page proof which could have been given in a few lines.

5. If, in the three years intervening between my review and his attack on it, Professor Skinner had given less time to the counting of footnotes and more time to the comprehension of the passages quoted from my review and to the unquoted context of those passages, he would possibly have saved himself from "careless and inaccurate statements," instead of attributing that term so freely to my review.

6. Professor Skinner makes on page 150 the remarkable statement:

> Furthermore, the author has put in a very clear light the historical sequence of the ideas which led to the development of the theory.

On the contrary, the author made no such pedagogical blunder. He wisely did not attempt to give any idea of Kummer's ideal numbers, the operations on which are so delicate that one must use the utmost circumspection (as remarked by Dedekind in his important historical papers in Darboux's *Bulletin*). Nor did the author present the second stage (Dedekind's viewpoints) in the historical development of the theory. For most obvious reasons the author refrained from presenting "the historical sequence of the ideas," and confined himself to the simplified present-day exposition of the theory, as far as he went.

L. E. DICKSON

A REJOINDER TO DR. DAVENPORT

THE task of the critic is always a disagreeable one, and it is only the conviction that the fate of eugenics as a science depends on the repudiation of much of the recent work of the Eugenics Record Office which impels me to reply to Dr. Davenport's letter in SCIENCE of November 28. I shall confine myself to the three points he raises regarding the paper on heredity in epilepsy although these points are not in the least representative of my criticism of that paper. Indeed, I dealt with not one, but a whole series of publications in which Dr. Davenport is concerned.

(*a*) Dr. Davenport states that

> First, Dr. Heron seems to assume that whenever a symbol in a pedigree chart is not accompanied on the chart by some special description it stands for a person about whom nothing is known. He calls attention to numerous cases where, notwithstanding, the corresponding individual is described in the text. The assumption is a gross error. The chart shows mainly the interrelationship of individuals, and indicates only certain traits.

Bulletin No. 2 of the Eugenics Record Office[1] is entitled "The Study of Human Heredity" and the opening sentence reads:

> The following methods are in use at the Eugenics Record Office. . . .

The "plan of charting" adopted is described in section 2 and it is there stated that while the letters E, F, I, N, etc., placed in or around the square or circle which stand for male or female, indicate that the individual in question is epileptic, feebleminded, insane or normal, etc., "when no letter accompanies the individual symbol it means that no definite data had been secured at the time the chart was made" (page 4). Further, Plate V. on page 16 is entitled "Key to Heredity Chart" and there examples of the symbols used are given. The first two are the square and circle without any accompanying letters and the description given is "No data." Again, in his tables Dr. Davenport uses a symbol X which he defines as "Unknown" (I pointed out that more than half the individuals entered in the tables were described by Dr. Davenport himself as "unknown"). Now in the great majority of cases the square or circle without any accompanying letter corresponds to an individual marked "unknown" in the tables, but I pointed out several cases where mistakes had been made. To take the first example I gave in my paper, Fig. 10, case 469, the chart shows two sisters one of whom is marked epileptic while the symbol for the other is left blank to indicate that "no definite data had been secured at the time the chart was made" or that there were "no

[1] It was reprinted in Bulletin No. 7 of the Eugenics Record Office, September, 1912.

data." In the description of the pedigree the first sister is stated to be "certainly epileptic," the second merely "shows signs of epilepsy," while in Table I. both are definitely entered as epileptic. Yet these different statements occur in one and the same study of inheritance in epilepsy.

(*b*) Dr. Davenport writes that,

> Second, Dr. Heron catalogues with infinite pains, "errors" in citing the case numbers. Here he has fallen into a trap which the authors unconsciously prepared for him. To avoid the possibility that a person who is not authorized should connect an individual at the institution with his family history it was decided to apply alterations to the case numbers which enable the authors, but not the ordinary reader, to identify the case.

My criticism was summed up as follows:

> Tables A, C and D (of Drs. Davenport and Week's paper) thus contain particulars regarding the relatives of 74 normal parents. In only 30 cases do the entries agree with the tables from which they are supposed to have been extracted, or with the pedigrees given in the paper. In 13 cases out of 74 the case numbers do not agree, while 9 cases which ought to have appeared in Tables C and D have been omitted.

The whole of the errors made were definitely cited by me and the following may be given as examples. Case No. 4529 of Table IV. appears as No. 4521 in Table A *of the same paper* and No. 2124 as No. 2129. Comparing Tables VI. and C we find that No. 335 appears as No. 332, 481 as 483, $\left.\begin{matrix}504\\3781\end{matrix}\right\}$ b as $\left.\begin{matrix}503\\3781\end{matrix}\right\}$ b, 1705 as 1704, etc. Yet Dr. Davenport now states that these changes were deliberately made by him to hide the identity of the individuals dealt with. I am quite unable to understand how any individual can be identified as No. 4529 and yet escape identification as No. 4521. Perhaps Dr. Davenport will also explain how a pedigree came to appear in Bulletin No. 4, Table VII. as No. 2983, only to be changed in Table D of the same paper to No. 2984, to reappear at the Eugenics Congress as No. 2983 in Table VII. and to return to No. 2984 in Table C.

(*c*) Dr. Davenport states that I overlooked the fact that the details of his pedigrees were sometimes entered in 5 columns and sometimes in 9, 10 or 11 columns (not only in 10 as he states). I was well aware of the fact and made no objection to this procedure since in most cases Dr. Davenport has made up the deficiencies of his "5-column" classification by a long series of footnotes. I did object, however—to cite only a single example—when I found in case 2487 that there were four different versions of the mental condition of a single fraternity of 12 children and pointed out that Dr. Davenport gave of those who died early 0 or 2, of the "unknown" 0, 1 or 6, of the insane 0 or 1, of the neurotic 0, 3, 4 or 5, and of the alcoholic 1 or 2, according to the page consulted. It is for Dr. Davenport to justify these differences.

Finally I would ask those who wish to judge between Dr. Davenport and myself to read my memoir in conjunction with those of Dr. Davenport which I have criticized. They will then be able to judge for themselves whether or not my criticisms are justified. They involved far more serious matters than those to which Dr. Davenport now endeavors to reply.

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SCIENTIFIC BOOKS

Researches in Physical Optics with Especial Reference to the Radiation of Electrons. Part I. By R. W. WOOD. Columbia University Press (New York, 1913). Pp. 133, plates 10.

This volume, whose subtitle serves to illustrate the manner in which the electron is dominating current thought in physics, is the most recent number of the Ernest Kempton Adams Series. Of the eleven papers which are here collected all are experimental in character: a large number of the results have already been announced in other places, mainly in the last three or four volumes of the *Philosophical Magazine*.

In point of importance, the first two of these essays, dealing with the truly remarkable phe-