LETTERS TO THE EDITOR.

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Crô Magnon Man: Imprints of his Hand.

WHILE visiting lately the painted caves of the Cantabrian Mountains (north Spain) with Prof. Boule, who had kindly invited me to accompany him, I took advantage of this opportunity to study the imprints of the human hands which occur on the walls of some of those caves, notably of Castillo.

It is well known that at Gargas and elsewhere the imprints are those of a small hand, such as might have belonged to the Grimaldi race, and one such small imprint I observed in the cavern of Altamina.

But in Castillo—so admirably described and illustrated by the Abbé Breuil—I was surprised to find that all the impressions indicate an unusually large hand. With the permission of Dr. Obermaier, and the kind assistance of Mr. Burkitt, I was able to obtain tracings of seven of these, and two of them are complete enough for detailed study. One is 190 mm. in length, measured from the tip of the middle finger to the wrist, the other about 200 mm. This accords with the

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

length of the Crô Magnon hand as indicated by the description of the skeleton given by Dr. Verneau.

This, however, is not all. When a tracing of one of the Castillo imprints is superposed on a tracing of the hand of a living subject (Englishman) having the same length, a characteristic difference is at once perceived. The fingers of the Castillo hand are shorter than those of the Englishman, and the equality in the total length is produced by the greater length of the palm. But this is a peculiarity which must have occurred in the Crô Magnon hand, for Dr. Verneau has shown that in the Mentone skeletons the metacarpals are disproportionately long when compared with the phalanges.

I have made some preliminary measurements of tracings taken from the hands of twelve tall Englishmen, ranging from 5 ft. 8½ in. to 6 ft. 0½ in., with a mean of 5 ft. 11 in. (thus of about the Crô Magnon stature). Dividing the length of the middle finger by the length of the palm, I obtain 0.87 as the mean index, with a range of 0.77 to 1.0; while the most complete of the Castillo hands gives 0.765 and the next best 0.72 to 0.76.

Thus the existence of two distinct races in the Aurignacian age, already indicated by the Mentone skeletons and the carved statuettes, receives additional confirmation.

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Cellular Structure of Emulsions.

IN reply to the letter of Prof. Kerr Grant in NATURE of April 16, similar phenomena to those which he describes have been found to occur with minute motile organisms in water, and with sediments of various kinds in water and other liquids. I have given an account of some of these appearances in my paper on the effect of gravity on the movements of micro-organisms in the Transactions of the Royal Society, series B, vol. cci., pp. 333-390. I have also obtained similar groupings with the fine sediment which is formed in a hypo-alum bath, used for toning and fixing P.O.P. prints. If a small quantity of this is poured into a shallow vessel, the particles which are at first evenly distributed through the liquid soon become aggregated into groups similar to those described by Prof. Grant.

In the case of *Euglena viridis*, the living organisms in the dark become aggregated into groups as shown in Fig. 1, the central dark mass in each group consisting of a stream of *Euglenæ* moving downwards, the lighter peripheral area consisting of *Euglenæ* moving upwards. Various sediments when allowed to settle in liquids become aggregated in a similar manner, but without the continuous up and down movements. Thus Fig. 2 shows a sediment of osmium dioxide settling in dilute glycerine, which closely resembles the aggregation of the living cells shown in Fig. 1.

In all the cases observed by me the regular grouping appears to be preceded by the formation of a network, as shown in Fig. 3, formed by manganese dioxide settling in a solution of gum arabic. Again, if a readily oxidisable photographic developer is poured into a flat dish to form a layer about 1/16 in. deep, the brown oxidised film which forms at the surface is at once broken up into a network, Fig. 4, which gradually becomes resolved into separate groups.

I have suggested that these groupings are in all probability cohesion figures, and that they may be related to the beautiful cohesion figures described by the late Mr. C. Tomlinson in the *Philosophical Magazine* for 1861 and 1864. They are probably formed whenever we have fine particles free to move, placed under such conditions that a force or forces, acting in opposition to the cohesion of the particles, can be brought into play. Cohesion, surface tension, diffusion currents, and gravity are among the forces probably concerned in the effects observed.

Prof. Grant's suggestion that the flocculi in the solar photosphere and in cloud formations of flocculent type may be related to this phenomenon is interesting. Such flocculent appearances can also be observed, under certain conditions, in ponds and pools which contain dense aggregations of motile micro-organisms, and I have very little doubt that the net-