burgh to point out why the barometer does not always indicate real vertical pressure. He points out that as the upper currents of the atmosphere when in motion are more mobile than the lower, and less retarded by friction than the lowest, there are frequent movements or "liftings" from the lower to the upper layers, and this affects the barometric column, "the normal upward diminution of pressure which takes place when the atmosphere is at rest being greatly altered when its upper portion is in rapid motion." Mr. Tennent says "the practical conclusion from this is obvious. On weather charts the constant rise and fall of the barometer which is there reported, is to a large extent simply due to the passage of air over a resisting surface; over a surface devoid of friction these mechanical effects would be entirely removed, its rise and fall would be greatly reduced, and might be considered as being solely dependent on the effects of heat and vapour. The gradients and isobars which are dependent upon it would also be similarly affected. The barometer does not indicate the real weight of the atmosphere, it only exhibits the amount of its elasticity from which its real weight can only be deduced when the dynamical element of motion does not enter into one of its currents." . . . "As a general rule, in the British Isles equatorial winds are accompanied by these rapid upper movements, while Polar winds move with a greater uniformity in the velocity of their various layers, and sometimes even those on the surface move more rapidly when copiously supplied from a vertical source. There is hence a remarkable difference in their *mode of inflow*. Equatorial winds as they increase in force are hence accompanied by 'lifting' and a fall of the barometer. Polar winds are not attended by 'lifting,' and if their supply is copious and partly from a vertical source, their increase in force is accompanied by a rise of the barometer. The range of the thermometer is equally great both above and below its mean. But with the barometer the extent of its range above the mean is not more than one-half of that which takes place when it is below it. When it is below the mean, equatorial winds generally prevail which are accompanied by 'lifting' and extensive range. Above the mean, Polar winds prevail which are not attended by 'lifting' or such extensive fluctuations. Hence, as a general rule, equatorial winds exhibit fictitious or dynamical pressure, while Polar winds possess more nearly real or statical pressure, being unaccompanied by the mechanical oscillations due to the passage of air over a resisting surface."

THUNDERSTORMS AT ANTIBES ON MARCH 26, 1877.—Col. Gazan has given a brief account, in the *Bulletin International* for April 18, of three thunderstorms which occurred at Antibes, in the south-east of France, on March 26, possessing certain characteristics well deserving of attention. About 7 A.M. a flash of lightning occurred followed by a clap of thunder, and at 7.10 A.M. a fall of hail without rain, lasting ten minutes. The hailstones were for the most part regularly round, quite opaque, and not bigger than common peas, the largest not much exceeding half an inch in diameter. Clear patches of blue sky in the east and south-west formed a striking contrast to a nimbus cloud in the west, which was connected with the upper clouds. The clouds were absolutely motionless, the air so calm that not a leaf was stirring, and the fall of hail exactly perpendicular. At 11.10 A.M. the sky was entirely overcast, and under the same conditions as before a fresh fall of hail took place, mingled with heavy rain, the hailstones being more equal in size and generally smaller. About 2.30 P.M. a pretty smart shower of rain fell, which, immediately after a flash of lightning followed by thunder, increased in violence, and was accompanied with hail. The largest of the hailstones did not much exceed the largest of those of the two falls preceding. During the whole time there was not a breath of wind until just before the end of the last thunderstorm, when a light westerly breeze sprang up. Col. Gazan infers from the quiescent state of the air, as shown by the absence of motion in the clouds, the perfect calm at the earth's surface, and the regular distribution of the hailstones over the ground, that the three thunderstorms were formed immediately over the place and that the phenomena were unattended with any gyratory movement whatever—conclusions which, if correct, have important bearings on the theory of thunderstorms, and therefore are well deserving of the most careful examination on the part of observers of the phenomena of atmospheric electricity.

METEOROLOGY IN ITALY.—The *Rivista Scientifico Industriale* publishes a "project for the constitution of an Italian Meteorological Society" from the pen of Prof. D. Ragona, director of the Modena Observatory, in which the writer points out the importance of meteorology, and adds that this science owes much to Italy, as it was in that country that the most valuable meteorological instruments, viz., the barometer, thermometer, and rain-gauge, were invented. More than 100 meteorological stations are already in existence, some of which are renowned for exactness of the determinations and delicacy of the researches they have made. They have also the advantage of great variety in their elevations, more than sixty of them being situated between 200 and 2,500 metres above sea level. Several influential persons have already consented to become members of the new society, and amongst them are the Minister for Agriculture, Industry, and Commerce, and Prof. G. V. Schiaparelli, of Milan. We wish the project every success.

