Reports of Scientific Meetings

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A section devoted to review of meetings not attended by large numbers of anesthesiologists but meetings at which matters of interest to anesthesiologists are considered.

Association of University Anesthetists

The Association of University Anesthetists met this year in New York City (March 16–18, 1967) in commemoration of the 200th Anniversary of the College of Physicians and Surgeons of Columbia University.

The scientific program of the Association this year comprised some two dozen presentations, which were notable both for their quality and their diversity, the topics ranging from the use of a computer-controlled, clinical teaching aid to some biochemical mechanisms involved in non-shivering thermogenesis and in the metabolism of 5-hydroxy-tryptamine by the brain. Although it is clearly impossible in a report of this length to summarize every paper, it is thought valuable to describe briefly the contents of some of them in order to convey the flavor of the proceedings.

Among those of the fourth estate, the description of Sim-One, the teaching model, was undoubtedly of greatest interest. This is a dummy with a difference, since its responses are computer-controlled. Designed by J. S. Denson, M.D., and S. Abrahamson, Ph.D., it represents an application of systems engineering to medicine. The dummy is, in fact, sensitive to a variety of external forces including drug overdosage and improper attempts at endotracheal intubation, and it responds much as a patient would. The major responses are, of course, programmed into the computer. When disaster appears imminent, the staff man can take over from the resident and set matters aright.

Dr. Philip E. Lee, Assistant Secretary for Health and Scientific Affairs of the Department of Health, Education, and Welfare, discussed the Federal role in health and medicine, emphasizing the programs of the Department which are of particular importance to academic anesthesiologists.

He pointed out that although NIH support for biomedical research had increased 100-fold in the period 1946–1966, a number of problems remained. Many medical schools have inadequate departments of basic science, many have little or no research in social sciences, and the clinical research in many of the major specialties needs to be improved and expanded. Many departments, such as anesthesiology, face a growing number of complex clinical problems that are outpacing the advances in fundamental scientific knowledge.

In the fields of medical education and health manpower development, Federal support has been increasing rapidly since 1963. There are serious shortages particularly in anesthesiology, where less than half of the number of clinical anesthesiologists now needed have so far been supplied, and, in academic anesthesiology, where less than a fifth of the needs have been met.

He also emphasized the impatience of many medical students with the education and training they receive; the need for better integration of basic and clinical sciences; the need for more elective pursuits; an increased emphasis on the social component of medicine; the possibility of developing physician assistants in anesthesiology; the value of a "core" curriculum; the need for greater efficiency in the educational process (*e.g.*, better teaching techniques and the use of technology); the need for new approaches in residency programs; the importance of medical education as a continuum; the need to make the health team a reality; and the need for research in medical education.

In the field of patient care, Dr. Lee identified a number of areas of common concern: infant mortality, emergency medical services, facilities and services for premature infants, the services available to the chronically ill (*e.g.*, alcoholics), the shortages of personnel for the provision of high-quality services in anesthesiology, and the health services for the poor. He emphasized the need for healthy services research.

Dr. Allen I. Hyman gave evidence to show that the (sheep) placenta, unlike the lung, consumes enough oxygen to produce a substantial tension difference between maternal and fetal blood. For this reason oxygen breathing by the mother results in only a small increase in fetal oxygen tension.

Dr. Richard Kitz reported on his search for a myoneural blocking drug which is nondepolarizing in action and which is hydrolized either spontaneously or by true (red cell) acetylcholinesterase (which everyone has, unlike pseudocholinesterase). To date this search has not discovered new drugs useful in man.

Dr. Stanley James, working with rhesus monkeys, showed that the recovery of asphyxiated infants is accelerated if metabolic acidosis is prevented or corrected. Body cooling was useless and did not prevent brain damage. Large doses of pentobarbital given to the mother before caesarian section depressed the fetus and reduced brain damage, but increased the incidence of fetal pneumonia.

Dr. Harry Wollman reported that cyclopropane in high concentrations increased the cerebral blood flow in normal man, while oxygen consumption was diminished. The causes of the increase in flow were increased perfusion pressure and reduced vascular resistance. It was pointed out that these various changes indicated that cyclopropane was the "safest" general anesthetic from the standpoint of maintaining a high ratio of cerebral oxygen delivery to oxygen consumption.

There is no intent to disparage any paper not possible to include in this report. Dr. Papper should be, and was, applauded for assembling a fine selection of scientific reports. The social events were contrived with equal craft, and they left everyone in fine spirits at the conclusion of the meeting.

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Toxic Effects of Anesthetics

A two-day symposium on the toxic effects of anesthetics was held in Seattle on May 12 and 13 under the auspices of the University of Washington. In attendance were some 35 persons from the United States and abroad representing a wide range of investigators from the physical and biological (including clinical) sciences. The diversity of background and interests emphasized the complexities inherent in toxicological research as well as in definition of what constitutes toxicity in anesthesia.

