Proceedings of the Fourth International Congress on Hyperbaric Medicine. J. Wada and T. Iwa, editors, Baltimore, Williams & Wilkins Co., 1970, $30.00.

This volume, containing 545 pages of text, including 47 pages of discussion, although a necessary reference for those working in the field, is generally disappointing. The Congress was held in September 1969, four years after the Third International Congress in Durham, North Carolina. Of the approximately 90 papers, there are not more than 25 containing substantially new material. The Congress neither brings one fully up to date on advances in the field nor provides a comprehensive understanding of the state of hyperbaric medicine. About half of the papers deal with animal studies, many largely repetitions of previous work, and only a few papers report clinical experience in sufficient detail and in a manner to permit reasonable scientific inferences. There are a very uneven group of reports from 13 Japanese cities (more than that number of centers) while there was none at the previous three Congresses. Some are marred by faulty English translations.

Although scientists and workers from at least 10 countries attended, there is evidence of diminished progress and/or significant narrowing of the hyperbaric field. An obvious problem is the frequent unsuitability of animal models and the very frequent lack of clinical controls. This can be seen also in the apparent failure of some optimistic clinical reports at the Congress to stimulate the necessary follow-up work. Jacobs and her coworkers reported apparently well-controlled exposures of elderly hospitalized patients, with the diagnosis of chronic brain syndrome associated with cerebral arteriosclerosis, exposed to 100% oxygen at 2.5 ATA for 30 90-min treatments over the course of 15 days. The patients showed significantly improved postpsychologic test scores (P < 0.01 for each of three tests). There were 13 experimental and five control patients, the latter being treated identically except that they received air rather than 100% oxygen at pressure. The authors concluded that "increased arterial oxygen tension effected by hyperbaric oxygenation increases the efficiency of cognitive function in aged subjects with symptoms of senility." This rather startling paper, presented in September 1969, appears to have produced neither firm confirmation nor denial.

Despite the limitations enumerated above, a wide variety of timely subjects are covered in the volume, and there is considerable spirited and frequently illuminating discussion.

Recompression is established as the treatment of choice for decompression sickness. There are excellent papers on bone necrosis, neurologic damage, and acute gas embolism in caisson workers and divers. In addition, there is a positive report of dramatic benefit in the treatment of three postcardiotomy gas embolisms, one after a delay of 11 hours (Winter et al.). Since gas embolization cannot usually be ruled out, a controlled trial of hyperbaric oxygen therapy for postperfusion neurologic damage appears indicated.

Hyperbaric oxygenation is now generally accepted as the method of choice for treating clostridial gas gangrene, and a fair idea of the range of practice may be obtained from this volume. There is still no general agreement regarding the time and the clinical necessity of debridement or the pressure level at which the patient should be treated. pO₂ levels above 250 mm Hg halt clostridial growth and the production of alpha-toxin, but the organisms resume growth and toxin production when lower pressure levels are resumed. Workers have been impressed with the dramatic decrease in tissue loss and improved survival with hyperbaric therapy, although rigorous surgical debridement and the vigorous use of antibiotics have produced low mortality rates in some hands without hyperbaric oxygenation. Human control studies are not available. The efficacy of the low pO₂ levels actually measured in necrotic tissue and the apparent death of the clostridia in many patients subsequently dying (Boerema and Groeneveld) are not explained. Indications for hyperbaric oxygenation in the treatment of gangrenous conditions with gas when clostridia are not present remains to be clarified. Unfortunately, in the work on infections, animal models have failed to give definitive answers.

It is well established that hyperbaric oxygenation produces constriction of normal vascular beds. This vasoconstriction results in a decrease in blood flow. Although venous oxygen tension rises, tissue oxygen consumption usually remains about the same or falls somewhat. These findings may
help to explain some clinical observations. For example, the beneficial effect of hyperbaric oxygenation on pedical grafts may be primarily a reduction in blood flow with a decrease in venous congestion. Similarly, the principle benefit in the treatment of cerebral edema may result from a decrease in the production and pressure of the cerebrospinal fluid secondary to a decrease in blood flow. The possible pathologic consequences (for example increased thrombosis) of this vasocostriction have not been adequately investigated. The normal studies do not, of course, necessarily indicate what will happen in regions deprived of adequate oxygen.

Oxygen toxicity places restrictions on administration of oxygen at high partial pressures. Exposure times must generally be limited and periods of recovery provided between exposures. Reported are continuing researches on the use of reducing substances to extend the safe period or level of oxygen exposure. This work is of first importance and is continuing to hold promise. In addition, there is accumulating evidence that pulmonary oxygen toxicity may be moderated by venous admixture. Some prolonged clinical exposures, without overt oxygen toxicity, are reported in instances where the arterial $pO_2$ remained low.

