

character. Having opportunity to make use of the services of a professional cheiromantist, he submitted to her the hands alone (the persons being concealed and no words spoken) of 30 pupils of both sexes, half of them of exceptionally high and half of abnormally low intelligence, demanding only whether she found them intelligent or not. Her diagnosis was correct in 63 per cent. of the cases. Again, he had photographs made of the hands (front and back views) of 20 pupils of both sexes, and submitted them for judgment to 20 persons. The percentage of correct determination of sex was 70, of intelligence 54. But applying the method of majorities (see Borel's paper above), 76.5 per cent. of the judgments were correct; the majority being superior in correctness of judgment not only to the average, but to any one of the individuals composing the average. These results surpass those obtainable by chance; and there is therefore some indication of intelligence furnished by the form of the hand, deserving of more detailed study.

14. A. Binet: *A Pedagogical Causerie* (27 pp.).—Expresses the author's belief that psychology has more value for pedagogy than was attributed to it in a recent book by James; defends the value of examining the vision of pupils; describes the classes of abnormal pupils recently established in the schools, and the manner of admitting pupils to them only in case a definite but brief examination of their scholastic attainments has shown them to be at least three years behind-hand, and another examination according to the "metric scale" (described above) has shown their intelligence to be defective by at least two years; exhibits the value both to normal and abnormal pupils of their association in the same school but in different classes; discusses the question of accurate control of actual progress made, a necessary condition of scientific pedagogy, and asserts that according to one method of control a class of abnormal pupils gained two and a quarter years in one year of the new instruction; develops a plan of mental orthopedic treatment; and gives the results of anthropo-

metric measurements that have been made in comparing normal and abnormal pupils.

15. The volume concludes with a number of bibliographical analyses.

E. B. DELABARRE

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*The Conquest of Disease through Animal Experimentation.* By J. P. WARBASSE, M.D. Pp. xii + 176. New York, D. Appleton & Co. 1910.

Dr. Warbasse has written a very timely book. The public hears much from the opponents of animal experimentation. Books, special periodicals and public lectures denounce the practise of vivisection and the inoculation of animals with disease germs; even exhibits are gotten up, representing animals undergoing tortures, showing the instruments used to operate on animals without, it is claimed, the use of anæsthetics, making a veritable chamber of horrors for the purpose of prejudicing the public against methods of scientific inquiry which have produced so much of value in controlling human disease. The anti-vivisectionists are busy; they are often influential, and too frequently they are unrestrained by a sufficiently scrupulous regard for truth from misrepresenting, often grossly, the cruelties practised in and the value resulting from experiments on living animals. Repeated attempts are made to get laws passed through state legislatures and the national congress preventing or greatly restricting such experimentation. It can not be doubted that the ardent propaganda of the opponents of vivisection influences public opinion to a very considerable extent. It is easier to appeal to the naïve sympathies of people by recounting tales of cruelty to poor dumb animals than it is to give them an adequate conception of the bearing and probable utility of the scientific experiments on living animals which are being carried on for the conquest of disease. Dr. Warbasse gives, in popular form, a good survey of this general field of investigation. There are chapters on the technique of animal experimentation, the extent to which pain is probably inflicted on animals, the discoveries in physiology due to animal experimentation,

the relation of animal experimentation to medicine, hygiene and surgery, and the conquest of diseases in the animals themselves. Even though one has followed the principal discoveries in medicine as they have been made from time to time, the results when brought together can hardly fail to surprise one whose attention to such subjects has been only casual.

Some opulent philanthropist who wishes to do a service to the cause of medical science would do well to authorize the publishers to send copies of this little book to every state senator and assemblyman, and every member of the national congress, so that our lawmakers may obtain, without more effort than busy men can well afford, a comprehensive idea of methods of research, upon which they are so often importuned to pass restrictive or prohibitory legislation.

Mr. Rockefeller has recently endowed a magnificent institution for medical research. Out of it have already come, by methods which the sentimental zoophilists have so severely condemned, discoveries whose value to the world are many times greater than the cost of the institution. If the well-meaning opponents of animal experimentation had had their way these discoveries would not have been possible. The country would have saved several of its guinea-pigs and homeless dogs, but it would have lost more of its children.

We are never entirely safe from the good intentions of the opponents of vivisection, and it is hoped that Dr. Warbasse's book will be widely circulated and will serve as a corrective of the misinformation which has been so liberally furnished to the public.

S. J. HOLMES

#### SCIENTIFIC JOURNALS AND ARTICLES

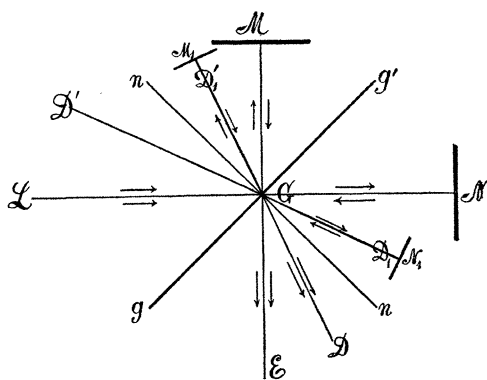
THE contents of the current number of the *American Journal of Mathematics* is as follows: "The Osculants of Plane Rational Quartic Curves," by H. I. Thomsen; "On the Primitive Groups of Classes Six and Eight," by W. A. Manning; "Minimalcurven als Orter von Krümmungsmittelpunkten," Von E. Study; "Minimalcurven und Serret'sche Flächen," Von E. Study; "On Steinerians of

Quartic Surfaces," by John N. Van der Vries; "On the Determination of the Ternary Modular Groups," by R. L. Börger; "Groups of Transformations of Sylow Subgroups," by G. A. Miller.

#### SPECIAL ARTICLES

##### ON THE GENERAL USE OF THE GRATING WITH THE INTERFEROMETER

IN a recent number of this journal<sup>1</sup> a method was described of bringing reflected-diffracted and diffracted-reflected rays to interference, producing a series of phenomena which in addition to their great beauty promise to be useful. In fact, the interferometer so constructed needs but ordinary plate glass and replica gratings. It gives fringes rigorously straight, and their distance apart and inclination are thus measurable by ocular micrometry. An adjustment may be made whereby ten small fringes occupy the same space in the field as one large fringe, so that sudden expansions within the limits of the large fringe (as in magnetostriction) are determinable. Lengths and small angles are thus subject to micrometric measurement. Finally the interferences are very easily produced and strong with white light, while the spectrum line used may be kept in the field



<sup>1</sup> From a lecture given to the Eastern Association of Physics Teachers, at Brown University, Providence, on May 21, 1910. See also C. and M. Barus, *SCIENCE*, March 11, 1910, p. 394, and a forthcoming number of the *Philosophical Magazine*.