The material, most of it presented for the first time, fell into two major categories: papers dealing with toxicity as classically defined, and papers dealing with cellular responses characteristic more of pharmacologic effect than of true toxicity. In the former category were several papers on the effect of neuronal depressants on dividing cells, particularly those in bone marrow and those in the developing embryo. J. A. Aldrete (Dept. Anesthesiology, U. of Colorado) reported that nitrous oxide, ethylene and xenon when administered to rats in analgesic concentrations for periods of days resulted in decreased levels of circulating red cells, leucocytes and platelets while control animals exposed to inert gases such as argon, neon or helium or rendered equally inactive by reserpine failed to show comparable changes. C. D. Green (Dept. Anesthesiology, U. of Virginia) emphasized the importance of strain differences within the same species and reported that the leukopenia associated with 8 days of nitrous oxide administration in Long-Evans rats was associated with an increase in levels of RNA in the thymus, a decrease in DNA in thymus and bone marrow, and no change in bone marrow RNA levels. Using tritiated thymidine he was unable to detect any effect of halothane on the rate of DNA synthesis, but suggested that the effects of nitrous oxide on white cells were the result of impaired DNA and RNA metabolism. Analagous and confirmatory data on the effect of anesthetics on bone marrow were provided by D. L. Bruce (Dept. Anesthesiology, Northwestern U.) who reported that peripheral changes in leucocytes correlated well with changes in marrow characterized by an increase in the number of dividing cells and a decrease in the number of mature cells following exposure to halothane. Bruce suggested that the effects of anesthetics on white cell division might be related to the "thickening" or stabilization of peripheral cytoplasm he has observed in giant amoebae and in circulating leucocytes. The effects of anesthetics upon dividing cells within the develop-

ing embryo were quantitated in terms of teratogenicity and mortality rates in chicks by B. E. Smith (Dept. Anesthesiology, U. of Miami) and by N. B. Anderson (Dept. Anesthesiology, U. of Florida) following an objective and thorough analysis by J. G. Wilson (Dept. of Pediatrics, U. of Cincinnati) of the methodological and interpretative difficulties which beset teratological testing technics. Both Smith, using ether, and Anderson, using cyclopropane, found that relatively long-term exposure of eggs containing embryos in the early stages of development to anesthetics was associated with increased mortality and increased frequency of anomalies amongst survivors. The finding of S. Snegireff (N.I.H.) that the number of mitosis in the neural tube of the chick embryo was decreased following exposure to volatile anesthetics led to the implication that the anomalies, which tend to involve especially development of the vertebral column and cranium, are the result of anesthestically induced changes in mitotic activity. The changes in chicks correlate with the observations of T. H. Shepard (Dept. Pediatrics, U. of Washington) that exposure of mammals (rats) to 70 per cent nitrous oxide on the ninth day following conception resulted in a high incidence (60 per cent) of vertebral anomalies amongst survivors.

Another aspect of toxicity considered was that relating to the effect of anesthetics, particularly halogenated anesthetics, on the liver. G. Klatskin (Dept. Medicine, Yale U.), in commenting upon the lack of true hepatotoxicity of a compound such as halothane, emphasized that lethal drug sensitization reactions could involve the liver and probably are the explanation for the occasional instance in which liver failure develops following multiple exposures to halothane. C. P. Hoech (Dept. Anesthesiology, Columbia U.) evaluated the use of hepatic spermine levels as an index of hepatic damage and regeneration following anesthesia and surgery, while G. Crossen (Dept. Anesthesiology, U. of Michigan) demonstrated with motion pictures the differences in responses of normal human liver cell cultures to halothane and to chloroform. The toxicity of non-anesthetic atmospheric pollutants was considered by J. R. Thompson (Dept. Pharmacology, U. of the Pacific), as was the toxicity of impurities and breakdown products of anesthetics (M. B. Chenoweth, Dow Chemical Co.), together with an outstanding review of the toxicity of fluorocarbons by J. W. Clayton (E. I. duPont de Nemours & Co.). In this connection it was noted by R. A. Van Dyke (Dow Chemical Co.) that the metabolism of inhalation anesthetics previously reported in experimental animals may occur to a greater extent in man, and that while the end-products of such metabolic degradation are non-toxic there are data suggesting that the intermediate products of metabolism might prove to be toxic.

The papers on the effects of anesthetics upon cell function which were outside the realm of toxicity as usually conceived of were especially concerned with cellular metabolic alterations. Basic considerations in the control of cellular carbohydrate metabolism were presented by J. Paul (Dept. Cancer Research, U. of Glasgow), followed by material on the effect of halothane upon mitochondrial electron transport systems and oxygen consumption by P. J. Cohen (Dept. Anesthesiology, U. of Pennsylvania). The effect of anesthetics upon membrane transport of metabolic substrates (*e.g.*, glucose) was discussed by N. M. Greene (Dept. Anesthesiology, Yale U.), and the effect of oxygen and anesthetics upon cell growth, glucose metabolism, lactate production and oxygen consumption in cell cultures were discussed by G. E. Kenny and B. R. Fink (Depts. Preventive Medicine and Anesthesiology, U. of Washington). The relationship between metabolic alterations and electrophysiologic changes (decreased contractile tension and rate of repolarization) observed in cardiac muscle by E. Frederickson (Dept. Anesthesiology, Emory U.) were regarded as causal by some and as casual by others, but such data emphasized to all that although the action of general anesthetics upon the central nervous system is most obvious from a behavioral, clinical point of view, general anesthetics exert important effects upon all cells.

Other important papers also presented may be read, together with details of the above material, in the monograph of the Proceedings of the symposium to be published by Williams and Wilkins Co., Baltimore.

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