

SCIENTIFIC SERIALS.

American Journal of Science, August.—The earth a magnetic shell, by Frank H. Bigelow. This paper gives the vectors of the polar magnetic field at the earth due to the sun, together with certain deductions from their intensity and distribution. Unless the magnetic permeability of the interior of the earth is less than 1, which is highly improbable, the polar vectors obtained must be interpreted as stream lines flowing round an obstacle in the interior of the earth. In other words, the outer stratum of the earth is permeable to the external magnetic forces, while the nucleus is not; that is to say, the earth is a magnetic shell. The diameter of this impermeable nucleus is calculated at 6340 miles, and the thickness of the shell at 790 miles. The external polar field is concentrated in two belts, one of which is the auroral zone round the poles, and the tropical belt at the two tropics. It is a pity that most magnetic observatories are placed on the mid-latitude depression. Since both the magnetic and the electromagnet vectors represent cosmical forces of the same type as gravitation, connecting the sun with the planets, they should be taken into account in general theoretical astronomy, or the celestial mechanics of the solar system. It is possible that certain irregular motions as yet unexplained may be accounted for on the basis of these additional forces.—On the velocity of electric waves, by John Trowbridge and William Duane. The apparatus used for photographing successive sparks whose images were thrown on the plate by a revolving mirror, was substantially the same as previously described; but the dielectric used was plate glass, and the terminals were made of cadmium. The average value for the velocity of electric waves travelling along two parallel wires was 3.0024×10^{10} cm. per second, a value which differs from the velocity of light by less than 2 per cent. of its value, and from the ratio between the two systems of electromagnetic units by even less.—On the distribution and the secular variation of terrestrial magnetism, by L. A. Bauer. The distribution and the secular variation appear to be closely related, they obey similar laws, and seem to be connected in some way with the rotation of the earth. The following are some of the laws traced by the author: The mean declination along a parallel of latitude is always westerly, the minimum occurring near the equator. The mean inclination along a parallel of latitude follows quite closely the law: $\tan I = 2 \tan \phi$ where I is the inclination and ϕ the geographical latitude. The minimum range in declination, and the minimum average secular change from 1780 to 1885 along a parallel of latitude occurred near the equator, the values generally increasing upon leaving the equator. The corresponding values in the case of inclination were maxima, and decrease upon leaving the equator.—Complementary rocks and radial dykes, by L. V. Pirsson. "Complementary rocks" are such that if the basic types are combined with the accompanying acid types, they give the composition of the main type of magma with which they are associated.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 1.—Dr. E. Lindon Mellus gave the results of experimental lesions of the cortex cerebri in the Bonnet Monkey. The experiments were confined to the left hemisphere, and consisted in the removal of minute portions of the cortex (generally about 16 sq. mm.) representing the centres for movements of the hallux and thumb, as well as several centres within the facial area. The animals recovered from the operation without any sign of sepsis, and were killed from ten to thirty-five days after the operation, the brains and cords hardened in Müller's fluid, and stained by the Marchi method. Numerous association fibres, both coarse and fine, connecting the lesion with the surrounding cortex, were found degenerated. These were always most numerous in the immediate neighbourhood of the lesion, and mostly distributed to the two central convolutions.

From lesions in the hallux centre degenerated association fibres were distributed to both central convolutions to the level of the inferior genu of the fissure of Rolando, to the parietal lobule, to the posterior portion of the superior frontal convolution, to the lobulus paracentralis, precuneus, and the gyrus fornicatus. Degenerate fibres crossed in the middle third of the corpus callosum and were distributed to corresponding portions of the right cortex, the degeneration on the right side

being considerably less than on the left. In the lower levels of the left internal capsule the degeneration was scattered over the area of the middle third of the posterior limb, being somewhat anterior to its position in higher levels. From the posterior limb of the internal capsule most of the fine degeneration passed into the optic thalamus, while the coarse passed on into the crus, where it was found in the middle third. Many coarse degenerate fibres passed from the crus into the substantia nigra. At the decussation of the pyramids the tract divides, the larger portion crossing to the opposite lateral column, while the smaller goes to that of the same side. The amount of degeneration passing to the lateral column of the same (left) side varies from a third of all the degeneration in one case to about a twentieth in the others. In each case a few degenerate fibres remain in the left anterior column after the completion of the decussation. The amount varies in different cases, and is not apparently dependent on the proportion of degenerate fibres passing to the lateral column of the same side. The relations and extent of the degenerated areas remain unchanged throughout the cervical and dorsal cord. The degeneration in the crossed tract of each side is evenly scattered over its entire area, the two sides only differing in the density of the degeneration. In the lumbar region the degeneration in each crossed tract and in the left anterior column begins to go out, and, in the only case examined at that level, the degeneration had not all disappeared at the level of the third sacral root.

In lesions of the thumb centre (ascending parietal convolution just above the inferior genu of the fissure of Rolando) degenerated association fibres were distributed to the central convolutions from the border of the longitudinal fissure nearly to the fissure of Sylvius. To a less degree, but in varying amounts, degenerate fibres were traced to the posterior portions of the middle and inferior frontal convolutions, to the supra marginal and angular gyri, the upper or posterior portion of the superior temporal convolution, the precuneus and lobus quadratus and paracentralis and the gyrus fornicatus. Degenerate fibres crossing in the middle third of the corpus callosum were distributed to the corresponding convolutions of the right side, though less in amount and area of distribution. There was a remarkable variation in the size of the fibres distributed to the central convolutions of both hemispheres, being coarse above the level of the lesion and fine below, thus corresponding with the measurements made by Bevan Lewis of the corpuscles of the fourth layer of the cortex in this region. The arrangement and distribution of the degeneration in the posterior limb of the left internal capsule was the same as in lesions of the hallux centre, and there was the same passage of fine degeneration from the capsule to the thalamus. The amount of coarse degeneration passing from the crus to the substantia nigra was much greater than in lesions of the hallux centre, varying from a half to nearly the whole of the degeneration reaching the crus. In one case only was there a division of the degenerated tract at the decussation of the pyramids such as was observed in lesions of the hallux centre, and the amount of degeneration passing to the left lateral column was less than in either of the hallux cases. This was also the only case in which a few degenerate fibres remained in the left anterior column after the completion of the decussation. In two cases some degeneration was found in the right capsule and crus occupying the same position and following the same course as the degenerate fibres in the left capsule and crus, but its direct connection with the lesion could not be demonstrated. From the level of the seventh cervical root downward the degenerate fibres steadily and gradually disappeared, and at the level of the third dorsal root there were none left, thus confirming the results obtained by excitation of the nerve roots.

The lesions within the facial area were, with one exception, along the upper border of the fissure of Sylvius. The single exception was in the ascending frontal convolution near the inferior genu of the fissure of Rolando. In all these experiments the degenerate association fibres were mostly distributed to the central convolutions, but in some instances to the posterior portions of the middle and inferior frontal, the superior and inferior temporal convolutions, and the supra marginal gyrus. The degeneration in the corpus callosum was mostly in the anterior half of the middle third, and the distribution of degenerate fibres to the convolutions of the right hemisphere more nearly corresponded to that of the left than in lesions of the hallux or thumb centre. In all the lesions of the facial area the degenerations in the uppermost levels of the capsule were in the anterior portion, gradually moving backward in the lower levels until they were