conditioned to a two-dimensional existence in a temperate climate breathing a mixture of oxygen and nitrogen which varies little from that of the sea level atmosphere. The fact that he must breathe a gaseous mixture renders him vulnerable to changes in environmental pressure.

Man's restlessness and competitive striving for gain has led him to exploit environments beyond the confines of the land, over and into the seas, and into the air and outer space.

Two thousand years or so ago the pearl divers of the Pacific perfected simple techniques to enable them to collect riches from the sea bed. Since then man has extended diving, first for salvage and underwater engineering, then for warfare and sabotage, and more recently for pleasure. Lately, however, the discovery of oil beneath the sea and the requirement for massive engineering structures at great depths has given diving man a new potential. The rewards are great, but so are the dangers, for to be effective he must expose himself to great pressures, to unaccustomed respiratory demands, weightlessness, and profound physical and emotional stress.

It is fortunate for the divers and those who employ them that even before their services were required the interest of the underwater environmentalists, mostly naval, in their problems was aroused. There was little need for trial and error and a wealth of experience and experimental data already existed. Without this the present underwater achievements would be impossible.

This second edition has been published at a very opportune moment. The first was published in 1969 but since that date major developments in deep diving with particular reference to the offshore oil industry have become of great significance. So much so that the editors, with the new underwater demands in mind, have redirected this volume to current needs.

Seven additional chapters have been added to the original 22 and many others have been modified and updated. The remaining, and little changed chapters are those which cover the basic principles of diving, the physics and physiology of gases under pressure, and those adversities peculiar to diving, for example: inert gas narcosis, oxygen poisoning, carbon dioxide poisoning, and decompression sickness, by authors such as Kylstra, Behnke, Schaefer, and Walder, all distinguished pioneers in this field. The fundamentals of engineering and breathing apparatus are updated and a new chapter on the physiological principles of breathing apparatus by Morrison, full of valuable data, is a welcome addition.

Fundamental to survival in the artificial environment are the Life Support Systems and the well-illustrated presentation by Miller is also a welcome and indeed necessary addition. It is generally assumed for practical purposes that fluids and body tissues are incompressible and the only worries underwater are those associated with gases. However, evidence is growing that pressure itself may have its effects on physiology and biochemistry and a timely warning is given by Macdonald under the heading hydrostatic pressure physiology.

Another relatively new complication of deep diving is the high pressure nervous syndrome. This was first attributed to helium narcosis, possibly associated with carbon dioxide retention, and seemed to put a final limit on depth. However, the study of this problem in both

animals and man as presented in two new chapters by Brauer and Bennett gives hope that the addition of carefully controlled amounts of nitrogen to the oxy-helium mixture could be the answer.

Other very real complications have received additional attention: cold exposure by Webb, bone necrosis by McCallum, and auditory and vestibular function by Farmer and Thomas.

The arrangement of the chapters is subtly appropriate and the abundance of expertise is neatly contained between a new opening: a short history of man in the sea, and a formal review of diving accidents by Hanson and Young. One cannot escape the significance of the comment that most accidents are due to carelessness or ignorance. The engineers and the doctors have done their best for the divers in their dangerous environment. The rest is up to the divers themselves to ensure that they are well trained and fit and that they fully appreciate the environmental hazards they face.

Finally in support of this exceptional publication it should be stated that, although mainly concerned with a relatively limited field of human activity, it offers a blue print for anyone interested or indeed involved in the adaptation of man to his environment.

The printing, illustration, and format of the book are excellent and rarely does one find such an abundance of references. The editors and contributors are indeed to be congratulated.

STANLEY MILES

Radon and its Daughters in Various British Mines. By J. C. Strong, A. J. Laidlaw, and M. C. O'Riordan. (National Radiological Protection Board Report R. 39). (Pp. 24; 50p). London: HMSO.

The element uranium is widely distributed and most rocks contain it at concentrations of around a few parts per million. Among its decay products are the radioactive nuclides radium-226 and its daughter radon-222, which is chemically an inert gas. Workers in mines inhale minute quantities of radon which diffuses from the rocks and there is a potential radiation hazard, both from the radon itself and from its short-lived decay products. Specifically, prolonged exposure to high concentrations is known to increase the incidence of lung cancer.

Duggan and co-workers have shown that radon concentrations in coal mines are relatively low but that higher concentrations occur in metalliferous mines. Consequently in 1973 the NRPB made an extensive survey of radon concentrations in non-coal mines and this is its report.

At present there is no statutory regulation of radon exposure in this country, although the International Commission on Radiological Protection recommends a concentration limit (averaged over a year) of 30/Ci per litre for radon-222 and an equivalent 'working level' is in force in the USA. The most important result of the survey is that 745 of the 1788 miners surveyed (that is, 40% of the sample) might well have been subject to exposure above this limit; 87 workers apparently had estimated exposures above five times this limit. Some reduction was noted in a later survey.

