ment support of scientific research will become increasingly necessary and important in the future, and the manner in which this support is administered will become increasingly significant.

The firm stand taken by the National Academy of Sciences and groups like the Federation of American Scientists is, in my opinion, excellent. But, unless their position is supported by individual action, I believe it will lose significance. Therefore, I wish this resignation to be recorded as the protest of one student against a ruling that I believe to be directed against the freedom of the individual scientist and the interest of our society as a whole.

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Nomenclature of the Rh-CDE System

In a recent paper by E. F. Ducey and R. I. Modica on the amendment of the nomenclature of the Rh-CDE System (*Science*, 1950, **111**, 466) several errors are to be noted in the use of the Wiener Rh-Hr nomenclature:

1. Table 1 indicates the following under Wiener's antigens: Rh_0, rh′, rh″, Hr_0, rh′, and rh″. The last two antigens should correctly read hr′ and hr″. Likewise, under Wiener's agglutinins, the last three indicated as Anti-Rh_0, Anti-rh′, and Anti-rh″ should correctly read Anti-Hr_0, Anti-hr′, and Anti-hr″.

2. In the sentence "For example, Wiener must use a different set of terms for the genotypes and the phenotypes (Rh_1, Rh_0 and R_1, R_0, etc.)," the order of "genotypes and phenotypes" implies a respective arrangement in the symbols appearing in the parentheses, "(Rh_1, Rh_0 and R_1, R_0, etc.)." Concerning the latter, it is to be noted that symbols Rh_1 and Rh_0 represent phenotypes and not, as implied, genotypes; also, contrary to the implication, symbols R_1 and R_0 represent neither phenotypes nor genotypes. According to the Wiener nomenclature, a genotype consists of two italicized symbols (a symbol for the gene contributed by each parent). Therefore, the possible genotypes falling under phenotypes Rh_1 and Rh_0 would correctly be R^1R^1, R^1r', R^1R^0, R^1r, R^0r', and R^0R^0, R^0r, respectively.

3. It is further stated that the Wiener symbol Rh_1 does not indicate whether the individual is homozygous or heterozygous, and that the corresponding Race symbol CDe/CDe or CDe/cde does. In this case a comparison has been made between a phenotypic symbol (Rh_1) and a genotypic symbol (CDe/CDe or CDe/cde). A valid comparison would have been made had genotypic symbols representing both systems of nomenclature been used, e.g., CDe/CDe = R^1R^1 and CDe/cde = R^1r.

4. For the sake of comparing Wiener's symbols against those of Race, the possible progeny resulting from the mating of an Rh_1 individual with an rh individual is discussed. Here again there exists a situation similar to that mentioned in (3); i.e., Wiener's phenotypes are compared with Race's genotypes. Also, it is stated that in the above-mentioned mating the possible progeny are Rh′, Rh_1, Rh_0, and rh″. The Rh′ is incorrect and should read rh′.

Employing several symbols mentioned above, the following table may serve to depict a more complete comparison between the Wiener and Race nomenclatures.

Phenotypes		Genotypes	
Wiener	Race	Wiener	Race
rh	cde	*rr*	cde/cde
Rh_1	CDe	R^1R^1	CDe/CDe
		R^1r'	CDe/Cde
		R^1R^0	CDe/cDe
		R^1r	CDe/cde
		R^0r'	cDe/Cde

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Ducey and Modica actually recommend the abandonment of the Wiener nomenclature and a modification of the Fisher-Race terminology. The gist of the latter is the substitution of D′, C′, and E′ for d, c, and e, because "the use of the lower case letters c, d, and e, to denote the Hr antigens leads to ambiguity when it is remembered that in the major groups, a and b indicate agglutinins." Therefore, the lower-case letters are to be reserved for agglutinins, the capital letters for antigens. The agglutinins are to be labeled anti-d, anti-c, anti-e, anti-d′, anti-c′, and anti-e′.

I do not wish to enter the controversy on the respective merits of the two main systems of Rh nomenclature, but would like to call attention to one major defect in the recommendation of Ducey and Modica. It is true that a and b denote agglutinins in the ABO blood group system, but many objections have been raised against their use, because it is misleading. The modern tendency followed in most textbooks and scientific papers is to use anti-A and anti-B instead of a and b, as the only clear designations of these two isoagglutinins. Therefore, to be consistent, Ducey and Modica's recommendation for the agglutinins would have to label them as anti-D, anti-C, etc. Otherwise the proposed amendment would, I am afraid, only add to the confusion.

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The recent criticism of current *Rh* terminology by Ducey and Modica correctly points out the comparative simplicity of teaching and understanding the Fisher-Race scheme but misses a far more significant fact, i.e., the possibility that Wiener's hypothesis of a series of multiple alleles at one locus on homologous chromosomes may be correct. The only method apparent at present of coming to any decision concerning relative correctness of

either theory has been succinctly discussed in the "Report of the Advisory Review Board" (*Science*, 1948, **107**, 27).

