Professor Howell has apparently attempted a marriage between the field of comparative anatomy and comparative behavior. The degree to which he has been successful must be judged by competent scientists in both fields. The problem which arises because methodology, including terminology, for describing activities of animals is not nearly as well developed as methodology in anatomy has not been solved by Professor Howell. This disparity has, however, placed him at a great disadvantage in writing "Speed in Animals." It is suggested that as science is currently organized and developed, the central problem to which Professor Howell addressed himself should have been attacked by authorities from fields of anatomy and behavior working in collaboration.

Professor Howell's position on the problem of how environment and behavior causally affected modification of structure is not clear to this reviewer. It seems that the assumption is made that changes in animals' environments and the subsequently modified behavior directly cause structural modifications. It is not clear that he fully considers the processes of selective elimination and "survival of the fittest." The causal relation of behavior to structural changes in the development of a species seemingly lacks full exposition in a subject content where this might be expected by a reader.

A check of the bibliography shows that the source material is predominantly drawn from the period of 1930's. Wartime conditions probably account for this time lag.

The reviewer regrets that "Speed in Animals" does not deal in a more comprehensive manner with the locomotor behavior of primates including man and that the behavior of prehension is not more adequately covered.

Perhaps it is yet too early for scientists to use effectively results from stroboscopic photography in analyzing the relations of animal structures to their actions. Professor Howell will find this technique of value in extending his field of interest.

Finally, it seems to the reviewer that the book could have been more fittingly entitled "Animal Locomotion."

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STEEL IN ACTION

Steel in Action. By CHARLES M. PARKER. 218 pp. 18 illus. Index. Lancaster, Pa.: The Jaques Cattell Press. 1943. $2.50.

FOUR chapters of this book are alone worth the time even of a busy man to read and study, namely: "Steel in Our Daily Life"; "The Struggle for Raw Materials"; "The Steel Industries of the World"; "The Distribution and Control of Raw Materials." The author's acquaintance with these and related phases of the steel industry is well known to those who have followed his recent work. He also speaks from a wealth of knowledge contained in the records of the American Iron and Steel Institute. Every industrialist and every citizen has an interest in these vital components of world peace and of our present and future economic life. To all persons in these two categories —and this means every one—we strongly recommend the reading of these four chapters.

BRADLEY STOUGHTON

SPECIAL ARTICLES

ON THE Rh AND OTHER BLOOD FACTORS IN JAPANESE[1]

THE practical importance of the Rh factor in the pathogenesis of a specific form of fetal and neonatal morbidity, erythroblastosis fetalis, has stimulated studies on the racial distribution of the Rh factor and its several varieties.[2-5] As Levine[2,3] has shown, the incidence of erythroblastosis fetalis in any race is directly proportional to the frequency of negative reactions with anti-Rh_0 serum. With this serum the values of positive reactions in the white, colored and Chinese races are 85, 92–95 and 99 per cent., respectively. In terms of negative reactions one should expect a far greater frequency of erythroblastosis fetalis in the white, and almost none among Chinese. These expectations are amply borne out by clinical observations.

It was of interest to make parallel observations on Japanese individuals residing in the metropolitan area of New York City. Cell suspensions (2.5 per cent.) in saline were obtained from 150 individuals of Japanese parentage. These tests were carried out independently by each author and identical results were obtained. In addition to tests with the several varieties of anti-Rh sera and tests for the blood groups, the subgroups of A and the M and N factors were also studied.

[1] From the Laboratories of Flushing Hospital, Flushing, N. Y., and the Ortho Research Foundation, Linden, N. J.

[2] P. Levine, SCIENCE, 96: 452, 1942.

[3] P. Levine and H. Wong, *Am. Jour. Obst. and Gyn.*, 45: 832, 1943.

[4] A. S. Wiener, SCIENCE, 96: 407, 1942.

[5] A. S. Wiener, R. B. Belkin and E. B. Sonn, *Am. Jour. Phy. Anth.* 2: NS 787, 1944.

The results of blood groupings and M and N typings are given in Table 1. For comparative purposes, the data for three other races are included.

TABLE 1

	White	Colored[5]	Chinese[3]	Japanese*
	Per cent.	Per cent.	Per cent.	Per cent.
O	45.0	47.1	30.0	26.0
A	41.0	28.2	34.0	40.0†
B	10.0	19.6	25.3	23.3
AB	4.0	5.1	10.7	10.7
M	29.2	29.0	23.3	30.0
N	21.2	28.3	22.0	16.6
MN	49.6	42.8	54.7	53.4

* This study.
† Among the Japanese bloods, the ratio of A_1 to A_2 was 5:1 if the intermediate type was calculated as A_2.