The number of persons in other occupations whose annual exposure to ionizing radiation regularly exceeds the appropriate limit is negligible. It appears therefore

that the victims of radiation hazards are to be expected neither among radiographers nor atomic energy workers but among non-coal miners! Could there be a better illustration of the value of regular monitoring of the working environment? M. J. DAY.

Report of the Working Party on the Laboratory Use of Dangerous Pathogens (Chairman: Sir George Godber), Department of Health and Social Security. (Pp. 40; 55p.) London: HMSO (Cmnd 6054). 1975.

It was not unexpected that the smallpox escape in London which resulted in the death of two outside contacts would lead to an inquiry into the use of dangerous pathogenic organisms in laboratories. Even without this event to focus attention, it was timely to consider the problem in view of the growth in recent years of institutions not primarily concerned with the routine diagnostic and research responsibility for handling such organisms, who nevertheless under current legislation could acquire and use them independently.

The report of the working party is divided into five sections and has four appendices. All aspects of the problem are considered in detail. The committee compiled a list of some 70 pathogens which they divided into two categories: 'A, organisms so dangerous as to present great risk to the health either of laboratory workers or of the human or animal communities such that material containing live organisms should not be accepted knowingly, or held at all in this country without authorization', and 'B, organisms which present considerable danger to laboratory workers and/or animals but are either present in the human or animal communities or are not likely to cause epidemics. They should be held only in a laboratory under the supervision of suitably qualified staff'. The working party assessed the size of the problem by circulating a questionnaire to laboratories, universities, and research departments to determine which species of pathogens on the list were held by individual laboratories. They discuss existing codes of practice, in particular 'Safety in Pathology Laboratories' compiled by the Department of Health and Social Security in 1972, note the potential hazard posed by genetic engineering and review the existing legislation relevant to the problem, such as the Health and Safety at Work Act.

Finally, the working party make specific recommendations for the handling of dangerous pathogens in laboratories. These recommendations are adequate and attainable without being excessively restrictive or impracticable. Thus in essence the report defines a comprehensive list of organisms considered to be of special importance in laboratories, formalizes the responsibility for their control, and advises on how best this may be done. Heads of all laboratories handling dangerous organisms and other interested parties such as doctors in environmental health should have a copy of this report and study it carefully. A. A. CODD

Research in Occupational Safety and Health. International Directory of Research Laboratories and Organizations. 2nd edition. (Pp. 584; Fr. fr. 60.) Association for Research on Prevention of Occupational Risks, Switzerland: 154 Rue de Lausanne, 1211 Genève 22. 1974.

The International Social Security Association whose members are drawn from government departments and other institutions has among its aims the publication of documents on social security and a permanent committee on the Prevention of Occupational Risks. This has several sections, one of which aims to make research involving experimental work on occupational hazards and prevention more widely known.

This book is a new English language edition of a volume first published in French in 1971. The information is based on replies to questionnaires issued in 1973 so that it is inevitably out-of-date in some respects. However, this is probably not a serious drawback as much of the important information it provides is likely to be correct for some time yet. There is a very useful index of the materials and subjects covered by various research institutes and organizations, which themselves are indexed by type of activity and field of study. Research workers are also indexed by name and there is a geographical index. As a directory it is a good source of information for workers seeking to know where certain interests lie or for travellers to other countries who wish to plan a series of visits related to their own research interests. Any research group with an international outlook would find this directory very useful.

R. I. MCCALLUM

Toxicology: the Basic Science of Poisons. Edited by L. J. Casarett and J. Doull. (Pp. 768; tables, 15 figs; £14.50.) New York: Macmillan. (London: Baillière Tindall) 1975.

Most of the chapters of this textbook, designed primarily for toxicological courses, were written by eminent experts. Their experience ensures a readable style which by contrast makes irritating the occasional imperfections, slips, and the absence of active editorial work. There are duplications, for example in the metabolism of pesticides, or the deposition and clearance of particles. The 42-page table on air pollutants could be omitted without any loss, as could more than 80% of the chapters on the skeletal and reproductive systems which are unrelated to toxicology. In the same chapters the authors omit to mention many important toxicological facts, for example: Ita Ita disease, skeletal fluorosis, the radiological signs of lead deposition, the ovarian effect of cadmium. In the chapter on metals there are sentences like: 'The demonstration that beryllium can induce tumours, especially by the probable route of human exposure, is indeed incriminatory'. There are several factual errors: lead in the bone is in equilibrium with free lead in the plasma; doses given in mg/kg but not in mol/kg fit the probit regression line; atropine is a competitive inhibitor of AcChE inhibitors; arsenic and fluoride are heavy metals and CO is a volatile agent; the dose effect relationship is defined as dose response relationship; the definition of absorption does not fit the use of this term by the same author. In the chapters by Professor Casarett, who died before the book was completed, there are wrongly drawn figures.

In spite of these shortcomings this textbook helps the reader to a better understanding of the mechanisms of toxicological research and gives him a critical approach to toxicological literature. The first unit of the book discusses the general principles of toxicology. The second unit is a successful presentation on systemic toxicology.