

basis, which is quite different from the one to be used in judging a translation of a recent research paper.

The book covers the composition and broad structure of the atmosphere; atmospheric thermodynamics; radiation; heat and moisture regimes; physics of cloud, precipitation, fog and visibility; atmospheric optics, electricity and acoustics; ionosphere. Dynamical meteorology has, deliberately, only one small chapter. References are given to more detailed Russian books on such subjects as scattering of radiation. There is no index.

As a book of its specific scope for Russian students, the original is good, the best part being the chapter on radiation. I boggled at the unqualified statement that the height interval in decametres between two isobaric surfaces is almost exactly twice the mean absolute virtual temperature between them, which is true only if the ratio of the pressures at top and bottom is 1:2, but not at much more.

The translation does not seem to have been critically examined by a meteorologist. The terminology is in places odd or merely a literal translation. Thus "meteorological booth" appears for "instrument screen" and "relative topography" for "thickness". Under some diagrams and in places in the text, Russian abbreviations have been transliterated instead of being entered in the accepted English form. It is essential for a book for students to use the terminology generally accepted in their own language. Two gross errors of translation were noted: (a) "under continental conditions the daytime rise of relative humidity is particularly marked in summer", instead of the correct "fall" which appears in the original—the reason for this is indeed explained in the next sentence; and (b) "drafts" instead of "droughts". The text describes an aerological diagram contained in a cover pocket in the original but not reproduced in the translation. The references to more specialized Russian books are translated, but no effort is made to direct the student to similar sources in English. The reproductions of cloud and aurora photographs are even worse than in the original. It is true the book covers a range not to be found within the covers of any recent book in English—Humphreys's *Physics of the Air* is the nearest in scope but much less up to date—but I cannot recommend it, especially at such a high price, to the English or American student. The original Russian book cost the equivalent of about 15s.

It is stated that Pogosyan's book has been written for a wide circle of readers. It is entirely non-mathematical but does require an elementary knowledge of physics. The book is generally sound but rather dull and in need of more and better diagrams and photographs to arouse interest. Thus there is a chapter on local forecasting illustrated with only one, and that very poor, cloud photograph which is of cirrus. The chapters on radiation and possible and not-possible effects on weather and climate of artificial influences and human activities are particularly good. The discussion, in this translation at least, of the relation between wind and pressure is not good, geostrophic and gradient wind being treated as synonymous.

The translation is not good and contains some odd terminology. Thus the Russian word for "cirrus" can also mean "fleece", hence the words "fleece-stratus cloud" in this translation. Some Russian terms, for example "sukhovei" (a hot dry east wind in South Russia), are merely transliterated and not translated or explained. The general reader, like the student, requires the accepted terminology. The meteorological examples, such as temperatures, refer to the Soviet Union. The diagrams have been very poorly copied from the original. I cannot recommend this translation to the British or American general reader.

It is doubtful if it is worth translating complete students' textbooks or books for the general reader from Russian for sale at such high cost in western countries. G. A. BULL

University News:

Glasgow

THE following have been appointed to chairs: Professor D. W. A. Sharp, professor of inorganic chemistry in the University of Strathclyde, to the new Ramsay chair of chemistry; Dr Alexander C. Forrester, reader in anaesthetics (Royal Infirmary), to the new chair of anaesthetics; Dr D. K. Mason, senior lecturer in dental surgery and pathology and in preventive dentistry at the University's Dental School, to the new chair of oral medicine.

London

THE title of professor has been conferred on the following: Dr T. C. N. Gibbens, forensic psychiatry, in respect of his post at the Institute of Psychiatry; Dr T. V. Glenister, embryology, in respect of his post at Charing Cross Hospital Medical School; Dr I. Macdonald, applied physiology, in respect of his post at Guy's Hospital Medical School; Dr I. MacIntyre, endocrine chemistry, in respect of his post at the Royal Postgraduate Medical School; Dr F. W. O'Grady, bacteriology, in respect of his post at St. Bartholomew's Hospital Medical College; Dr E. A. Power, mathematics, in respect of his post at University College.

Appointments

DR D. E. R. GODFREY, at present head of the Department of Mathematics at Woolwich Polytechnic and part-time vice-principal, has been appointed principal of the polytechnic on the retirement of Dr H. Heywood. Dr Heywood has accepted a post as senior research fellow at Loughborough University of Technology.

CORRIGENDUM. The price of the book entitled *Chemical Equilibrium* by Allen J. Bard (*Nature*, 214, 1170; 1967) is 25s.

CORRESPONDENCE

Education for Change

SIR,—Dr Davies's remarks (*Nature*, 214, 1079; 1967) on the kind of graduate which industry will require in the 1970s and beyond deserve close attention from heads of university departments and from headmasters. We should like to reinforce his argument with information gathered from the schools, from university undergraduate courses and from graduates of some years standing both in Great Britain and abroad.

It is, we think, generally agreed that among sixth formers there is a trend away from the rigorous science discipline of mathematics, physics and chemistry. This has recently been the basis of Dr Dainton's remarks. What many sixth formers seem to want, however, is not so much arts subjects instead of science, but the possibility of combining the two. Our own experience over the past three years, during which we have visited very many schools as examiners and lecturers, is that there is in schools increasingly the possibility of a sixth former taking (say) mathematics at A and S level together with a language or history. Of twenty applications for one of our combined courses, thirteen were offering science and language subjects at advanced level.