METEOROLOGY IN FRANCE.—The prefects of three different departments have published a circular notifying to the mayors of the several communes under their authority the required conditions for receiving daily the weather-warnings issued by the observatory. It is the first time that official action has been taken for the propagation of the system inaugurated by M. Leverrier. The progress made under his direction is very remarkable, and meteorology is becoming very popular in every part of France. The system is to continue on the voluntary principle.

SUNDAY WEATHER WARNINGS.—The weather telegrams sent every Sunday by the British Meteorological Board have been discontinued, as it is only during winter that the taking of observations has been authorised. The head of the Meteorological Office has written to M. Leverrier notifying the fact, and expressing a hope that the Sunday service will be resumed next September. This decision has given rise to some sarcastic paragraphs in the French leading journals, which doubt whether storms will be found strict Sabbatarians even in summer.

GEOLOGICAL NOTES

GEOLOGICAL MAP OF BELGIUM.—Considerable discussion has lately taken place in Belgium regarding a detailed geological map of that kingdom which it has been proposed to construct. The Academy of Sciences, the Geological Society of Belgium, and the Association of Engineers have all formed committees of inquiry as to the best methods of preparing the map. It may interest geological readers to know the scheme which after prolonged discussion has been agreed upon by the Geological Society of Belgium. The organisation of the staff is proposed to include a geological committee charged with the actual survey, and consisting wholly of geologists; a cartographical committee composed of cartographers and geodesists, to take charge of the engraving and publication of the map in chromolithography; a director, as president of both committees, to be appointed by the King, on the recommendation of the geological committee. Each committee is to be independent of the other, and to have the utmost liberty within its own proper sphere of action. The Government, on the recommendation of the Royal Academy of Belgium, names the first five members of the geo-

logical committee, and the additions to this number are made by the Government on the recommendation of the committee itself. The geological committee may nominate for appointment by the Government as associate members, the assistants which it will require for the execution of the work, and it will regulate their remuneration subject to ministerial approbation. This committee will settle the legend of the map, as well as all details which can be regulated in advance; it will determine by whom and under what conditions the geological work is to be carried on, and it will decide upon the memoirs or other works connected with the geology of the country, which are to be published as accompaniments of the map. Each published sheet of the map will bear the name of its author. The geological committee will communicate through the director with the cartographical committee before the final printing off of the sheets of the map. The cartographical committee will comprise five members, including the director-president, all appointed by the Government. The Director will convoke the committees as often as he considers necessary and at least once in three months. It will be his duty to superintend the execution of the work determined by the committees, and to give an account of its progress at every quarterly meeting. He will also present annually to Government a report upon the whole work connected with the map and upon the employment of the funds placed at his disposal. These regulations embody the views of the majority of the Geological Society of Belgium, but from the keen and prolonged debate on the subject (well reported in the *Bulletin*), it is clear that some members of the Society shrewdly foresee the difficulties which are sure to arise if these regulations are finally adopted by the Government. The whole scheme is too cumbrous. Unless the president happens to be a man of singular powers, it will be a matter of herculean labour to get a harmonious and complete result out of the independent work of two committees, who need not be summoned above once a quarter, and who are not compelled to have any direct communication with each other until just before the final issue of each sheet of the map. The actual survey will be made, in part at least, by paid assistants. Their work will be subjected to the criticism of the geological committee, the majority of which may change from time to time, thus affording no guarantee of uniformity of system. The maps, after coming out of the ordeal of this committee, will pass under that of the cartographers, who, it seems, are to have full power to bring out the maps in any style or shape they choose, and who may possibly be quite unacquainted with geological requirements. We can anticipate the astonishment with which some fine day one of the assistants may peruse a published copy of his own "feuille." Perhaps his name engraved at the bottom of the sheet may be the only indication he will recognise of his association in a work with which his connection ceased when he handed his field-maps over to the geological committee. It is to be hoped that the Government will reduce this somewhat complicated machinery. A responsible director, with, if need be, a small council of geologists, palæontologists, and map-makers with whom he might from time to time consult, would be sufficient to organise a staff of field-surveyors and to carry out in fullest detail and in complete harmony a geological survey of the country.

