Correspondence

Dr. Dain on the Plebiscite

SIR,—The speech I made at Shrewsbury last Sunday, which received much publicity in the Press, seems to have caused some misunderstanding in the profession. I should like to make it clear that I depart in no way from the careful and balanced statement issued by the Council to every doctor in the country. The Minister of Health's concessions present us with a changed situation which makes the new plebiscite necessary.

I would urge that it is the duty of every doctor to make up his own mind on the facts, and to decide whether Mr. Bevan's concessions go far enough to safeguard the essential professional freedoms of the practising doctor.—I am, etc.,

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H. GUY DAIN,
Chairman of Council.

Anti-Rh Serum Nomenclature

SIR,—In the annotation on "Anti-Rh Serum Nomenclature" (Feb. 28, p. 400) you discuss the recent edict of the National Institute of Health in the United States regarding the labelling of anti-Rh sera, namely to use the earlier Wiener Rh-Hr system as standard, with the corresponding Fisher-Race C-D-E notations in parentheses. You regard this decision as a "transitional compromise," implying that eventually the original notations will be abandoned in favour of the Fisher-Race system. However, this conclusion as well as the Board's own analysis fails to take into account all the available facts.^{1 2 3 4} I have therefore prepared my own analysis of the situation, and after it is printed in your journal perhaps one of the C-D-E protagonists will attempt a reply. Only by publishing all the facts and both sides of every scientific problem can we ever hope to arrive at the correct solution.

Advantages of the Rh-Hr Nomenclature

1. They have priority, having been proposed by one of the discoverers.
2. They form a coherent and unified system, which readily lends itself to extension to include newly discovered blood factors belonging to the rhesus system.
3. The genetic theory on which the notations are based is amply supported by heredity studies on a large series of families, and statistical studies on the distribution of the types in the population. On the other hand, there is no evidence against the theory.
4. The notations are simple to use in writing and orally.
5. The notations clearly separate the designations for phenotypes and genotypes, and for agglutinogens and genes, leaving no room for ambiguity.
6. The phenotypes' names clearly indicate what tests have actually been made and what reactions were obtained, without including symbols for hypothetical blood factors which have not been tested for, and for which there is no clear experimental evidence.
7. The notations clearly indicate the relationship to the original rhesus factor, and separate the Rh-Hr types from other independent systems such as the A-B-O groups and M-N types.
8. For individuals who already know and understand the four blood groups and the three M-N types, the Rh-Hr notations are easy to learn almost instantaneously.
9. The notations lend themselves readily to clinical use, since the capital R's and small r's clearly indicate which types are Rh₊-positive and which are Rh₋-negative.
10. They take advantage not only of the reciprocal relationship between the Rh and Hr factors, but also of the special clinical, serologic, and genetic position of factor Rh₀.
11. They do not involve any incorrect assumption of one-to-one correspondence between genes and partial antigens.
12. They are self-sufficient.
13. None of the symbols used in the Rh-Hr notations have previously been applied to other agglutinogens.
14. The notations as used by workers throughout the world are uniform.
15. Simple tables are available for the Rh-Hr types and their genetics.

16. They are the *only* notations used in most standard textbooks, encyclopaedias, dictionaries, and articles.

Supposed Disadvantages of the Rh-Hr Notations

1. That they take longer to teach. Where this seems to be so, it is merely because one must *understand* the Rh-Hr types in order to use the Rh-Hr notations intelligently, and to teach them.
2. That they have been changed several times. This is true, but none of the changes are basic or really upsetting. Moreover, one need only learn the present nomenclature to understand the subject. The changes have served to improve and streamline the nomenclature, and are no more objectionable than the changes made from year to year in order to improve the performance and appearance of automobiles. One does not have to study the entire evolution of the automobile from 1905 to date in order to learn how to drive one's 1948 model.

Supposed Advantages of the C-D-E and Rh₁-Rh₂-Rh₃ Notations

1. Many workers have the false impression that they are easier to "learn" and teach. The reason for this is that one can speak about C-D-E and Rh₁-Rh₂-Rh₃ at once, without having any real understanding of the subject. These notations therefore serve as a convenient cloak for lack of knowledge and understanding, and actually discourage any desire to acquire such an understanding.
2. They make use of a one-to-one correspondence between genes and blood factors. This supposed advantage is based on the wrong concept that such a one-to-one correspondence must exist, which is not true.
3. They are gaining more adherents. This is true only because the protagonists of this system are teaching it, and because the new regulation passed by the National Institute of Health has forcibly called these notations to the attention of workers. The C-D-E and Rh₁-Rh₂-Rh₃ notations will naturally attract some adherents, just as the Moss and Jansky systems each gained their adherents. The resulting unnecessary confusion may take many years to clear.