As far as terminology is concerned, it should be borne in mind that every aspect of the Fisher-Race scheme is duplicated in the Wiener scheme (a fact emphasized in the Report of the Advisory Review Board).

The criticisms, therefore, that a different set of terms must be used in the Wiener scheme for phenotypes and genotypes, or that any symbol does not indicate homozygosity or heterozygosity, etc., are unjustified. The Report of the Advisory Review Board has modified and incorporated Wiener's suggestion for distinguishing between genes and erythrocyte agglutinogen factors by printing gene designations in italics and antigen designations in ordinary type.

When one designates the phenotype Rh_0 (Wiener), what is now implied is the phenotypic constitution Rh_0 hr′ hr″. It is perhaps redundant to point out that, if this were not so, then it would be a simple matter to distinguish the relative correctness of either theory; e.g., available anti-c (hr′) serum either would or would not react with 100% of the Rh negative population.

Insofar as the proposed amendment of the nomenclature by Ducey and Modica is concerned, certain facts make it extremely undesirable (aside from the reeducation of physicians, experimental workers, editors, and proofreaders). The use of superscript distinctions can only result in a newer variety of the old confusion. The suggested use of designations other than the small letters c, d, and e to denote Hr antigens is based on a fallacy. The letters a and b do not indicate agglutinins. Major blood group agglutinins, by older terminology, are referred to as *alpha* and *beta*. This is the justification for the current trend to use the terms Anti-A and Anti-B to designate beta and alpha agglutinins, respectively. To substitute the letters a and b at any point in the major blood groups nomenclature immediately confuses that terminology. The proposal that small letters be reserved for agglutinins and capital letters for antigens adds nothing to the present situation. The Fisher-Race scheme is as adaptable to the discovery and naming of new genes, antigens, and agglutinins as is the proposed system.

The Review Board's statement that the Fisher-Race theory (and nomenclature) "is based on a genetic hypothesis, which is purely theoretical and for which no clear proof exists—a hypothesis no more tenable on genetic grounds than Wiener's hypothesis" is, in our opinion, a clear exposition of the current situation, and the recommendation that both systems of nomenclature be used concurrently, although not the most desirable, is the only scientifically honest recommendation possible at this time.

There would seem to be little doubt that, if the two hypotheses and systems of nomenclature continue to explain newer observations, the Wiener scheme will eventually disappear because of its own relative unwieldiness.

The Utah State Health Department is currently using the Fisher-Race nomenclature exclusively, although it recognizes the possibility that the scheme is based on incorrect theory. Practically, however, it has been found far easier to use this scheme than the Wiener scheme to explain to practicing physicians the rarely occurring, more esoteric aspects of isosensitization due to Rh factors.

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Developments in Oceanography

Judging from manuscripts which we have on file, the communication "Education and Training for Oceanographers," which was published in SCIENCE June 23, 1950, was written prior to January, 1949. Since that time there have been extensive developments in oceanography at the A. and M. College of Texas, where a Department of Oceanography has been established in the School of Arts and Sciences. These developments may be of interest to your readers.

Instead of our courses in oceanography being offered as "part of various curricula," they actually make up a graduate curriculum in oceanography, which leads to the Master of Science degree in that field. It is expected that this program will be augmented so as to permit work at the doctoral level in the near future.

We are now engaged in several oceanographic research projects—one a systematic investigation of the oceanography and meteorology of the Gulf of Mexico sponsored by the Office of Naval Research; another a project in biological oceanography conducted at the laboratory of the Texas A. and M. Research Foundation at Grand Isle, Louisiana, and sponsored by a group of the major oil companies operating on the Gulf Coast; another a cooperative program with the Fisheries Biology Section of the U. S. Fish and Wildlife Service conducted from the oceanographic vessel, the *Alaska*; and a fourth, the work done under the Dow Research Fellowship in Chemical Oceanography. Other work is pending.

The initial academic staff includes, in addition to the writer, who is professor of physical oceanography and marine meteorology, W. Armstrong Price, professor of geological oceanography, John G. Mackin, professor of biological oceanography, and Donald W. Hood, assistant professor of chemical oceanography. Another staff member is to be added in physical oceanography and marine meteorology in February, 1951.

The A. and M. graduate program in oceanography is strengthened by close association with the Departments of Biology, Chemistry, Geology, Physics, Mathematics, Geography, and the School of Engineering. Research is conducted through the Texas A. and M. Research Foundation, which is legally and financially independent of the college but is dedicated to its welfare and has available to it the staff and facilities of the college.

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