Rather indifferent results are reported in the treatment of myocardial infarction with hyperbaric oxygenation. A valuable prospective study with controls is reported by Thurston of London. Fifty-seven patients, randomly distributed between intensive conventional and hyperbaric oxygen treatment, showed no statistically significant difference in mortality. The clinical impression was that the very sick patients, especially those in cardiogenic shock, with pulmonary edema, or with severe arrhythmias, were helped (often dramatically) by the hyperbaric therapy. It may be that early surgical revascularization will become the treatment of choice in these severely ill patients, but it would appear reasonable to attempt a carefully controlled study of hyperbaric oxygenation in cardiogenic shock. Simple confirmation of a myocardial infarction is not, however, sufficient indication for hyperbaric therapy.

There is complete disagreement on the value of hyperbaric oxygenation in the preservation of organs. It appears likely that successes have been achieved either (a) because high partial pressures of oxygen were not actually reached in the organs or (b) because hypothermia made possible reasonable preservation even in the presence of damage produced by high oxygen tensions.

There continues to be accumulating evidence that certain types of severely ill cyanotic infants may be more safely operated on in a hyperbaric environment than in a usual cardiac operating room. Unfortunately, advocates of this method, such as Meijine and Mellink of Amsterdam, are carrying out no control procedures.

This volume is an important though flawed historic record. Most physicians will find a number of articles of considerable interest to them. Those working in the field will find this a necessary reference despite its limitations. The editors are to be commended on the attractiveness of the volume and on inclusion of the wealth of discussion.

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Colour Atlas and Criteria of Fundus Changes in Hypertension. Edited by K. Irinoda. Philadelphia, J. B. Lippincott Co., 1971, 141 pp., $19.00.

The ocular fundus examination is a common procedure in the evaluation of hypertensive disease. Sometimes it provides important clues to conditions of the blood vessels in other areas of the body. However, terminology and the methods of classification should be understood.

To remove some of the ambiguity and confusion that results from differences of individual judgment and expression, the Japanese created a committee that studied thousands of photographs of the ocular fundus and arrived at a consensus that is illustrated in this text. This represents the accumulation of information, discussion, and agreement that was acquired over a period of 10 years. Most institutions in this country do use fundus photography, making isolated and complete recordings of the fundus.

The text contains approximately 90 fundus photographs so that any individual studying the text may recognize the cardinal changes. The photographs and accompanying diagnoses are sufficiently without the need for additional commentary. The determinants used are clearly defined, such as narrowness of the retinal vessels, the reflex on the retinal arterioles, change in vascular course, arteriovenous crossing phenomena, and the abnormality of the branching angles. The photographs make a distinction between organic narrowness and functional narrowing of the arterioles. Illustrations demonstrate clearly the increase in the arterial reflex locally and generally, as well as sheathing. Each photograph is accompanied by a diagram illustrating the points of the vessels and the particular vessel changes that are to be noted.

The illustrations of arteriovenous crossing phenomena, the retinal, choroidal, and vitreous hemorrhages, as well as the various types of exudates, are clearly seen. Alterations of the venous system, of the neovascularization of the
Progress in Respiratory Research: Vol. 5. Pulmonary Circulation. Edited by J. Widimsky, S. Daum, and H. Herzog, New York, S. Karger, 1970, 464 pp., $28.80.

In June 1969, a little more than 1 year after the occupation of Prague by Soviet troops, the European Society for Clinical Physiology of Respiration held a symposium in Prague on the pulmonary circulation. In attendance was an impressive array of investigators predominantly from Western Europe but also a few from the United States and Canada. Those who have a deep-seated interest in the pulmonary circulation but missed the meeting will be happy to learn that the proceedings have just been published.

The roster of contributors is a European "Who's Who" for the pulmonary circulation. Approximately 50 papers were presented. With few exceptions, the topics were traditional: hemodynamics of the normal and abnormal pulmonary circulation; the influence of vasoactive substances on the pulmonary circulation; the consequences of occluding one pulmonary artery either acutely, as by a balloon, or chronically, as by pneumonectomy; the circulatory derangements produced by pulmonary embolism; the effects of aging and exercise on the pulmonary circulation; collateral circulation of the lungs. Intermingled with these inevitable topics were some fresh ones: the mechanisms responsible for the genesis of pulmonary hypertension in subjects who have been ingesting "appetite-losers," such as Aminorex-flumarat; the concept that, within physiologic limits, the pulmonary arterial resistance and compliance are automatically balanced to keep unchanged the time constant of the pulmonary arterial tree; the train of circulatory events set into motion by pulmonary embolism.

