

logical product of a $(3N-1)$ -sphere and a $3N$ -sphere, minus certain $(6N-4)$ -dimensional loci corresponding to collisions. For $C \leq -\delta$ the structure of $M(C)$ has yet to be determined. It is planned to correlate the critical values $C=0$ and $C=-\delta$ with the physically known transition temperatures such as the critical temperature. (Received March 23, 1943.)

159. Isaac Opatowski: *An explicit formula for the refractive index in electron optics.*

The refractive index μ is expressed in electron optics (W. Glaser, *Zeitschrift für Physik* vol. 81 (1933) pp. 647-686) in terms of the electrostatic potential V , the magnetic vector potential \mathbf{A} and the unit vector \mathbf{s} , which is defined as tangent to the electron trajectory. Since \mathbf{s} is not known a priori and is a function of V and \mathbf{A} , the elimination of \mathbf{s} from the expression of μ is of advantage. This is done in the paper for a very ample class of fields in which a momentum integral of the equations of motion exists (*Bull. Amer. Math. Soc.* vol. 46 (1940) p. 887 and *Journal of Mathematics and Physics* vol. 20 (1941) pp. 418-424). (Received March 26, 1943.)

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160. Jesse Douglas: *Point transformations and isothermal families of curves.* II.

This paper is a continuation of one with the same title (see *Bull. Amer. Math. Soc.* abstract 49-1-71). Its new feature is the principal use of synthetic rather than analytic methods. The problem is referred to the investigation of certain properties of a hexagonal web. (Received February 27, 1943.)

161. Jacques Dutka: *Transversality in higher space.*

In this paper, a geometric criterion for transversality developed by Kasner in his paper *Transversality in space of three dimensions* (*Trans. Amer. Math. Soc.* vol. 30 (1928) pp. 447-452) is generalized for n -dimensional Euclidean space. It is shown here that a necessary and sufficient condition for a given correspondence between a lineal element and a hypersurface element to be a transversality is that a certain induced correlation be a polarity. A principle of transference connecting simple and $(n-1)$ -fold integrals in the calculus of variations when they produce equivalent transversalities is established. The result obtained is applied to the theory of infinitesimal contact transformations from which are derived analytic tests equivalent to the above-mentioned geometric criterion. Actual examples of transversalities in addition to the well known condition of orthogonality are also given. (Received March 25, 1943.)

162. Jacques Hadamard: *On fractional iteration and connected questions.*

The author presents some results communicated to him by two younger geometers on fractional iteration and permutable transformations in one variable. This subject is connected with group theory or, more precisely, with Cartan's conception of geodesics in a group-space. (Received March 27, 1943.)