DISCUSSION

NOMENCLATURE OF THE RH BLOOD TYPES[1]

BASED on recent developments in the knowledge of the Rh blood types, certain changes in the nomenclature originally proposed by the writer[2,3] for the Rh agglutinogens and agglutinins appear desirable.

TABLE 1

ORIGINAL NOMENCLATURE OF THE RH TYPES AND THEIR DISTRIBUTION AMONG 871 WHITE INDIVIDUALS IN NEW YORK CITY

Classes	Reactions with antisera			Types		Reactions with antisera			Types	
	Anti-Rh*	Anti-Rh_1†	Anti-Rh_2‡	Designation	Frequencies per cent.	Anti-Rh	Anti-Rh_1	Anti-Rh_2	Designation	Frequencies per cent.
W	–	–	–	Rh negative	12.4	+	–	–	Rh	2.5
U	–	+	–	Rh′	0.8	+	+	–	Rh_1	53.6
V	–	–	+	Rh″	0.5	+	–	+	Rh_2	13.4
UV	–	+	+	Rh′Rh″	...	+	+	+	Rh_1Rh_2	16.8

* Standard anti-Rh agglutinin; corresponds with the original anti-rhesus serum of Landsteiner and Wiener, and gives about 85 per cent. positive reactions on bloods from white individuals (K. Landsteiner and A. S. Wiener, *Proc. Soc. Exp. Biol. and Med.*, 43: 223, 1940).

† Agglutinin anti-Rh_1 gives approximately 70 per cent. positive reactions on Whites (A. S. Wiener, *Arch. Path.*, 32: 229, 1941).

‡ Agglutinin anti-Rh_2 gives approximately 30 per cent. positive reactions on Whites (A. S. Wiener, SCIENCE, 98: 112, 1943; A. S. Wiener and E. B. Sonn, *Jour. Immunol.*, 47: 461, 1943). This agglutinin appears to be identical with the so-called anti-KJ agglutinin recently described in England (R. R. Race, G. L. Taylor, K. E. Boorman and B. S. Dodd, *Nature*, 152: 563, 1943).

In Table 1 is presented the former designations together with the frequencies of the types in a series of 871 white individuals. The new designations, given in Table 2, are suggested in order to overcome the following difficulties:

(1) The designation of type Rh in Table 1 is somewhat ambiguous because the term "Rh types" is usually used in a general sense. Therefore, I have adopted the suggestion of Race *et al.*[4] to designate this type as Rh_0,[5] and at the same time have changed the name of the standard anti-Rh agglutinin to anti-Rh_0, in order to make it correspond with its specific agglutinogen.

(2) The difficulty that the types Rh′ and Rh″ were not named after the antisera with which they react is now removed by naming the agglutinin giving 70 per cent. positive reactions anti-Rh′, while the agglutinin giving 30 per cent. positive reactions is named anti-Rh″. The designations of types Rh_1, Rh_2 and Rh_1Rh_2 still do not correspond with the antisera, but this is taken care of by the use of the alternative designations, Rh_0', Rh_0'' and $Rh_0'Rh_0''$, where these are necessary or desirable for the sake of clarity. Usually, however, the unambiguous and simpler designations, Rh_1, Rh_2 and Rh_1Rh_2, will still be found preferable.

TABLE 2

PROPOSED NEW DESIGNATIONS FOR THE RH BLOOD TYPES

Classes	Antisera			Designation of types	Antisera			Designation of types**
	Anti-Rh_0*	Anti-Rh′†	Anti-Rh″‡		Anti-Rh_0	Anti-Rh′	Anti-Rh″	
W	–	–	–	Rh negative	+	–	–	Rh_0
U	–	+	–	Rh′	+	+	–	Rh_1(Rh_0')
V	–	–	+	Rh″	+	–	+	Rh_2(Rh_0'')
UV	–	+	+	Rh′Rh″	+	+	+	Rh_1Rh_2 ($Rh_0'Rh_0''$)

* Anti-Rh_0 is the new designation for the standard anti-Rh agglutinin.
† Agglutinin formerly designated as anti-Rh_1.
‡ Agglutinin formerly designated as anti-Rh_2.
** Designations given in parentheses are optional and are to be used whenever necessary to avoid ambiguity.

Some confusion may result from the fact that sera containing the two agglutinins, anti-Rh_0 and anti-Rh′, and giving about 87 per cent. positive reactions, were formerly designated simply anti-Rh′. Such sera could now be designated as anti-Rh_1, so that the terms anti-Rh′ and anti-Rh_1 have been interchanged, and the same hold true for the terms anti-Rh″ and anti-Rh_2. All possibility of error can be avoided, however, if one designates the two sera containing two agglutinins as anti-Rh_0,Rh′ (or anti-Rh_0') and anti-Rh_0,Rh″ (or anti-Rh_0''), respectively, instead of using the shorter designations, anti-Rh_1 and anti-Rh_2.

[1] From the Serological Laboratory of the Office of the Chief Medical Examiner of New York City. Aided by grants from the United Hospital Fund and the Carnegie Foundation through the Committee on Human Heredity of the National Research Council.

[2] A. S. Wiener, *Proc. Soc. Exp. Biol. and Med.*, 54: 316, 1943.