Throughout the book emphasis is on new techniques. These are applied to determine the degree of inhomogeneity of pulmonary blood flow, the localization of pulmonary emboli, and the interplay of hypoxia and gravity in determining the partition of blood flow within the lung. Unfortunately, in many instances, the descriptions of the techniques are tantalizingly brief, providing insufficient data for confidence in either the accuracy or reproducibility of the methods. However, in these instances, the reader is supplied with ample references.

Each reader will have to find his own topics of special interest. For me, two topics attracted particular attention: the mechanism by which acute hypoxia elicits pulmonary hypertension, and the behavior of the circulation during the hypoxic state. With respect to acute hypoxia, Hauge reviewed the evidence that the release of histamine is the link between the decrease in alveolar \( p_{O_2} \) and the pulmonary vasoconstriction. He pictures the receptor in an extravascular site, strategically located so as to be readily accessible to the gases in both air and blood; however, the \( p_{O_2} \) in alveolar air seems to exert the greater influence. Not reviewed at this conference, but consistent with the data of Hauge, is the experimental evidence of Lloyd, favoring an extravascular location for the receptor, and the data of Bergofsky, which have also drawn attention to the mast cell as a possible source of the histamine. Unfortunately, the arguments reviewed at this meeting implicating histamine as the mediator have the inherent weakness of relying inordinately on the use of pharmacologic inhibitors. It seems reasonable to expect that the next few years will clarify the interplay between alveolar hypoxia, the interstitial space, the mast cell, and pulmonary arterial constriction. Parenthetically, for the sake of perspective, it may be worth mentioning that the rather detailed considerations of the local mechanisms by which acute hypoxia exerts its pulmonary vascular effects do not take into account the possible role of extrapulmonary influences, e.g., the sympathetic nervous system which is undoubtedly involved in intact animals and man.

The second topic which intrigued me was presented by Arvidsson and collaborators and
dealt with the circulatory effects of imagined leg exercise during the hypnotic state. These investigators, working with normal human subjects under hypnosis, found that the hypnotic suggestion of leg exercise increased cardiac output (and ventilation) without increasing oxygen consumption. They explained this remarkable dissociation of oxygen consumption from the cardiac output by invoking a centrally induced vasodilatation in the muscles secondary to the increase in ventilation which accompanied the imagined exercise. For those concerned with the mechanisms controlling the cardiac output, these observations will be exceedingly provocative and suggest new avenues of experimental approach.

These examples may serve to illustrate the diversity of topics encompassed in the proceedings of the symposium. Although the individual papers vary considerably in length, content, and style, each paper provides enough information to provide the reader with at least a glimpse of the specialized interests of the laboratory which the authors represent. This volume is neither a comprehensive treatise nor a comprehensive source of reference. However, it does provide a fair taste of research on the pulmonary circulation that is currently under way in Europe.

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Symposium on Cardiac Arrhythmias, Elsinore, Denmark 1970. Edited by E. Sandøe, E. Flensted-Jensen, and K. H. Olesen, Sodertalje, Sweden, AB Astra, 1970, 826 pp.

This publication contains the Proceedings of the Symposium on Cardiac Arrhythmias, held in Elsinore, Denmark, April 23–25, 1970. It is a comprehensive review of cardiac arrhythmias. Thirty-seven chapters are written by 40 authorities from various nations, all of whom are known for their contributions in the field of cardiac arrhythmias.

This monograph deals with the various aspects of the subject including mechanisms, etiologic factors, diagnostic problems, and management. Management includes special methods of therapy in detail with sections on DC cardioversion, antiarrhythmic drugs and their side effects, and monitoring of arrhythmias.

One of the most attractive features of the symposium is the report of the discussions of the lecturers, panel members, and participants, published at the end of each section. The different points of view presented pinpoint areas where new information is needed, and permit the reader to have a critical appraisal of the subject.

Because the sections were contributed by different authors, their tone varies from section to section. Some chapters, including mechanisms of reciprocal rhythm and right bundle-branch block with left posterior hemiblock, are clearly presented; others such as the natural history of Wolff-Parkinson-White syndrome are superficial. The constant accumulation of new facts in the field of arrhythmias makes it difficult to be up-to-date. This is probably the reason for an inadequate presentation of His bundle electrocardiography and cardiac pacing.

Another deficiency of the book is its uneven reference list, with more than ample references on some topics but very little on others. In addition, some sections are plagued with useless illustrations. In spite of these criticisms, the book is a succinct storehouse of valuable information and will be of interest to those physicians interested in arrhythmias.

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