

Pirbright of the World Reference Laboratory for Foot and Mouth Disease in 1957.

Under his direction in the 1950s the institute developed many new techniques, notably in tissue culture, and Galloway was able to encourage the development of more advanced work in the biochemistry and biophysics of the virus which he himself had been associated with twenty years earlier, with Elford.

Galloway took a leading part in much international discussion on the control of foot and mouth disease. He advised the US Government in 1946–47 on the campaign against the outbreak in Mexico and was responsible for founding the Technical Group of the European Commission for the Control of Foot and Mouth Disease. Through these international activities it can be fairly claimed that he helped greatly towards the cooperation which has achieved a reduction of the disease in many of the most seriously affected areas.

He is survived by his wife, one son and two daughters.

Correspondence

Sternglass's Assumptions

SIR,—The letter under the above title by P. L. Taylor (*Nature*, **225**, 881; 1970) is an example of arguing in a circle. He proves that infant mortality is an exponential function of time by making the assumption that the overall fractional rate of change is constant!

As we have stated in our paper (*Nature*, **224**, 1257; 1969), there is no justification for such an assumption. Even if we postulated an exponential dependence for each individual cause of death, it would not be true for the total mortality, since the different causes of infant mortality are reduced at different rates. Indeed, there is at least one cause, due to genetic defects, which is either irreducible or can only be reduced extremely slowly. Thus a plot of the logarithm of total mortality against time would give a curve with a gradually decreasing slope and not a straight line.

Yours faithfully,

PATRICIA J. LINDOP
J. ROTBLAT

Department of Physics,
The Medical College of St Bartholomew's Hospital,
Charterhouse Square, London EC1.

Information Explosion

SIR,—I hope that the scientific community will heed Professor Webb's warning (*Nature*, **225**, 132; 1970) that we need new ways of presenting information if we are to survive the crisis brought about by the growth of the published literature.

Our colossal indifference to this basic problem stems perhaps from our belief that we can solve it by using computers. Yet this approach is obviously hopeless. Machines can retrieve information for the reader, but they cannot assimilate it for him.

If we examine the literature, we see that it is designed to save publishing costs and not to aid the reader in rapidly and easily comprehending complex information. What fundamentally we need to do then is (1) recognize that the cost of publication is an integral part of the cost of research and be prepared to pay adequate page costs and (2) redesign the literature for rapid reading and easy assimilation.

Although this program will raise the cost of publication by about 10 per cent, this increased cost will be offset

by the manifold greater economic returns resulting from the increased usefulness of the information being published.

Yours faithfully,

F. BRUCE SANFORD

US Bureau of Commercial Fisheries,
Division of Publications,
Seattle, Washington 98101, USA.

Keep Off the Grass

SIR,—As mentioned in your leading article¹ of February 7, 1970, more research is needed on cannabis, the effects of which have often been compared with those of alcohol. But a present obstacle against undertaking these highly desirable researches is the great difference between the problems of excessive alcohol consumption and those of the illegal consumption of marihuana, hashish or other cannabis products. The difference is that results obtained from biochemical, pharmacological or behavioural studies of alcohol can be correlated with the amount of alcohol circulating in the individuals under test (a good number of reliable methods of assay are available), whereas none of the results, even those of recent date^{2–4}, can be linked with the tetrahydrocannabinols (THC), either as such or metabolized and present in the experimental subjects. This present lack of a quantitatively reliable assay of the amount of active principle or principles of cannabis, absorbed and maybe circulating in the blood or perhaps in other body fluids, makes an accurate assessment of the pharmacological or behavioural data almost meaningless, especially if such results are compared with the effects of alcohol or other drugs or obtained with control groups. May I express a strong hope that this problem of an analytical method, obviously for micro-quantities, will be solved soon, because without it there is little chance of establishing the true nature (benign or dangerous) of cannabis?

THC may be transformed into the materials which, in fact, affect the central nervous system, and there are in any case wide individual variations in the subjective and objective effects. Moreover, illegally acquired marihuana cigarettes (as is often ignored) are usually low in their contents of active constituents, and the long-term effects of cannabis on Western man are unknown. All these uncertainties add to the great difficulty of giving unbiased judgment about the kind of harm (temporary or permanent) that abuse of the drug would bring about. This leaves the presence of tobacco, mixed with hemp particles in the pot cigarettes, outside any consideration of damage to health.

One further point merits emphasis: if one takes "harm" as measure of the degree of hardness of a drug, and not the number of habituates or addicts, then the amphetamine and barbiturate groups are surely harder than cannabis. But that alone is no recommendation to free cannabis from its legal shackles. On the contrary, without entering a large list of reasons for this viewpoint, one can only agree with the last sentence of the leader of *The Times*⁵, just as one has to agree with your leader, when it places education, information and public discussions at the top of priorities in the struggle against the problem of drug taking, and at the same level as legislation.

Yours faithfully,

F. BERGEL

Magnolia Cottage,
Bel Royal,
Jersey, Channel Islands.

¹ *Nature*, **225**, 485 (1970).

² Weil, A. T., Zinberg, N. E., and Nelsen, J. M., *Science*, **162**, 1234 (1968).

³ Weil, A. T., and Zinberg, N. E., *Nature*, **222**, 434 (1969).

⁴ Crancer, jun., A., et al., *Science*, **164**, 851 (1969).

⁵ Leader, and Fowler, N., *The Times*, February 7 (1970).