the Institute of Medical Laboratory Sciences standing apart from trade union involvement. Yet one is left with the unhappy suspicion that where reference was made to new problems that had arisen from the conflict between union aspirations and other interests the BMA was not recognised to be one of the unions whose aspirations were being promoted most strongly.

You showed greater objectivity in regretting that, despite recommendations in the Zuckerman report, no new career structure had emerged for non-medical staff in hospital laboratories with improved promotion on a broader basis than hitherto. The current anomaly whereby scientific staff are divided arbitrarily between PTA and PTB Whitley Council grades restricts both the number of posts for which PTA staff may apply and the career "ceiling" for the most able in PTB grades. Neither constraint is in the interests of the service or of the patient.

Interprofessional conflict too is contrary to the interests of the service, and, while it might be argued that the BMA could not promote the welfare of the medical profession without sometimes irritating other professional groups, indulgence in non-productive aggravation is to be regretted. The apparently nostalgic reference to medical laboratory scientific officers as technical staff was needlessly provocative while doing nothing constructive to enhance the aspirations of the medical profession. After all, the change in designation for which this institute sought recognition for a quarter of a century has at last been adopted officially and we could recall with appreciation the evidence in our possession of moral support from the Royal College of Pathologists a few years ago. Of course that was when the college emulated the longer-established royal colleges in their statesmanlike reluctance to become embroiled in controversy and recognised that even to promote the sectional interests of pathologists there existed more appropriately constituted bodies.

You commit a diagnostic error when you refer to the increasing number of graduates who, "unable to obtain posts as scientists," are entering the MLSSO grades. The gratuitous insult that medical laboratory scientific officers are not scientists, while calculated to aggravate friction in medical laboratories, is less serious than the misreading of graduate career development.

In the 1950s the main catchment area for recruitment to medical laboratories straddled the line dividing those going to universities and those in the next ability range. By 1960 the first postwar boom in the expansion of university places had already taken place, yet even since that date Britain's higher education has almost trebled in size.¹ The steadily increasing number of graduates recruited thus reflects the progressive movement of the dividing line; the data give no support to the hypothesis that there was a sudden influx of graduates into MLSSO grades coinciding with graduate unemployment. It is simply the case that if we want to go on recruiting from the same ability range as 25 years ago we shall find that a very much higher proportion of recruits are graduates.

It is not even necessary to argue—as one could—that practice of the profession has achieved a degree of sophistication requiring a graduate standard of education; graduates are now recruited into many posts not because a specific degree is necessary to do the job, but because staff of the required capacity had

exploited the increased opportunities to go to university.

Finally you ask, with a specific reference to this institute, how long it will be before the lesson is relearned that practising scientific skills gives greater job satisfaction than management. Does that not apply, then, to medical skills?

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¹ Department of Education and Science and Scottish Education Department, *Higher Education into the 1990s: A Discussion Document*. London, HMSO, 1978.

SIR,—I found your leading article (21 October, p 1108) most enlightening. After starting with a balanced account of the fate of the Zuckerman Report and the details of the draft circular to replace HSC(IS)16, you then nail your colours to the mast by relating the proposed head of a pathology department not to the director of a modern progressive concern but to the captain of the *Ark Royal* (in which Elizabethan era is not specified). To continue the nautical theme perhaps the biblical ark would be more appropriate, rescuing the various species of pathologist (appropriately two-by-two) from the inexorable flood of able and articulate non-medical scientists. Who will act as the dove and whether the olive branches² will be picked up is not clear. It is certain that the waters will not subside.

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¹ *Gazette of the Institute of Medical Laboratory Sciences*, 1977, 21, 238.

² *Gazette of the Institute of Medical Laboratory Sciences*, 1978, 22, 393.

SIR,—Though the implication that the captain of *Ark Royal* commands through consension has no doubt brought a grimace or two from your old-salt readership, your Trafalgar Day leading article (21 October, p 1108) is to be commended for pointing out the wisdom of the Scottish laboratory management proposals in contrast to those emanating from the Department of Health and Social Security. The former follow present practice, at least in my experience of physiological measurement laboratories, and one would be hard put to find a suggestion more likely to lead to a breakdown of morale, interest in work, and patient-directed effectiveness than that of the formal appointment of a laboratory manager.

Regarding the question of providing reasonable career opportunities for the relatively small groups outside pathology, radiology, and physics, the Association of British Clinical Neurophysiologists, in its comments on the consultative paper of 1975, noted that the problem could largely be solved by regional organisation within the specialty; not through geographic centralisation but by functional integration of independent units. This still appears to offer good prospects both to the technicians and to the services they provide.