Ice-Work in Labrador.—Mr. H. Y. Hind, who has already published much valuable information regarding the glacial phenomena of British North America, has recently visited part of the north-eastern coast of Labrador, and has prepared some notes of the chief geological results of the journey. His contributions to our knowledge of the glaciation of that part of the world are of special interest, and will no doubt be welcomed by those geologists who still maintain the potency of icebergs and floating-ice over glaciers and ice-cap. He describes the "pan-ice" of the Labrador coast—that is, the frozen sea-water of the bays and shallow seas along the coast, and shows that though in winter it has no lateral motion but merely rises and falls with the tides, in spring and summer it breaks up into pieces or "pans" from a few square yards to many acres in extent. These "pans" pressed by the south-east Arctic current against the coast, and accommodating themselves to all its sinuosities, are pushed over the low islands and promontories with irresistible force, grinding and polishing the hard rocks, rasping the sides of steeper cliffs, and driving before them every boulder and pebble which may be lying on the surface, as well as any blocks which they may be able to detach from the solid rocks. The same kind of action takes place in the shallow seas, the bottom of which, down to a depth of twelve or fifteen feet, is smoothed and planed by the drifting ice. While the prevalent drift is from the north-west out of Davis Strait, a change of wind sometimes brings the endless chain of loose ice back again. The rocks are again abraded and the loose blocks are driven to and fro until they acquire the true boulder-form. In the sheltered depressions of the sea-floor accumulations of *débris* must be taking place like some varieties of boulder-clay. Mr. Hind remarks that this form of ice-work goes on over hundreds of miles of coast. He assumes that it has been the means of smoothing and polishing the rocks of Labrador up to a height of many hundred feet above the sea during the gradual elevation of the land. At the same time he states that though he believes the deep fjords to have been excavated by glaciers, he has found after the most careful search only one example of glacial striæ. An obvious objection will occur to many readers; it may be that the smoothing and polishing of the hills of Labrador has not been done by pan-ice but by solid sheets of land-ice which moved over the country, no doubt grooving and striating it from end to end. All that pan-ice has effected may have been merely the rubbing down of the exposed parts of this general glaciated surface, and the consequent removal of the striæ. The sea-bottom off the Labrador coast freezes in sixty and seventy feet of water, forming what is called "anchor-ice." Seals taken in seal-nets from depths of ten or fifteen fathoms are often found frozen solid when brought to the surface, where, however, they thaw in a few hours. The Labrador climate, as is well known, owes much of its severity to the constant supply of ice drifted past it from the north. Mr. Hind examined thousands of icebergs near at hand last summer, and in only one or two instances did he detect upon them any foreign material. He concludes that true icebergs have little opportunity of transporting rock and *débris*, though he admits that where they ground they may be deepening the water by their incessant rolling and grinding, as the swell of the sea sways them to and fro. He speaks of a loose fringe of such stranded bergs on banks at a distance of ten or fifteen miles from the outermost islands, extending for hundreds of miles along the coast of north-eastern Labrador. These banks intercept the icebergs and prevent them approaching nearer to the land, so that it is only the broken fragments of the smaller "foundered" bergs which enter the fjords and channels.

Human Remains in a Raised Beach.—During the recent long excursion of the geology class of the University of Edinburgh, an interesting find was made in the raised beach to the west of Pittenweem, on the coast of Fife. The storms of last winter have cut away some new slices of the coast, and laid bare fresh sections of the low raised beach which fringes the more sheltered parts of that coast-line. Portions of the skull, arm, and shoulder-bones of a full-grown skeleton were observed protruding from an upper argillaceous layer of the undisturbed gravel of this raised beach. In examining them, one of the phalanges of a child was likewise obtained. Some additional bones were picked up on the beach, but the greater part of the skeleton had no doubt been removed by the waves. From the

position of the bones seen *in situ*, it was inferred by the students that the body had originally been cast ashore by the sea with one arm extended beyond the head, and that in this posture it had been covered up with mud and gravel. The stratum, containing the remains, lay about 4½ feet above the present high water-mark, and was covered with earthy sand.

NOTES

WE regret to see what we must characterise as an unwarranted attack made upon Sir Wyville Thomson in the current number of the *Annals and Magazine of Natural History*, as to the disposal of the specimens obtained by the *Challenger* Expedition. Dr. Martin Duncan appears to have taken for granted that an extract of a private letter which some indiscreet friend of Mr. Alexander Agassiz published in *Silliman's Journal*, and which then found its way into the English journals, is "official." He would have done well to have ascertained whether this was really the case before allowing himself to comment on Sir Wyville Thomson's proceedings in such severe terms. So far as we are aware, out of the many naturalists actually engaged to work out the results of the *Challenger* Expedition, only *three* are not Englishmen, two being Americans, and one German. These three gentlemen are of the very highest repute in their respective branches, and Sir Wyville Thomson has, in our opinion, done well for science to secure their services.

A LARGE and influential deputation of members of both Houses of Parliament, headed by the Duke of Richmond and Gordon, President of the Scottish Meteorological Society, waited on the Chancellor of the Exchequer on Tuesday to advocate that society's claims to State assistance. Sir Stafford Northcote said that the Treasury was prepared to grant 1,000*l.* for services rendered to Government during the past twenty years, and as regards the future he promised to consider the matter.

