other countries? Finally, who is to see that the search for a more efficient literature is conducted with full awareness that the most important attributes of the scientific literature are often the most difficult to define? The National Academies, standing aloof from Governments and above individual learned societies, are a necessary forum for the resolution of these issues. The Committee on Scientific and Technical Communication is bound to become a kind of battleground. That is a proof of the responsibility it must discharge.

POWER OF TEN

THE winds of change are sometimes almost indistinguishable from placid summer breezes. The decision of the British Government that British money must now be decimal comes nearly six years after the Halsbury Committee uttered the cautious view that such a step would bring some benefit, not disaster. More than a century has passed since a Royal Commission recommended decimals, nearly two centuries since the French Revolution and its rationalists rescued some sanity from what they had done, and it is two millennia since the invention of zero. Yet even now the British Government has arranged that reform shall not come with indecent haste. The Halsbury Committee thought that three years would be enough for converting—or scrapping—the nation's cash registers, and for helping fifty million people to put behind them the scales of twelve and twenty, but five years have been allowed. And the decision has been taken to retain the pound sterling as the major unit of the currency when the mechanics of the transition would obviously be simpler if the penny were made a hundredth of some new unit roughly equal, by good chance, to the U.S. dollar. Bankers argued to the Halsbury Committee that the abandonment of the pound would precipitate a flight from sterling, but it is likely that things would have gone the other way, and that a public demonstration of good sense would have lent strength to the British currency.

Even modest gains are, however, to be welcomed, and it is important that the decimalization of British money should not now be hindered by obscurantists. There will be those who claim that the duodecimal system is better because twelve has several integral factors, though it is at least as sensible to argue that the base of all arithmetic should be a prime number in order that people should not be encouraged to manipulate vulgar fractions. In any event, nobody has invented symbols for the digits ten and eleven. Then there is no prospect of being able to start all over again, and to count everything in binary, though the English-speaking peoples may still savour the convenience of the system of volumetric units linking gills, pints, quarts, gallons, pecks and bushels by ratios of two or four. (How long, it may be asked, will that last?) More distantly, other feats of rationalization may now be attempted. Why not, for example, decimalize the day? The Assyrians, with their attempts to count in twenties and sixties, were edging towards a decimalized year. A decimalized day should be a much more practical proposition. From midnight to midnight would be a million new seconds. One per cent of a day, or 10^4 new seconds, would be a convenient sub-unit roughly equal to a quarter of what is now an hour. Astronomers and airline travellers alike would welcome—in due course—that further proof that decimals are not merely reasonable but inevitable.

INFORMATION AND COMMUNICATION

Information and Prediction in Science

Proceedings of a Symposium sponsored by the Académie Internationale de Philosophie des Sciences, held in Brussels 3–8 September, 1962. Edited by S. Dockx and P. Bernays. Pp. xi+272. (New York and London: Academic Press, 1965.) 76*s*.

INFORMATION and Prediction in Science is divided into six sections which deal, respectively, with information theory, and the role of information in logic, mathematics, physics, biology and the human sciences. The concept of information is given a pretty wide interpretation. A few papers (for example, A. Church, on the elementary theory of differential equations) have but the most tenuous connexion with the subject.

In the opening paper, L. Brillouin attempts to reconcile the following two theses: (1) information $= k \ln(P_0/P_1)$ can be identified with negentropy; when a scientist discovers a new theory, negentropy is actually created by thought; (2) for a mathematical theory, "valid over any field and without any limitation", $P_0 = \infty$ and $P_1 = 0$.

I see this as one good reason (among others) for dropping (1), but Brillouin instead modifies (2). He maintains that any theory, if it is to be applied to the world, has (*a*) limits of applicability, and (*b*) limits of accuracy. By testing the theory we can discover both (*a*) and (*b*) and thus calculate $k \ln(P_0/P_1)$, the amount of correct information in the theory. Everything else is sheer imagination. It may help us to understand, but it has no bearing on reality.

Quite apart from its instrumentalism, this solution is unacceptable for the following reason. Though a law of Nature has in some sense a limited field of application, it does not usually have a field of remaining errors. Brillouin seems to argue that this follows from the admittedly unavoidable existence of experimental errors. But this is a confusion, since it is not in the theory that we allow for errors, but in the measurements. Thus, the only way to discover (*a*) and (*b*), if they exist, is to refute the theory.

S. Watanabé points out that if we take a Boolean algebra of properties, then any two objects which do not have all their properties in common have a fixed number in common. Thus, similarity slips through our fingers. This formal criticism of nominalism leads to the idea that there must be preferred properties if we are to talk of similarity, and thus to the problem of hierarchical classification (for example, are we to classify a crow and a rook in the same species or only in the same family?). Watanabé's solution (which is highly intricate) is a classification algorithm which partitions sets into taxonomic trees on the basis of the properties which the elements possess.

This solution has one serious defect: it is not applicable to measurable properties, since whenever y is a preferred predicate, so is $-y$. Although 'smoking' and 'non-smoking' may be equally significant for a study of similarity, it is clear that the same is not true for '5 inches long' and 'not 5 inches long'.

H. B. Curry, P. Bernays and W. Sierpinski discuss in different ways the informational content of mathematics. Curry and Bernays take the formalist view that mathematics is the theory of formal structure and thus contains a great deal of information. Sierpinski suggests that even unproved statements of mathematics (for example, the continuum hypothesis) can have great heuristic value.

S. I. Bok, in discussing the problem of life, rejects the view that it is necessary to postulate a separate creation of life. He maintains that biologists could only have thought so because they had merely a superficial knowledge of thermodynamics. This he sees as a typical case