Disadvantages of the C-D-E, Rh₁-Rh₂-Rh₃, and other Systems

1. They lack priority.
2. The genetic theory on which they are based is purely theoretical; there is no experimental evidence to support it, nor does it lend itself readily to experimental attack. On the other hand there is some statistical evidence based on the analysis of the distribution of the Rh-Hr types in the population that tends to refute the linkage idea.
3. The notations are cumbersome to use. For example type rh becomes small-c, small-d, small-e over small-c, small-d small-e. An error in printing in which a capital letter is substituted for a small letter or *vice versa* could prove fatal. Thus if anti-d is written instead of anti-D this would be very serious, but if anti-rh₀ is written instead of anti-Rh₀ the intention of the writer would still be obvious.
4. There is no clear separation of phenotypes and genotypes. The use of designations for "the most likely" genotype without indicating clearly all the time what is intended conveys to the reader the false impression that the actual genotype has been determined. The writings of users of these notations continually confuse genotypes with phenotypes, and it is impossible to tell from the designation used what tests have actually been made.
5. The letters C-D-E give no indication of any relationship to the rhesus system and convey instead the erroneous impression of a relationship to the A-B system of blood groups.
6. To learn the other notations suggested one must start from scratch, and all one's knowledge and understanding of the A-B-O and M-N systems is wasted.
7. The notations are too awkward for clinical use. There is no clear indication in the notations which bloods are Rh₊-positive and which are Rh₋-negative.
8. While some of the proposed systems of notations take advantage of the reciprocal relationship between the Rh and Hr factors, none takes into account the special clinical, serologic, and genetic position of the factor Rh₀.
9. The notations are not self-sufficient or self-explanatory. Thus users of the C-D-E notations are compelled also to use the Rh-Hr notations, as can be seen by consulting the papers of Fisher and Race who originated the C-D-E notations.
10. The symbols C and E have already been applied to other agglutinogens in human blood. The introduction of the use of these letters for agglutinogens of the rhesus-type would therefore result in ambiguity.
11. There is no uniform understanding among users of the C-D-E notations as to terminology for the phenotypes. Thus blood reacting with "anti-C," "anti-D," and "anti-c," but not with "anti-E" is variously designated as CDe, or CcDe, or CDe/cde, etc. Under the Rh-Hr notations, the blood would be designated

simply as Rh,rh, a name which clearly indicates positive reactions with sera anti-rh', anti-Rh₀, and anti-hr', and negative reactions with anti-rh".

12. No simple unified tables regarding the types and their heredity involving the other proposed systems of notations are available for use.

13. The C-D-E and other proposed notations are not mentioned in most standard laboratory texts, and are therefore unintelligible to the average reader.

—I am, etc.,

New York.

A. S. WIENER.

REFERENCES

- ¹ Wiener, A. S., "Theory and Nomenclature of the Rh Types, Subtypes, and Genotypes," *British Medical Journal*, 1946, 1, 982.
- ² — "Rh System in the Chimpanzee," *Science*, 1946, 104, 578.
- ³ — "Nomenclature of the Rh Factors," *Lancet*, 1948, 1, 343.
- ⁴ — *Blood Groups and Transfusion*, 3rd edition, 1943. C. C. Thomas, Springfield, Ill.

Scepsis Scientifica

SIR,—In his interesting address Prof. Geoffrey Jefferson (Feb. 28, p. 379) asks, "Could anything be learned from the structure and workings of the brain?" From the context this seems to refer to the relations of the brain to mind. He answers the question by saying that "to this old question we have no modern answer."

The *Proceedings of the Royal Society of Edinburgh*, Section B (Biology), 1943-4, Vol. 62, Part I, p. 86, gives at least one "modern answer."—I am, etc.,

Bristol.

R. J. A. BERRY.

** The reference is to an address entitled "Some Recent Advances in the Study of the Brain as the Implement of the Mind" which was read by Prof. Berry to the Royal Society of Edinburgh on June 5, 1944.—Ed., *B.M.J.*

SIR,—I read Prof. Geoffrey Jefferson's article (Feb. 28, p. 379) with such keen appreciation and enjoyment that it seems ungrateful to suggest that the issue might have been made clearer in the final paragraphs. The use of words as an economy of thought, to which the human race owes so much, is sometimes more confusing than helpful. Prof. Jefferson writes, "There are other large fields of knowledge besides Science." The meaning of these words as they stand alone is not very clear; but the important underlying meaning, obvious from the context, is that scientific technique is suitable for the investigation of some but not all of our total experiences.

The confusion arising from the use of the term "Science," at one time in its literal sense of knowledge, and at another in its acquired sense of a definite technique (deduction combined with induction, with special emphasis on the appeal to experience), has established a sort of vicious circle. Science in its meaning of scientific technique has had dramatic triumphs in the investigation of certain fields of our total experience, such as chemistry and physics, and has given us valuable knowledge of these subjects. These great successes naturally raised hopes that Science would be equally efficient in supplying knowledge in all other fields. But if we employ a word which means by derivation "Knowledge," not only for the knowledge obtained by a special technique but also for the technique itself, it is an easy step by equating all knowledge with the special technique to prejudice the whole issue and to obscure the truth, emphasized by Prof. Jefferson, that scientific technique as a means of winning knowledge is not infallible nor even suitable in all fields of our total experience.