[3] A. S. Wiener, E. B. Sonn and R. B. Belkin, *Jour. Exp. Med.*, 79: 235, 1944.

[4] R. R. Race, G. L. Taylor, D. F. Cappell and M. N. McFarlane, *Nature*, 153: 52, 1944.

[5] Interestingly enough, the identical idea occurred quite independently to the present author.

The six genes postulated under the author's theory of heredity are designated as *rh*, *Rh'*, *Rh"*, *Rh$_0$*,*Rh$_1$* (or *Rh$_0$'*) and *Rh$_2$* (or *Rh$_0$"*), to correspond with the factors they determine. Incidentally, the frequency of type Rh_1Rh_2 given in Table 1 is slightly but significantly higher than that expected under the theory. While at first the writer was inclined to ascribe this to difficulties in the technic, this possibility has been ruled out by more recent studies. The excess of type Rh_1Rh_2 probably represents the effect of isoimmunization in pregnancy,[6] which would affect adversely principally infants of types Rh_1 and Rh_2. An observation favoring this idea is that the excess of individuals of type Rh_1Rh_2 is particularly pronounced in races characterized by large families and high infant mortality, *e.g.*, Chinese and Moslems.[7]

No attempt has been made to include the factor determined by the so-called anti-Hr serum of Levine and Javert[8] (or anti-St serum of Race and Taylor[9]) in the scheme. Levine believes that this factor is determined by a special allelic gene. However, unpublished observations by the writer indicate that this factor is related to the various Rh blood types in a manner analogous to that in which the factor detected by so-called anti-O sera is related to the A–B groups and subgroups (*cf.* Race *et al.*[4]). The observation that homozygous bloods of type Rh_1 fail to react with anti-St sera[9] can readily be explained in a manner similar to that proposed by the author to account for the behavior of anti-O sera.[10]

A. S. WIENER

BROOKLYN, N. Y.

NOTES ON STARRING IN AMERICAN MEN OF SCIENCE

IN accord with G. A. Miller's suggestion in SCIENCE for May 12 that Cattell's inauguration of a system of starring of scientists be discussed, and improvements on it suggested, excerpts are given from a study of starred psychologists[1] followed by some suggestions as to how the system of starring might be improved.

Cattell's inauguration of the system of starring the leading research workers in each of twelve fundamental sciences is considered by competent judges to have been a major contribution to the growth of research in America.

The star indicates that, in the private opinion of his peers, the starred psychologist is distinguished for psychological research. It implies either a large volume of good work or a considerable amount of especially original work. Of course it does not imply that the work done by others is not decidedly worth-while, but merely that it has not impressed the voters as quite so worthy of approbation.

The star is a recognition which not only gives the recipient satisfaction, but also increases his opportunities. It is a challenge to the recipient to continue his good work and to others who aspire to win this recognition. Vast amounts of good work have been completed as a result of this friendly rivalry. Many psychologists who are not starred feel confident that they are "as good a man as . . ." and consequently set out to prove it.

The good that starring does is increased by the widened knowledge as to who are starred and why. This widened knowledge not only encourages and puts the starred men more fully on their mettle, but it also attracts attention to their work and increases their opportunities for further research. It, moreover, augments the opportunities of promising persons not starred in the hope that, as a consequence of encouragement and improved facilities, they will win this coveted recognition. The various universities employing starred scientists are placing increased value upon this recognition as a proof of individual merit and institutional strength. They not only attempt to retain and attract men already starred, but also to have local men not yet starred win this high honor; to this end they often increase facilities and otherwise encourage their more promising men.[1]

SOME SUGGESTIONS

Objections to the system of starring which prevailed unaltered for 1908–1943 have largely been of five sorts. (1) Although in 1903 (when starring was first done) a large share of the scientists could be classified and rather fairly judged by the vote of leaders in one or another of twelve sciences, this is no longer true. Several additional sciences have become significant and specialization has interfered with many men feeling competent to vote on workers in allied disciplines. The fact that even some members of the National Academy of Sciences can not win a star because they are working in fields not recognized by Cattell in 1903 is a serious defect. Instead of 12 sciences, at least 20 should be recognized. (2) The number of men starred recently is too small. In 1903 the leading one fourth of all the scientists worthy of sketching in "American Men of Science" were starred. In the seventh edition of "American Men of Science" about 34,000 scientists are sketched, while only about 1,300 are starred. (250 newly starred, about 220 starred in 1937, about 200 starred in 1932, about 300 starred in 1921 or 1927 and the remainder starred in 1908 or 1903.) It appears that it is relatively fully 10 times as difficult to win a star now as it was in 1903. If instead of awarding stars to the top 25 per cent. of the scientists (as in

[6] *Cf.* A. S. Wiener, SCIENCE, 96: 407, 1942.
[7] A. S. Wiener, E. B. Sonn and R. B. Belkin, unpublished observations.
[8] C. T. Javert, *Am. Jour. Obstet. and Gynec.*, 43: 921, 1942.
[9] R. R. Race and G. L. Taylor, *Nature*, 152: 300, 1943.
[10] A. S. Wiener and H. E. Karowe, *Jour. Immunol.*, in press.
[1] S. S. Visher, *Am. Jour. Psychol.*, 52: 278–292, April, 1939.