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Maternal alcohol consumption and birth weight

SIR,—In your editorial (8 July, p 76) you raised the question of the alcohol intake safe for the fetus. We believe that your starting point is quite as erroneous as are the American slogans "Mom's couple of drinks a day mean an abnormal baby,"¹ "Women when they find out they're pregnant shouldn't celebrate with a bottle of champagne,"² etc, or the French study indicating the importance of the type of drinks.³

We could show experimentally⁴ that alcohol, even at double the lethal dose, does not affect DNA synthesis and has no cytotoxic, mutagenic, or teratogenic effects; while its first metabolite, acetaldehyde, is intensely cytotoxic, mutagenic, and teratogenic whenever its blood level surpasses 30 $\mu\text{mol/l}$, the maximum concentration found in healthy people who have ingested alcohol. As to the growth retarding action, in pregnant rats 40% ethanol or disulfiram by itself failed to affect the rate of fetal resorptions and the weight of the fetuses, whereas 40% ethanol given together with disulfiram caused a fivefold increase in fetal resorptions and a 30% decrease in the weight of liveborn fetuses ($P < 0.001$ for both differences).

Responsibility for the "fetal alcohol syndrome" is therefore ascribed to acetaldehyde at maternal blood concentrations exceeding 35 $\mu\text{mol/l}$, which are due probably to an inherited or acquired defect of a specific aldehyde dehydrogenase. Evidence in support of this was offered by several clinical observations,⁵ among them on a woman who had been drinking regularly 100 to 200 ml of absolute alcohol daily since 1965, when she was 23. In 1970 and 1972 she had delivered two normal babies, then in 1975 she had one with a characteristic alcohol syndrome. In spite of medical advice she had not stopped drinking. In 1976, a year after delivering the affected child, she again became pregnant but 10 days later she was arrested and jailed. In the prison she had no possibility whatever of obtaining alcohol. After seven months she was released and immediately resumed drinking. In spite of this, at term she gave birth to a somewhat underweight but otherwise fully normal baby. Three weeks later we gave her 0.5 ml/kg of alcohol to drink; by 30 minutes her blood acetaldehyde level had risen to 140 $\mu\text{mol/l}$.

Since the acetaldehyde level does not depend on the amount of alcohol consumed, if the mother is healthy, her fetus will not be hurt by "binge drinking" or a "couple of drinks." The 30 ml of alcohol contained by them corresponds to 300 ml of wine, and in France and Italy many millions of pregnant women continue to take such amounts with their meals with comparative impunity. On the other hand, if the mother's capacity to metabolise acetaldehyde is defective minute amounts of alcohol will harm the child, both directly and by damaging the placenta. Thus with such women it is of no avail to cut down their alcohol intake, as you suggest. There are two ways of preventing the risk. One is strict abstinence during the whole course of pregnancy; this measure promises an unharmed child even if the previous one has been affected or if the mother's aldehyde-oxidising enzyme is not fully active. The abstinence, however, will in all probability be violated by many women, especially those who are regular drinkers. A more promising possibility would be to screen prospective mothers for their

blood acetaldehyde level after a drink. With a level exceeding 30 $\mu\text{mol/l}$ the woman must be strongly advised not to have a child or, if she is pregnant, to have it aborted.

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¹ *Medical Tribune*, 1977, March 16.

² *Journal of the American Medical Association*, 1977, **237**, 2585.

³ Kaminski, M., Rumeau-Rouquette, C., and Schwartz, D., *Revue d'Epidémiologie et Médecine Sociale de Santé Publique*, 1976, **24**, 27.

⁴ Véghelyi, P. V., and Osztovics, M., *Experientia (Basel)*, 1978, **34**, 195.

⁵ Véghelyi, P. V., et al., *Acta Paediatrica Academiae Scientiarum Hungaricae*, 1978, **19**, 181.

Minimum information needed by prescribers

SIR,—We were interested to read the article by Dr A Herxheimer and Professor N D W Lionel (21 October, p 1129) and should like to elaborate on our personal communication to which they refer. We wholeheartedly agree with their suggestion that there is a real need for unbiased information to be made available to prescribers. Further, this information should also be factual, relevant, evaluated, and up-to-date. An initial scheme was started in 1971, designed for local use in Nottingham hospitals, but the present format was adopted in 1975. In the light of experience the production process has become more refined and distribution outlets increased.

The information is supplied on standard-sized cards which are kept in a file-card box at the point at which the drug will be prescribed—for example, the ward or outpatient clinic—which enables the information to be easily retrieved and updated when necessary. The information is presented in two parts. The front of the cards contain sufficient information for the appropriate drug to be prescribed. It begins with the non-proprietary drug name (except with standard combined-active-ingredient products such as Sinemet), and this name is used to index the cards. Then follows a description of the drug by therapeutic class, its approved and proved indications, recommended dosages, and normally available presentations. The reverse of the card contains clinical and pharmacological information, which is presented under the headings: pharmacology, absorption, distribution, excretion, drug interactions, influence on laboratory tests, clinical and pharmaceutical precautions, contraindications, side effects, and treatment of overdose. In this way the cards more than fulfil all the suggestions made by Dr Herxheimer and Professor Lionel.

So far 140 individual drug titles, together with index cards of proprietary to non-proprietary names, have been produced and distributed. A total of over 2500 copies of each card are distributed to 35 centres throughout the UK. The rate of production has been unavoidably slow as both of us have demanding jobs, but it is hoped that a total of about 300 titles will be achieved within the next 18 months. During this time updating of earlier titles will begin, an essential part of the overall information scheme. We also intend to

produce disease-orientated index cards which will relate treatment of disease states to the selected drugs. We have found that joint production of the scheme between a drug information pharmacist and a clinician with a teaching commitment to therapeutics produces an ideal balance of information. When necessary, additional specialist medical advice has been sought.