The anti-Rh sera employed in this study are in the order of the frequency of positive reactions in a random white population, anti-Rh_0, anti-Rh′ and anti-Rh″. The data obtained with these three anti-Rh sera are recorded in Table 2, in which the results for the Japanese as well as for the three other racial groups are given.

TABLE 2

	White	Colored	Chinese	Japanese*
	Per cent.	Per cent.	Per cent.	Per cent.
anti-Rh_0	85–87	95.5 (L) 92.0 (W)	99.3	98.0
anti-Rh′	70–73	46.0 (L) 29.2 (W)	93.0	85.4
anti-Rh″	30	29.2 (W)	no data	61.4

(L) indicates data of Levine[2]; (W) indicates data of Wiener.[5]
* This study.

The anti-Rh″ serum was generously supplied by Dr. Wiener. In accordance with his suggestion, this serum was diluted 1:5 in order to remove the effects of a concomitant agglutinin of another specificity. However, in our hands, it was necessary to interpret some of the weaker reactions, such as ±, as negative with the anti-Rh″ agglutinin.

From a practical standpoint, the most significant finding is the exceedingly low incidence of negative reactions with the anti-Rh_0 serum among the Japanese. As in the case of the Chinese, one may conclude that the incidence of erythroblastosis fetalis and of intragroup transfusion reactions should be very low among Japanese as compared to the white race. This is amply supported by the scarcity of reports of these conditions in the Japanese medical literature.

The findings with the Japanese bloods on the basis of the several antigenic components of the Rh factor are presented in Table 3 along with the corresponding data for white and colored races recently published by Wiener.

TABLE 3

Reactions with anti-Rh_0	anti-Rh′	anti-Rh″		White	Colored	Japanese
+	+	+	Rh_1Rh_2	19.2	7.3	47.25
+	0	+	Rh_2	14.8	21.9	13.35
+	+	0	Rh_1	51.2	21.2	37.40
+	0	0	Rh_0	2.2	41.6	0.00
0	+	+	Rh′Rh″	0.0	0.0	0.66
0	0	+	Rh″	0.3	0.0	0.00
0	+	0	Rh′	0.8	0.7	0.00
0	0	0	Rh neg.	11.4	7.3	1.34

The terminology of the Rh antigens given above is that recommended by Wiener.[6]

Aside from the very low incidence of Rh negative individuals among Japanese already mentioned, the most significant finding is the absence of the type Rh_0 which is so frequent in the colored race. In striking contrast is the high incidence of the phenotype Rh_1Rh_2 in Japanese as compared to that in the white and colored races.

Almost identical differences in white and colored individuals were observed by Levine[7] in tests with an active anti-Rh″ agglutinin produced by an Rh_1 individual. In tests with a potent anti-Hr serum all Rh_1Rh_2 bloods gave negative reactions. About 60 per cent. of Rh_1 bloods of white individuals and almost all colored individuals tested possessed the Hr factor.

These preliminary findings serve to illustrate the importance of comprehensive racial studies which could be carried out as soon as all varieties of anti-Rh sera become readily available. It can be expected that the final theory of the heredity of the Rh antigenic complex will emerge from or be confirmed by the statistical analysis of the various phenotypes in many racial groups, as in the case of the four blood groups.

ROBERT K. WALLER
PHILIP LEVINE

ON THE SPECIFICITY OF CHOLINE ESTERASE IN NERVOUS TISSUE[1]

RECENT investigations have provided evidence for a new concept of the role which acetylcholine may have in the mechanism of nervous action.[2, 3] The release and the removal of the ester are considered as an intracellular process directly connected with the nerve action potential at points along the neuronal surface. The ester released by a stimulus depolarizes the membrane by rendering it permeable to all ions. Thus, flow of current is generated (action potential) which

[6] A. S. Wiener, SCIENCE, 99: 532, 1944.
[7] P. Levine: Unpublished data.
[1] This work was aided by grants of the Josiah Macy, Jr., and Dazian Foundations.
[2] J. F. Fulton and D. Nachmansohn, SCIENCE, 97: 569, 1943.
[3] D. Nachmansohn, R. T. Cox, C. W. Coates and A. L. Machado, *Jour. Neurophysiol.*, 5: 499, 1942, and 6: 383, 1943.