MR. J. RUSSELL REEVES, F.R.S., after whom that magificent bird Reeves' pheasant was named, died on the 1st instant at Wimbledon, aged 73. As a young man in the H.E.I.C.'s service in China, Mr. Reeves contributed not a little to our knowledge of the flora and fauna of that country, several new plants and animals having been sent home or described by him. His love for natural history continued to the time of his death, and for some time he kept up a good aviary at his house at Wimbledon.

THE Rhind lectures, delivered in Edinburgh by Dr. Arthur Mitchell, on the condition and antiquity of the cave-man of Western Europe, in other words the early, or earliest European of whom we have any knowledge, were brought to a close on Friday last. Dr. Mitchell showed that the cave-man's weapons of the chase and war were made of bone or horn, and highly finished, while his implements of stone were extremely rude, and calculated chiefly to serve as tools in the making of his bone implements, thus placing him in the bone rather than in the stone age of civilisation. From an elaborate examination of the objects which the cave-man has left, displaying an art-faculty, and from the study of the crania of the cave-people themselves, he showed that they must have possessed a high capacity for culture in all directions, and must have been as complete in their whole manhood as living Europeans. From an exhaustive examination of the cave-fauna, and of the actual fauna of Western Europe, Dr. Mitchell gave reasons, which certainly call for grave consideration on the part of archæologists, for believing that the antiquity of the cave-man of Western Europe is to be measured by a few thousands, and not by tens or hundreds of thousands of years.

THE Anthropological Institute will hold a Conference at 4, St. Martin's Place, Trafalgar Square, on May 22, on the Present State of the Question of the Antiquity of Man, when the following papers will be read:—Prof. Boyd Dawkins, F.R.S.—"On the Evidence Afforded by the Caves of Great Britain;" Prof. McKenny Hughes—"On the Evidence Afforded by the Gravels and Brick Earth;" Mr. R. H. Tiddeman.—"On the Hyæna Bed in the Victoria Cave." Communications have also been solicited from foreign anthropologists.

THE Paris Acclimatisation Society distributed its medals last Saturday at the Vaudeville. One of them was awarded to Mr. Alfred Mosenthal, Consul of the late Transvaal Republic, for his admirable work on the acclimatisation of the ostrich. Successful experiments on his system have been made on a large scale in Algiers.

MR. ETHERIDGE writes to the *Times* with reference to his examination of the red and green shales found below the depth of 1,073 feet in the boring at Meux's Brewery, and of which Prof. Judd spoke in a recent article in NATURE on Deep Well-borings in London. He states that the evidence now shows them to be of palæozoic age, and of the continental type of Devonian rocks containing the molluscan fauna of that period.

AT the April session of the German Geological Society Herr Speyer exhibited a number of fine palæontological specimens belonging to the Permian formation, obtained at a depth of 242 metres from borings in the vicinity of Memel. The twenty-five species found embraced eleven molluscs, five entomostracæ, two bryozoa, &c. Although nearly all of them are represented in the Lower Permian of Thuringia, Hesse, and Wetterau, but one-third of the number are found in the corresponding English formations. The above-mentioned borings yielded in the midst of the Permian formation occasional specimens of dolomite, with crinoidal stems and imperfect remains of brachypods, belonging properly to the Devonian.

THE monument to Liebig to which we have previously referred, was unveiled at Darmstadt, his birthplace, on the 12th inst., the seventy-fourth anniversary of his birth.

THE Annual Meeting of the Cumberland Literary and Scientific Association was held at Keswick on the first three days of the present month. This association, as we have previously intimated, is formed of a large number of local Cumberland societies, and both its first and its recent meetings have been highly successful. The idea of thus associating the various local societies of a county is admirable, and we would strongly recommend its universal adoption. The president at the last meeting was the Bishop of Carlisle, who gave a really interesting and fairly liberal address on the "Analogies and Contrasts between Human and Divine Science," the greater part of which consisted of an account of some recent advances in physical science. Several other papers were read, nearly all of them scientific, and more or less on subjects connected with the district. The new president is Mr. Isaac Fletcher, M.P., F.R.S., and the next meeting will be held at Cockermouth in May, 1878.

COMMANDER PERRIER read a paper at the last meeting of the Geographical Society of Paris, on the determination of the longitude of Algiers by telegraphy. The exact longitude is 2′ 50″·21 east from Paris, the probable error being only 0″·01. The time required for the transmission of the electricity from Paris to Marseilles was found to be only $\frac{2}{100}$ of a second; the distance between these two cities being 863 kilometres, it shows that the velocity of the electricity was not less than 46,000 kilometres per second. Similar experiments tried on the submarine cable between Algiers and Marseilles proved that the time required to travel was $\frac{23}{100}$ of a second; for a distance of 926 kilometres this shows a velocity of only 4,000 kilometres. But the battery used for signalling in the aërial line was composed of 100 elements,