

Miscellaneous.

SEA-WATER.—Hercules Tonno and L. Schmelck state that they have been examining sea-water drawn at different depths and at remote points, and have detected but very slight differences in composition. Certain variations in the specific gravity were due to a dilution of sea-water by the continued introduction of ice or fresh-water, but the respective proportions of the various salts remained the same.

CAUSES OF THE FERTILITY OF LAND IN THE CANADIAN NORTH-WEST TERRITORIES.—Robert Bell showed, that, with local exceptions, a vast fertile tract stretches from the Red River valley to the Lord River, a distance of some fourteen hundred miles, characterized by a dark loamy soil of varying depth and nearly homogeneous consistency. The primary cause of the fertility of this region may be found in the character of the subsoil, which consists largely of cretaceous marls and the comminuted material of the glacial drift. The speaker ascribed to moles and other burrowing animals the chief agency in the process by which the black loamy soil was formed out of this subsoil. Darwin had proved that in England and some other countries earth-worms played the chief part in the formation of mould. These worms appear to be absent in the north-west, as well as in most cold and sparsely settled countries, perhaps due to the depth to which frost penetrates. But in the north-west he believed the ground squirrels and moles more than made up for the absence of worms. In the fertile area referred to, the old and new mole-hills cover the entire surface, rendering it "hummocky," as is easily observed after a prairie fire. These animals are very active in autumn, digging many more burrows than would appear to be of any use to them. Each hummock thus thrown up covers about a square foot, and buries all the grass, etc., on this space. In this manner large quantities of vegetable matter were ultimately incorporated with the soil, which was also refined by the fact that the stones and coarse gravel are left undisturbed below the surface, so that in time they are more deeply buried by the layer of mould produced. By an interesting coincidence at the season when these burrowing animals are most active, the prairie vegetation is mature, and contains the greatest amount of substance. The coldness of the soil during a great part of the year tends to preserve the organic matter in it. While the circumstances given were the direct cause of the fertility, the ultimate reason was perhaps to be looked for in the climate, which fosters the growth of such vegetation as forms both the fertilizing material and the food of the little workers, who mingle it with the mineral portion of the soil. The action of frost in comminuting the soil does not account, by itself, for the introduction of the organic matter upon which its fertility depends, and which is due to the co-operation of the circumstances and agencies described.

GROWTH OF THE SKULL IN DOGS.—M. Lacassagne having communicated to the biological society of Lyons a paper on the cranial dimensions in man in their relation to social condition and intellectual culture, Dr. Arloing has followed up the subject upon dogs. Discarding the merely instinctive faculty, attention was paid only to the intellectual. The subject of weight and race was so far considered as to render it easy to make allowance for these, since the average weight of the well-known breeds is known everywhere. The following table tells its own story:—

	Weight of the skull. Grams.	Weight of brain. Grams.
St Bernard.....	100.39	387
Large spaniel (Grand epagneul).....	85.5	695
Bull, medium size.....	81.14	205
Bull, small size.....	53.2	110
Little spaniel.....	50.7	67
Loulou.....	53.9	62
Havana.....	73.6	60
King Charles.....	50.7	45

The brain of a small ape weighs from seventy to seventy-five grams. We see from the table that the weight of the head is doubled, while the weight of the brain is eight times greater, between the extremities of the table. The difference would be much greater if we could compare the weight of the brain with that of the body. The conclusion reached is, that education increases the dimensions of the skull in animals as in man.

THE LIQUEFACTION OF NITROGEN.—M. S. Wroblewski & K. Olszowski announced to the Académie des Sciences on the 23rd of April the complete liquefaction of nitrogen. Nitrogen cooled in a glass tube down to -136°, and submitted to a pressure of 150 atmospheres, remained gaseous—nothing could be seen in the tube. If the gas is allowed to escape slowly, and the pressure is not allowed to fall beyond fifty atmospheres, the nitrogen is completely liquefied, presenting a very distinct meniscus, and evaporating rapidly.

FAIRY RINGS.—An interesting contribution to our knowledge of so-called "fairy rings"—those circles of dark green grass which not infrequently occur on pasturo-land—will be found in a late number of the *Journal of the Chemical Society*. The luxuriant growth of the grass constituting the ring is connected with the decay of certain fungi which pre-existed on the spot and have yielded mineral and nitrogenous products which serve as manure to the grass that succeeds them. Sir J. B. Lawes, Dr. J. H. Gilbert, and Mr. R. Warington have analysed the soils of the fairy rings with the view of throwing light on the source whence the fungi derive their nitrogen. It seems fair to conclude from their experiments that the fungi obtain this element not from the nitrogen of the atmosphere, as formerly supposed, but from the organic nitrogen of the soil.

FORMATION OF COMETS' TAILS.—In a recent paper, Mr. Ranyard gives some further details with regard to his theory as to the formation of comets' tails. He points out that the experiments of Prof. Graham and the more recent investigations of Prof. Wright show that all classes of meteoric bodies hold gas as a sponge holds water. When the meteorites are heated in the laboratory the occluded gas escapes, and as a swarm of meteoric stones in space comes up to perihelion and is heated by the sun, the occluded gases must be driven off. At a distance from the heated nucleus, whose radiation into space can take place freely in all directions, Mr. Ranyard conceives that a mist is formed by the condensation of the less volatile gases. The particles of mist will be bombarded on the side towards the nucleus by the swiftly moving molecules of the more volatile gases escaping from the heated meteors. Condensation on the surface of the mist particles and evaporation from their sunward sides will be set up, and repulsion of the mist from both the sun and nucleus will follow. According to Schiaparelli's theory a comet's nucleus consists of a swarm of meteoric stones; according to Mr. Ranyard's development of this theory the tail is due to a very thin mist formed from the condensation of occluded gases, the particles of which are driven backwards by the recoil due to evaporation towards the sun.

GLACIATION OF NORWAY.—H. M. Cadell describes the plateau mountains of Norway as an old surface of denudation, now lifted above its former base level of erosion, and greatly roughened by subsequent erosive action. He agrees with Penck in maintaining that there is a fundamental difference between Swiss and Norwegian glaciers; the former originating in sloping fields of *névé*, while the latter are overflows of upland ice-sheets. Three glaciers descend from the ice of the Folgefond, and twenty-three from the great Jostedal ice plateau. These upper sheets are regarded as small examples of the present Greenland ice, and as remnants of what once "extended over the whole of northern Europe." The folds are described as "most typical examples of true ice formed rock-basins," and it is stated that there is no evidence of fracturing or faulting in the rocks about them (although Kjerulf has shown the contrary statement to be true).

INCREASED DEMAND FOR BUTTER.—A German technical journal points out that the increase of population, with a decrease of cattle in civilized countries, increases the demand for butter to such an extent that before long all the available fat will be demanded for making "compound"; and as the makers of that can afford to pay a higher price than soap-boilers, the latter will have to dispense with fat altogether.

AN OLD IDEA UPSET.—Dr C. C. Abbott, of the Trenton, N. J., Natural History Society, has destroyed another old belief in weather lore. For twenty years he has kept a record of the building of their winter houses by the musk-rats, the storing of nuts by squirrels, and other habits of the mammals which are commonly regarded as indicating the character of the coming winter. His conclusion is that the habits referred to have no connection with the rigour or mildness of the approaching season.