otherwise alter until the field quickly became dark owing to the fusion of the crystal. This seems to indicate that the change in structure begins quite independently of the formation of the reflective layers, the latter being only an incident occurring at a particular stage of the cooling.

(6) It would seem that something of the following kind happens to the crystal. It is, of course, anisotropic in structure, and the effect of heat is to set up a molecular strain which at a certain point of temperature causes so strong a shearing action between nearly contiguous layers of the substance that whole rows of crystal elements lying between these layers are rolled over, as it were, by the "couple" applied to them, until they take up their "second positions of equilibrium," as M. Mallard would say (see his paper "Sur la Théorie des Macles," *Bull. Soc. Min.*, December 1885, p. 467). If these latter positions were such as to bring the *obtuse* bisectrices (supplementary lines) into parallelism with a normal to the main plate, the occurrence of the hyperbolas above described would be fully accounted for. Such an action would be of the same general character as that which takes place in calc-spar when macles are being developed in it by Reusch's method; viz. by carefully compressing a crystal of it in a definite direction (*Pogg. Ann.*, vol. cxxxii. p. 445), I have succeeded by properly regulating the direction and amount of the pressure in making spar-macles containing numerous "planes of sliding" (*Gleitflächen*, as Prof. Reusch calls them), which reflect light with a pearly lustre, and almost as brightly as the potassium chlorate macles described above.

It has yet to be explained, however, why the intense reflective power does not show itself during the process of heating, when the tilting over of the crystals would certainly take place, and not until a particular stage of the cooling is reached. I am inclined to believe that this may be due to the substance acquiring a certain amount of plasticity at high temperatures, such as has been observed by M. Mallard in crystals of nitre under similar circumstances. This may prevent any loss of optical continuity until a certain critical point in the cooling has been reached; and at this point the displaced crystal elements suddenly part company with their unaltered neighbours, leaving a numerous series of parallel tubular cavities, precisely like those which are undoubtedly present in calc-spar macles formed by Reusch's method. The opposite sides of these parallelogrammatic cavities may be so near each other that the rays reflected from them may interfere, and give the colours of thin plates corresponding to a rather high order in Newton's scale. Although a large amount of light must escape reflection at any single cavity, yet if the transmitted rays encountered a large number of precisely similar and similarly situated cavities at slightly lower levels in the crystal, the sum of the partial reflections would produce an effect almost equivalent to a total reflection of the original incident ray, and a corresponding deficiency in the amount of light transmitted through the whole plate. The brilliancy of the colours in the light reflected from the well-known films of decomposed glass is accounted for in precisely the same way, and the successive separate films of glass can be easily seen under a microscope at the edges of the compound film, where they only partially overlap.

The fact that no brilliant reflection is observed in and near the plane of symmetry of the crystal may be due to the sides of the cavities in a given horizontal row not lying strictly in the same plane, but being slightly inclined alternately in opposite directions, so as to form a series of anticlinals and synclinals, or ridges and furrows like those of a roof. Thus a beam of light incident in the plane of symmetry would be reflected in directions lying a little to the right and left of this plane, and not in the plane itself. The satin-like appearance of the reflecting layers, already alluded to, would be fully accounted for by such a structure.

The changes above described seem of interest as bearing upon the cause of the strong iridescence of some crystals of potassium chlorate, about which I may have something to say in a future communication. H. G. MADAN

Eton College, May 10

SCIENCE IN RUSSIA

THE last volume of the *Memoirs* of the Kharkoff Society of Naturalists (vol. xviii.) contains several papers of interest. All who have had to deal with Acarides, and are acquainted with the difficulties of their classification, will welcome the elaborate memoir, by M. Krendowsky, on the Hydrachnids of Southern Russia. It is not a mere description of forms, with a more or less happy classification, but an elaborate contribution towards the systematic arrangement of this imperfectly-known subdivision. The embryogeny of the Hydrachnids, and especially their larval phase, have received special attention, no satisfactory classification being possible without that preliminary study. It appears also from M. Krendowsky's researches that many Hydrachnids of Southern Russia are really temporary parasites on several insects, mollusks, and sponges, especially when young and in the state of six-footed larvæ. The Hydrachnids of South-Western Russia belong to thirty-five species (nine species each of *Nesæa* and *Arrenurus*, five of *Atax*, and four of *Limnesia*); the author has been led to revise the whole of the classification of the freshwater Acarides, and gives it complete, with analyses of each family, as well as of the very numerous genera.

Another paper of great interest is devoted by the same author to the estuaries of the Bug, Dnieper, and the smaller ones in the neighbourhoods of Kherson and Odessa. This paper is full of the most useful information as to the characters and geological history both of these estuaries and the *limans*, which are now shut off from the sea by their sand-bars, and have become mere elongated salt lakes.

Prof. Lewakowsky contributes to the same volume a paper on the Jurassic limestones of the Crimea, based especially on their micro-structure. It appears that they mostly contain very small debris of corals and rhizopods; they are not coral structures, as was supposed, but have much likeness to what Dana describes as beachsand-rock. Like the clay-slates of the same formation in the Crimea, they have been deposited in a wide basin which extended into Kherson and Ekaterinoslav, and they were composed of materials brought from the south, from a continent which occupied part of what is now submerged by the Black Sea. M. Genjouriste's researches into the microscopical structure of the coal of the Donez Basin are interesting inasmuch as they show that the prevailing materials for the formation of this coal were the higher vascular Cryptogams, and not Algæ, as was sometimes supposed by Russian geologists. Dr. M. Dybowsky's additional note on the Spongilla *Dorvilia stepanovii*, one of the most interesting discovered in Europe, contains a description of the structure of its gemmulæ, with the porous and "cirrous appendages." The note, as also the preceding papers, are accompanied by several plates.

SCIENTIFIC SERIALS

The Quarterly Journal of Microscopical Science, vol. xxvi. part 3, April 1886, contains a memoir on the leeches of Japan, by Dr. C. O. Whitman (plates 17 to 21). A short abstract of this important memoir has been given in our Biological Notes.—Contributions to the embryology of the Nemertea, by Prof. A. A. W. Hubrecht (plate 22). No. 1 is an account of the development of *Lineus obscurus*, Barr. These investigations, already published in the Dutch language, are fully detailed in this paper, and the plate gives the details of the principal results, combined into fifteen diagrammatic tracings. In one section the earliest developmental stages and the derivatives of the primary epiblast; in a second the hypoblast before the shedding of the primary larval integuments; and in a third the mesoblast, are treated of.—On the early development of *Julus terrestris*, by F. G. Heathcote, M.A. (plates 23 and 24). This is the first part of an essay on a subject not treated of by British naturalists since the days of Newport. It treats of the segmentation of the ovum, which shows a remarkable resemblance to that found in Amphipods by Uljanin. The formation of the blastoderm is such as is generally found in tracheate development. The cells, which at the conclusion of the blastoderm formation remain within the yolk, represent the endoderm. The mode of formation of the mesoderm almost exactly resembles that described by Balfour for spiders. In a future paper the author intends describing the further developmental stages of the embryo.—William A. Haswell, M.A., on the structure of the so-called glandular ventricle (*Drüsenmagen*) of Syllis (plate 25). This organ is in reality a well-developed muscular gizzard, and contains no glands in its walls. The muscular elements of the organ present an embryonic character containing as they do a polynucleated core.—Arthur B. Lee, on Carnoy's cell researches (plate 26). While Carnoy's conceptions of the cell body do not materially differ from received views, the author of this paper thinks that sufficient attention has not been given to his labours on the