It was a realization of this which prompted this Institute to introduce combined studies courses three years ago. Here a science or technology (mathematics, an electrical engineering topic or textile technology, for example) occupies roughly half the syllabus, the remainder being either European studies with a modern language or management sciences. We have not found applicants for these courses to be those who feel they might have difficulty in securing admission to an arts department for languages or to an engineering or mathematics depart-

ment. On the contrary, they tend to be those who could easily secure a place for a single discipline. In any case, our combined studies courses are of honours standard and not in any sense an easy option.

The same desire for "generality" is also revealing itself in other countries. Even though the school courses for both *Baccalauréat* and *Abitur* do not show as much specialization as the British sixth form courses, and in spite of the possibility of breadth of study in French and German universities, it is clear that many science graduates in France and Germany feel that their undergraduate course still left a good deal to be desired. An article in the June issue of *Réalités* (pages 84-88) shows this very clearly. Some of the conclusions drawn by French graduates now working in industry are very revealing. "There is no point in packing the curriculum with the rudiments of all the specialisms. You end up with mere nomenclature. It is the old problem of whether to have a well-trained head or a well-filled head. The question 'Is an engineer a scientist or a business man?' has not been answered. Technical development in certain fields is so rapid that scientific training can only to some extent prepare the student to understand new technologies. In a managerial position for example, 90 per cent of a man's technical knowledge is not derived from his university education."

These are some of the problems facing the university teacher in faculties of science and technology. In our view, Dr Davies has made out a convincing case for more "generalism" in scientific and technological studies. It is up to the universities to see that the wishes of undergraduates and the needs of industry receive a hearing.

Yours, etc.,

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No Change for Chemistry

SIR,—May I clear up some misunderstanding which is apparent from your comments on the Royal Society Postgraduate Training Report on Chemistry (News and Views, June 3)? Your implication that industrial views were ignored is inaccurate, as a reading of the report would show. A forceful industrial critic of the academic set-up was a member of the committee, and the most frequent industrial grumbles were quoted in an "Industrial-Academic Relations" section.

Again, a "product opinion" survey was deliberately not attempted because we knew that an exercise along these lines was being planned in conjunction with the Royal Institute of Chemistry; indeed, a member was common to both committees so that duplication could be avoided. In your further comment on June 10 you seem to have just become cognizant of this RIC committee (although it was mentioned in the Postgraduate Report) but again you do not seem to have realized the mutual awareness of these two projects.

Yours faithfully,

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THE industrial criticisms mentioned in the report, and the single reference to the RIC committee, are included in the two paragraphs reproduced below:

"It is generally agreed that in chemistry there is a greater-than-usual degree of mutual understanding between university and industry. One healthy facet of this relationship is that neither treats each other with over-exaggerated respect; reciprocal comment, both public

and private, on each other's methods and aims is usually forceful and sometimes fruitful.

"One perennial industrial complaint concerns the reluctance of postgraduates to enter industry in the UK, and is usually coupled with dark hints of conscious or unconscious brain-washing on the part of the supervisors. In this view, the present postgraduate training is regarded as a self-perpetuating system for academics with little concern for the need to produce industrial pace-makers. The Swann and Willis Jackson Committees have already discussed this problem and it will not be dealt with further here, except to point out that the situation in chemistry is better than earlier alarmist statements suggested. It is also relevant to note that an industrial-academic Committee of Enquiry has been appointed by the British Chemical Education Committee (a Royal Society-Royal Institute of Chemistry body) to investigate in detail the relationship of undergraduate and postgraduate courses and training to the needs of industry. Another industrial stricture is typified by a recent article which pours scorn on university training topics as being trivial, eminently predictable, mere straight line extrapolations or interpolations from known phenomena. Many university problems are also regarded industrially as being too rigidly narrow, tending to inculcate a blinkered and restricted mental attitude in the student."

—Editor, *Nature*.

Applying Research

SIR,—Recently published figures purport to show that the UK is spending nearly as much on research and development as the whole EEC combined. Few of your readers would question the correlation between today's production and the research of a few years ago. Yet our Gross National Product increases with painful slowness. There is something here that needs explaining. Possible suggestions:

(a) The law of diminishing returns is operating in a big way.

(b) That taxation advantages, and accountants' views about what expenditure does qualify as "R and D", differ so much from industry to industry, and from country to country, that valid comparisons cannot be made.

(c) The tendency to regard a research department as a prestige symbol worth paying for, like an over-elaborate headquarters building. (I can think of research departments that seem to have been closed down for reasons bearing little relation to the quality of their work.)

(d) That industry has still not learnt to use scientists and engineers properly. (I once interviewed a distinguished Ph.D. of several years standing, whose job was to devise schedules of cutting up steel rod and plate in order to fill orders with minimum wastage! This is, I hope, a very extreme case of inefficient use.)

(e) That, in a typical firm, a number of people in the "research department" are in the process of being groomed for administrative and sales work.

Comparison with the USA hardly suggests that (a) is an important factor. I am sure that all the others are operating to some extent, and I suggest that attempts to measure some of them, even roughly, would be very timely indeed. I feel sure that some of them can be measured, though I am not myself qualified to do so.

Before we start telling ourselves that we are hopelessly inefficient in applying the results of research as compared with, say, West Germany, it seems to me important to establish whether the disparity of real research effort is really so great as the raw figures seem to suggest.

Yours sincerely,

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