One of the main difficulties with the whole scheme is that the number of drugs in routine use is constantly increasing, largely because there is no guidance or agreement on the basic drugs necessary, although the attempts by the World Health Organisation to produce such guidance are a step in the right direction. Limiting the number of drugs in routine use will help to contain the amount of information that the prescriber requires to enable patients to be treated safely and efficiently.

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Death certificates and epidemiological research

SIR,—It would be unfortunate if the laudable intention ("to improve the accuracy of the information which the Office of Population Censuses and Surveys receives") of Sir Cyril Clarke and Dr George Whitfield (14 October, p 1063) were to be frustrated because those unfamiliar with the use of mortality statistics were led by their paper to conclude that death certificates were, in any case, so full of errors as to be useless for epidemiological research. Even on the evidence they present this is not so, despite the list of 39 so-called "major" discrepancies in 191 certificates. Every comparative study of this kind, including the largest series reported to date,¹ came to the same broad conclusion—namely, that death certificate diagnoses are reliable for some causes of death and not so reliable for others; and such studies are valuable to the extent that they indicate which is which.

The present series gives only a partial picture of mortality at ages 1-49 years because deaths in surgical, gynaecological, trauma, and orthopaedic wards are excluded, as are all deaths outside hospital. Some of the main causes of death in this age range, such as accidents and other violence and cancer of the female breast and reproductive organs, to name a few, would be represented inadequately if at all, and the study is, of course, irrelevant in assessing the reliability of death certificate data for such causes.

It is obvious that the "actual" causes of death as tabulated are not intended as substitute medical certificates of cause of death (see, for example, No 23). Consequently the comparison with the death certificate is a fair one only if multiple cause coding is adopted for both. If this is done, according to my reckoning, discrepancies between diagnoses on certificates and "actual" causes disappear in whole or in part for 19 of the 39 deaths. That is to say, in each instance both forms of record would have one or more ICD codes in common.

In any sizable sample of comparisons of this kind one would expect to encounter compensating errors, and the present material provides a good instance of one error cancelling out another. For two of the deaths listed (Nos 4 and 13) clinical opinion indicated suicide but the legal decision did not. But the opposite occurred for two other deaths

(Nos 12 and 14). Thus the net result is that the number of suicides in the sample is exactly the same whether one counts death certificates or "actual" causes. Before one could estimate the validity of mortality statistics based on death certificates it would be necessary to know whether, among the certificates which by the nature of the investigation were not studied at all, there were errors that would have compensated for some of the remaining "major" discrepancies. For example, in the tabulated list acute myocardial infarction (ICD:410) occurs twice among the death certificates and is given three times as the "actual" cause. But the difference of one must be set against the total death certificates assigned to this cause among the population at risk from which the sample of 191 deaths studied has been drawn.

Although major discrepancies in the present series may not be as numerous as the authors would have us believe, one must accept that wrong diagnoses will occur in any sizable set of death certificates and it is pertinent to consider what effect these will have on the results of epidemiological research. In many investigations, whether retrospective, case-control, or prospective, the object will be to discover if an association exists between one characteristic, such as a given diagnosis, and other attributes (area of residence, food intake, genotype, marital status, occupation, smoking habits, water supply, etc). In general—that is, if errors are uncorrelated—the effect of misclassification is to weaken a statistical association so that in reality the link between the disease, for example, and the attribute may well be stronger than the data appear to indicate. This is one reason why epidemiologists not infrequently can draw faulty conclusions from imperfect and ambiguous information. Experienced clinicians, of course, are often able to do the same.

Major Greenwood, writing about epidemiology, once compared those who would insist on nosological perfection in medical statistics to Horace's rustic who refused to cross the river until all the water had flowed away. If the Royal College of Physicians study leads to an improvement in the quality of medical certification of the cause of death so much the better. Meanwhile, one hopes that clinicians and others wishing to undertake epidemiological studies will not be deterred by exaggerated fears about the frequency of inaccuracies in this primary source of data.

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¹ Puffer, R. R., and Wynne Griffith, G., *Patterns of Urban Mortality*. Washington, DC, 1967.

SIR,—The article from the Medical Services Study Group of the Royal College of London (14 October, p 1063) illustrates—dare I say inadvertently?—a problem which sometimes faces the doctor when he completes a death certificate. This problem is the effect of what he writes on that death certificate on relatives of the deceased who are already upset.

Out of the 39 cases of discrepancy between stated and "actual" cause of death, nine of the corrected causes used terms or phrases which could be emotive and which were not used or alluded to by the certifying doctor. Such words as "alcoholic," "alcoholism," "suicidal," and "syphilitic" and the names of various mental disorders appeared. These are all well known to the general public and do carry certain unfortunate social connotations.

The doctor wishing to spare the feelings of the relatives may well feel that omission or