This belief in the total infallibility of scientific method has become firmly established in the popular mind, largely owing to the dual meaning referred to above which has become attached to the term "Science," and it is this misconception which is threatening our civilization with disaster to-day.

As scientific technique invades the higher fields of biology and psychology it is compelled willy nilly, in order to maintain its output of success, to appropriate more and more to its use those techniques such as intuition and introspection which are suitable to these higher levels, and we are sometimes surprised to realize that these higher techniques have now been quietly incorporated in the scientific method. Unfortunately the highest techniques of all, meditation and love, have not yet been officially adopted, although to the writer it would seem just as much as error of technique to attack the problems of, for instance, social psychology by the scientific method, unaided by meditation and love, as to endeavour to analyse or weigh a chemical substance by meditation and love unaided by the scientific method.

Of course there is not the slightest objection to combining all techniques, including meditation and love, under the heading of "Scientific Technique" if we wish; but we might then just as well call this all-embracing technique "Religion." This brings us back to our old friend and enemy, the use of words.—I am, etc.,

London, S.E.21.

M. H. K. KANE.

Temperature Records and Ovarian Activity

SIR,—The letter by Dr. P. M. F. Bishop (April 10, p. 706) reflects certain common misconceptions concerning the significance of temperature records in the study of infecundity. May I attempt to clarify the position within the space available lest a valuable clinical method be employed without due regard for either its potentialities or its limitations? Dr. Bishop asks four questions.

Question No. 1: Does the basal temperature pattern denote whether ovulation has taken place?—The occurrence of a diphasic temperature cycle indicates that a phase of oestrogenic secretion has been followed by a phase of progesterone secretion. The rise of temperature caused by progesterone is usually, but not invariably, associated with, or follows upon, ovulation. But progesterone may be secreted without actual liberation of an ovum (e.g., in the case of retained ova or of luteal cysts), so that the rise is no absolute proof of ovulation. Conversely, ovulation may occur without luteinization, so that the absence of the typical rise in temperature may not prove the absence of ovulation. The condition of the endometrium also depends on ovarian secretion, not on ovulation itself. But the association between ovulation and a diphasic temperature curve is so high that in practice it has been used by a number of independent workers for timing of intercourse or of artificial insemination.

Question No. 2: Can it indicate exactly when ovulation takes place?—Experience with artificial insemination and with laparotomies timed in relation to the temperature cycle (cf. Greulich, W. W., Morris, E. S., and Black, M. E., *Proc. of the Conference on Problems of Human Fertility*, 1943, p. 37) show that ovulation, which of course is not necessarily an instantaneous process, tends to coincide with the thermal shift from the low to the high level. The accuracy of timing depends among other factors on the rapidity of the rise and is, therefore, less reliable in cases where the shift is of the gradual ("staircase") type.

Question No. 3: What information does it provide as to the degree of ovarian activity?—Injection of natural oestrogens tends to lower the level of the temperature. In women with anovular cycles and a high level of oestrogenic secretion (e.g., in certain cases of glandular-cystic hyperplasia or ovarian cysts) the waking temperature remains permanently at or below the level characteristic for the follicular phase; injections of progesterone raise the waking temperature to the level normally prevailing during the luteal phase according to the dose given. Again, during the early phase of pregnancy when the progesterone level is high the temperature is also high. When the progesterone level falls during pregnancy (e.g., in imminent abortion, or during the fourth month of gestation) the temperature drops, but rises again in response to progesterone injections. These are but some of the facts which indicate that the actual level of the waking temperature, as well as its relative variations, reflects quantitative variations, and not only the phases, of ovarian activity.

Question No. 4: Is it likely to give more accurate information if the temperature is recorded rectally than if it is taken by mouth?—The oral temperature is apt to give occasional deceptively low readings, due to extraneous factors such as mouth-breathing, to which the rectal reading is not susceptible. This means that in any individual case the oral temperature may show a misleading value, so that the subject might miss a critical date, if I may use this expression.

Dr. Bishop also contrasts the 500 records collected at the Fertility and Endocrine Clinic of the Chelsea Hospital for Women during the past three years with the large number to which I referred. Perhaps there is some confusion between number of women observed and number of cycles recorded. It has been my practice to ask my patients to record the waking temperature for not less than three months, and quite generally until they have reached the fourth month of pregnancy or their case has been discontinued. In one case illustrated in the original communication (*Lancet*, 1945, 2, 663, Fig. 6) 26 successive cycle records from one patient were reproduced, and more than 1,500 records gathered from private practice were consulted in developing the argument of that communication. Of course since then the work has been much extended by myself and others. It is a fact long recognized that successive menstrual cycles differ from each other with respect to occurrence of ovulation, time of ovulation, duration of luteal phase, etc., and it is quite insufficient in the treatment of infecundity to record only one cycle or occasional