

A fund has been established in memory of **Sir Dudley Stamp** for encouragement of geographical study and research, especially by young geographers. Further information can be obtained from the Joint Honorary Secretaries, Dudley Stamp Memorial Fund, c/o London School of Economics, Houghton Street, Aldwych, London, WC2.

**ERRATUM.** In the article "Direction of *in vivo* Degradation of a Messenger RNA" by Robert F. Baker and Charles Yanofsky (*Nature*, 219, 26; 1968)  $7 \times 10^9$  cells/ml. in the fifth line of the fourth paragraph should read  $7 \times 10^8$  cells/ml., and in the last line of the fifth paragraph on page 28, within 0.5 of the completion of messenger synthesis should read: within 0.5 min of the completion of messenger synthesis.

**ERRATUM.** In the communication "Rhythmical Changes of the Electrophoretic Mobility of Erythrocytes after Irradiation with Increasing X-ray Doses" by Bernhard Tibbukait (*Nature*, 219, 382; 1968) the legend to Fig. 3 should include the following: (○),  $P > 0.05$ ; (●),  $P = 0.05$ ; (×),  $P = 0.01 + 0.001$ . The author of this communication was Bernhard Tibbukait, not Bernhard Tribukait as stated.

**CORRIGENDUM.** In the article "Rosalind Franklin and the Discovery of the Structure of DNA" by A. Klug (this issue, page 808) the following corrections should be made: page 808, column 2, line 3, "helical" should read "helix"; page 809, column 1, line 16, delete reference 1; page 809, column 1, under "Historical Outline", line 5, insert "Wilkins and" before "a research student"; p. 810, column 1, 8th line from end, delete "detailed"; page 844, column 2, line 3, "and" should read "to"; page 844, column 2, penultimate paragraph, line 4, "solution" should read "structure".

## CORRESPONDENCE

### In Defence of Defensive Warfare

**SIR,**—Dr Gordon Smith in his review (*Nature*, 219, 537; 1968) takes the position, from which few would dissent, that work designed to protect the community against CB attack is ethical, and that information of use to a potential aggressor is better not made public. Much, however, in regard to the work at Porton turns on the meaning of "made public". Here Dr Gordon Smith is probably in a position to know what the rest of the scientific community cannot—whether Britain really keeps potentially aggressive weaponry to itself, or whether, as many of us suspect, any discovery of this kind is automatically communicated for evaluation and manufacture to the Americans—possibly with the understanding that should we require them as a deterrent, American germ weapons will be made available through the North Atlantic Treaty Organization. If this is the true position, it is more morally equivocal than Dr Gordon Smith implies—one argument for removing Porton from the Defence to the Health Ministry is that it would make such knock-for-knock fire insurance a little harder to maintain, if it exists.

Yours, etc.,

ALEX COMFORT

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**SIR,**—In his long and useful review of my book (*Nature*, 219, 537; 1968) Dr Gordon Smith accuses me of writing a

"rather patronizing" passage in which he claims that I question his own motivation for working at the MRE and that I suggest that he has not fully thought out his own position. I know Dr Gordon Smith's views on this subject and would not dream of saying any such thing. Nor did I. If he reads the passage more carefully he will see that I was unambiguously speculating on what the attitude of Hippocrates might have been.

Yours, etc.,

ROBIN CLARKE  
Editor

Science Journal,  
Associated Iliffe Press Ltd,  
Dorset House,  
Stamford Street, London SE1.

### Naming the Units

**SIR,**—On page 765 of the August 17 issue of *Nature*, under "Naming the Units" you print Professor Gamow's statement that "Great Britain, Italy and Spain have no special name for that number" ( $10^9$ ).

On the contrary my dictionaries all give milliard as an English word meaning a thousand million.

Yours, etc.,

W. J. FARMER

89 Ewell Road,  
Surbiton.

**SIR,**—For the mere number  $10^9$ , is there any objection to Kilomillion?

Yours, etc.,

G. CORDEROX

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Pall Mall, SW1.

### Going Metric

**SIR,**—It is certainly true that great industrial and commercial benefits may be expected by the forthcoming conversion to metric weights and measures in England, but it is a pity that so little thought has been given to the disadvantages of a system so incompatible with human perception.

The fundamental operation of perceptual psychology is doubling and halving; this operation can be performed both faster and more accurately than any other fraction can be obtained. Common housewifely chores such as mixing ingredients or measuring detergent rarely require more than three successive operations of that sort. Thus the sixteen ounce pound and pint are ideally suited to the kitchen. Moreover, the scale of human portions of food is such that they are easily reckoned in small numbers of ounces. In metric countries, housewives are forced into subterfuges, such as successive halvings of the 500 gram metric pound, a process requiring three significant digits instead of two. Rather than combine four of one with two of another, they must reckon 250 and 125.

