are various exceptional cases of anomalous dispersion, and to cover these a modified theory of uniaxal crystals is given in the following terms. The molecules (or crystal units) of the medium are not necessarily to be supposed ellipsoidal in shape, but are optically æolotropic, so that the subsidiary equations connecting the polarisation of a particle with the effective electric force are æolotropic, with an axis of symmetry; the particles are supposed to be arranged in a homogeneous assemblage, such that the effective cavity may be taken as a spheroid of small ellipticity with its axis of symmetry coincident in direction with that of the crystal unit. Hence an explanation is given of the anomalous dispersion of the double refraction in regions free from absorption, that is, when a medium composed of the same crystal units arranged in regular cubical order would give regular dispersion. The theory is considered finally in its general application to dispersion in biaxal crystals.

The author has attempted to connect the varieties of dispersion of double refraction with the structure of the crystal under the following assumptions. The crystal unit contains vibrating electrons, so that their combined effect is expressed by three principal equations connecting the polarisation of the unit with the effective electric field; if, then, these units are arranged in regular cubical order, we have a medium with principal refractive indices along three fixed directions in space, and in this case it is assumed that there is regular decrease of the double refraction with increasing wave-length in regions away from absorption bands; but considering in general any other homogeneous assemblage, the effect is expressed by a change in the effective electric field acting on the crystal unit; this effect is estimated by supposing, as a sufficient approximation, that the effective cavity is slightly ellipsoidal instead of being spherical. Thus differences of packing of the crystal molecules are represented optically by variations in the ratios of the axes of the effective cavity and in their directions in space compared with the polarisation axes of the individual unit. Combining these assumptions, it is shown that they are sufficient for a descriptive theory covering the varieties of dispersion of double refraction found in natural crystals.

PARIS.

Academy of Sciences, October 7.—M. Henri Becquerel in the chair.—The spectrum of the Daniel comet, 1907*d*: Jean **Bosler.** The spectrum of the nucleus of the comet was photographed on the nights of August 8 to 9, 18 to 19, and 19 to 20, with exposures of forty minutes, one hour, and one hour and ten minutes. Details are given of the lines observed, which appear to indicate the presence of hydrocarbons and cyanogen. There are also some lines of which the origin is uncertain.—Trigonometric series: Marcel **Riesz.**—The execution of a geodesic chain of precision in the Savoy Alps: Paul **Helbronner.** Particulars are given of the immediate objects of the survey, together with a list of the thirty-three stations, mostly mountain peaks, proposed to be included in the survey. Of these, twenty-six were completed between June 12 and September 28.—Spectroscopes with mirrors: Maurice **Hamy.** The substitution of mirrors for objectives is often used in spectroscopes. The present note gives a study of the theory of the best position to give the face of the last prism or grating to obtain a field of images as flat and as extended as possible.—The thermoelectricity of nickel; the influence of foreign metals: H. **Pécheux.** Three specimens of nickel were studied, the chemical analysis of each being determined. Couples were formed of each of these with pure copper, and the thermoelectromotive forces studied for a temperature range of 640° C. The curves of electromotive force of the three couples were not parallel, but the results are comparable, differing only by about 0·25 per cent. on the average. The simultaneous existence of copper and cobalt in a specimen of nickel produces the most marked deviations of E.M.F.—Phenyl migrations in the aromatic iodohydrins by the elimination of HI from the same atom of carbon: M. **Tiffeneau.** The theory developed in previous papers regarding the migration of the phenyl group in compounds of the type

$$(Ar)R—C(OH)—CHI—R'$$

has been extended and confirmed by a study of the corresponding ether oxides.—The phases of development of the Epicaridæ; experimental verification of the nature of the Microniscidæ: Maurice **Caullery.**—The presence of Tyroglyphinæ in the long bones of the wings of birds: E. L. **Trouessart.**—The existence of statoblasts in the scyphistome: Edgard **Hérouard.**—The necessity of cultures in the study of the gonococcus: A. **Guépin.** The absence of the gonococcus, and of any other pathogenic microbe, can only be admitted as proved after negative results have been obtained from systematic cultures.—Some new fossil plants from the travertine of Sézanne: René **Viguier.**

DIARY OF SOCIETIES.

FRIDAY, OCTOBER 18.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Indicated Power and Mechanical Efficiency of the Gas Engine: Prof. B. Hopkinson.

THURSDAY, OCTOBER 24.

CHEMICAL SOCIETY, at 8.30.—The Constitution of Phenol- and Quinol-phthalein Salts: a Contribution to the Quinonoid Theory of Colour: A. G. Green and P. E. King.—Poly-ketides: J. N. Collie.—Production of Orcinol Compounds by the Action of Heat on the Sodium Salt of Ethylacetoacetate: J. N. Collie and E. R. Chrystall.—A Simple Gas Generator for Analytical Operations: J. M. Sanders.—Some Double Ferrocyanides of Calcium, Potassium and Ammonium: J. Campbell Brown.—Halogen Determination in Organic Substances: J. Moir.—Racemisation by Alkali as applied to the Resolution of γ-Mandelic Acid into its Optically Active Isomerides: A. McKenzie and H. A. Müller.—The Optical Activity of Cyclic Ammonium Compounds: F. Buckney and H. O. Jones.—Keten. A New Anhydride of Acetic Acid: N. T. M. Wilsmore.—The Action of Phosphorus Pentachloride on Hydroxy-trimethyl Succinic Ester. 1:2-Dimethyl Trimethylene 1:2-Dicarboxylic Acid: H. Henstock and B. E. Woolley.

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