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.,

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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[1]".

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.,

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[1] 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.,

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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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