The number of significant digits is also increased when using centigrade temperatures. The Fahrenheit degree was developed to have a certain psychological reality to it. One degree F is a just-noticeable difference to most people, and fractions need not be considered. The degree C is simply too big. In metric countries the temperature of swimming pools and rain is expressed as two digits and a decimal, whereas in the civilized Fahrenheit world two digits alone do quite nicely, and negative numbers are rarely needed.

This is not to say that one cannot make do with perceptually unnatural scales, but something is lost in the pro-

cess. People stop trusting their senses, which are no longer in tune with the reckoning of numbers, and begin to calculate the measurements of everyday life instead of intuitively feeling them. The result can only be an alienation of the soil from the mechanized world. Two times two equals four many times a day in the household world, and it is nice to deal with this phenomenon in small numbers and without resorting to fractions. It seems a shame that some authorities are willing to forgo the psychological validity of their national weights and measures in order to increase profits.

Yours, etc.,

JAN BERKHOUT

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Brain Research Institute,  
UCLA.

The Center for the Health Sciences,  
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### Scientists and the History of Science

SIR,—The reviewers have finished with James D. Watson's *The Double Helix*. While the reviews will be forgotten, it will remain an important contribution to the literature of the history and sociology of science. Some of the scientists who attacked the book in print would not agree with this judgment. They claim Watson's account is not a true description of how scientists work, or that it is a view of a very unusual set of events not normal to the general course of science, or that Watson has given a distorted picture of what happened. Some day, it has been argued, historians will get the story right, and the proper balance will be struck between Watson's book and what actually took place. In the preface to *The Double Helix* Watson is nearer the truth: "I am aware that the other participants in this story would tell parts of it in other ways, sometimes because their memory of what happened differs from mine and, perhaps in even more cases, because no two people ever see the same events in exactly the same light. In this sense, no one will ever be able to write a definitive history of how the structure was established".

Because he was one of the principal participants in the discovery of the structure of DNA, his account will remain an important source of information for historians. Unless others involved in the discovery, or people close to them, write their own versions and make them available, Watson's book will stand as the key personal record. If the scientists who know the DNA story at first hand think it should be told in another way they should do so, disseminating their accounts by publication or preserving them in manuscript or on magnetic tape and making them available to libraries and to historians. If scientists are concerned to enlighten the public about science they need to provide the records of their activities. The

Royal Society has taken an important step recently by opening a registry for the location of scientists' personal papers. A programme of oral history—a library of tape-recorded interviews with scientists about their life, work and ideas—should also be considered. The Wellcome Institute for the History of Medicine and the American Institute of Physics have begun collections of this kind for their respective fields, but a coordinated effort by British scientific societies in this direction will help considerably in the writing of the history-sociology of today's science and technology.

Yours, etc.,

H. FRUCHTBAUM

Clare Hall,  
Cambridge.

<sup>1</sup> Watson, James D., *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*, xii (Weidenfeld and Nicolson, London, 1968).

### Rosalind Franklin and DNA

SIR,—Discussions with a number of people on the final draft of my article on Rosalind Franklin (this issue, page 808) have pointed to the need for some qualifications, which there has been no opportunity to incorporate into the published text.

Firstly, the statement that Franklin discovered the *B* form of DNA does not imply that earlier workers had not obtained X-ray pictures which, though of poor quality, can in retrospect be assigned to the *B* form (see R. Olby, *New Scientist*, June 27, 1968). Franklin was the first to obtain a well defined *B* pattern and characterize it as belonging to a definite structural state of DNA.

Secondly, although the cylindrical Patterson function calculated by Franklin and Gosling unquestionably shows the existence of a double helix in the *A* form, the resolution of the map is only about 5 Å, so that the details of the model fitted are only approximate. The later, definitive work of the King's group (Fuller, Wilkins, Wilson and Hamilton, *J. Mol. Biol.*, 12, 60; 1965) shows that the two chains are far from equally spaced. Likewise it is doubtful whether the resolution in the three-dimensional Patterson map was high enough to enable the orientation of the helical molecules in the crystal cell to be deduced without ambiguity. It is the opinion of Fuller *et al.* that the X-ray data used were too sparse to settle this problem, and even their more comprehensive data to 3 Å resolution were "no more than sufficient for the purpose".

Yours, etc.,

A. KLUG

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Cambridge.

These points would have been incorporated into the printed version on page 808 if, because of the incidence of holidays and for other technical reasons, Dr Klug had not been prevented from seeing proofs of his article before it went to press.—Editor, *Nature*.

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