernest H. Bagnall (Manchester), Frank H. Newman (London), William A. Taylor (Crewe), Joseph H. Ivey (Camborne), Joe Crowther (Brighouse, Yorks); Free Studentships—John Schofield (Huddersfield), Joseph Jeffery (Birmingham), George A. Robertson (Oldham), Charles Kelly (Belfast), John Robinson (Belfast), Edmund F. W. Mondy (London).

## SCIENTIFIC SERIALS.

*American Journal of Science.*—August.—We notice the following papers:—The use of cupric nitrate in the voltameter, and the electro-chemical equivalent of copper, by Frederick E. Beach. Copper nitrate solution of density 1·53 possesses certain advantages over the sulphate in voltameters. It is best to add one drop of saturated $NH_4Cl$ solution. The dependence of the amount of copper deposited upon the current density does not appear until a density of 0·25 ampères per sq. cm. of electrode is reached, and then it is counteracted by adding more $NH_4Cl$. With the nitrate, the weight of copper deposited is practically independent of the temperature between 10° and 35°. The solution may be used a number of times. The equivalent of copper as determined from the nitrate voltameter agrees to four figures with that calculated from the best chemical determinations. But it is essential that the solution should be pure, and especially free from traces of nitrite.—On Mackintoshite, a new thorium and uranium mineral, by Wm. Earl Hidden; with analysis by W. F. Hillebrand. This is the original mineral of which thorogummite, discovered in 1891, is the alteration product. It is an opaque black mineral of hardness 5·5, and resembles zircon and thorite in form. It differs from thorogummite by the further oxidation of the uranium and the assumption of one molecule of water. It contains three molecules of silica, one of urania, three of thoria, and three of water.—On the reduction of nitric acid by ferrous salts, by Charlotte F. Roberts. The volume of nitric oxide disengaged, swept along by carbon dioxide and collected over caustic soda, was measured for the estimation of nitrates. The best results were obtained by passing the gas through KI solution before collecting, and estimating from the total volume of gas collected. Nitric oxide, being slightly soluble in caustic soda solution, must not be left long in contact with it. When the reaction takes place at high temperatures, some higher oxides of nitrogen may be formed, but this is corrected by the KI solution.—Concerning the struc-