The session on anatomy and physiology was chaired by W. A. H. Rushton. H. B. Barlow elaborated the proposition that increasingly fewer signals are generated in more numerous fibers, as information is relayed in sensory pathways. He adduced examples of receptive fields in the retina and the visual cortex and discussed adaptation and his recent work on binocular stereopsis in support of the argument. V. B. Brooks gave a beautiful account of some recent work by himself and his colleagues on elucidating the functions of the motor-sensory cortex. The afferent information flow in this part of cortex consists of somatic and kinesthetic, as well as visual and auditory, stimuli. The motor-sensory cortex is arranged functionally in radial columns, similarly to the somatosensory and visual cortex. The input receiving columns are about 0.2 millimeter in diameter and the output columns about 1 millimeter in diameter. Thus one afferent column contains about 25 afferent columns. There is extensive overlapping of afferent and efferent columns among themselves and with each other. Decisions to move and how to move are not made in the motor-sensory cortex. Rather, the latter is concerned with receiving afferent information and executing movements involving positive feedback. This is well suited for the tactile placing reaction, the instinctive tactile grasping reaction, and the act of accurate stepping. J. C. Eccles reviewed cerebellar structure and physiology, including the pathways that link the cerebellum to the spinal cord and the cerebrum. He emphasized that the cerebellum is part of a dynamic loop. It does not contain precise somatotopic maps as, for example, the sensory or motor cortex. Instead, there is a large overlap of somatic inputs and any small region in the cerebellum will receive inputs from a very large number of sources. The cerebellum does not hold information of ongoing activity for long periods of time. It operates, as if it were giving advice, moment to moment, on ongoing activity. Experimental evidence for dynamic loop control of movement is provided by the tremor of about 9 cycles per second which is found superimposed on movement.

The session on models and theory was chaired by Otto Schmitt who put forward an ingenious idea of treating nervous systems as interpenetrating domains—for example, three, of which one would represent the intracellular space, another the extracellular space, and a third the space occupied by nerve membranes. Such an approach could achieve the advantage of lumping some properties of individual cells into characteristics of the domains. Warren McCulloch gave a paper on digital oscillators. He showed that under certain conditions a randomly connected net of shift registers under the control of a logic network would produce a surprisingly large number of different sequences without repetition and mostly of relatively short length. This would overcome some of the earlier problems of too few or too long sequences in neural net models. McCulloch stressed the importance of looking at irredescibly triadic relationships in place of two valued logical ones, since our thought processes are concerned essentially with relationships ARB such as “A is conscious of B” or “A thinks that B” and the relation R cannot be left out of account. R. F. Reiss presented some ideas on how to deal with the potentially very large number of possible states of sequential machines and presented certain quantitative measures for this problem. K. N. Leibovic and N. H. Sabah surveyed synaptic input–output relations, signals in nerve fibers, and the functional significance of small network structures, such as reciprocal synapses. Among some novel ideas which they presented they postulated, on theoretical grounds, a synaptic mechanism mediated by neural activity–dependent K+ concentrations in adjacent cells and in the intercellular space. They also proposed a new type of signal, which they named “g-pulses” and which is intermediate between electrotonic signals and “all or none” spikes. These “g-pulses” behave somewhat like damped spikes and they can be deduced from a modified form of the Hodgkin and Huxley equations for excitable tissue. The “g-pulses” are of interest in view of the numerous, strange signals recently recorded in nerve preparations which look, in fact, like something between spikes and electrotonic polarization. They could be a flexible and reliable form of signal with regard to information processing. Some psychophysical implications were briefly mentioned.

The size of the symposium was sufficiently small to enable all participants to interact with one another and sufficiently large so that each of the various groups—which primarily mathematical or biological—could make a signifi-

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Mental Retardation Caused by Physical Trauma

The relationship of physical trauma to the production of mental retardation was considered 13–16 October 1968 at the University of Nebraska, Lincoln, by 45 participants including neurosurgeons, neuropsychiatrists, obstetricians, pediatricians, and psychologists from the United States and overseas. It was the fourth of seven research conferences on the etiology of mental retardation recommended in 1962 by the epidemiology of postnatal and perinatal trauma, clinicopathologic correlations, and pathogenesis of traumatic damage to the developing brain.

The opening address underscored some of the problems confronting observers and research workers in the definition and estimation of the qualitative differences in function which are called mental retardation. The scope, incidence, and size of the patient population at risk or affected is not accurately known or defined.

All parameters of behavioral change are not examined in the standard testing of children, thus making it difficult to estimate the incidence of minor neurological impairment following physical trauma. The question was raised whether, with such tests, we uncover a diffuseness of representation or a diffuseness of lesion. The possibility that an elementary function might be spared at the expense of a general loss of higher functions was suggested.

The use of animal models is a direct approach to the problems, experimental reproduction of events with time and specific cortical areas are controlled. Work was reviewed which demonstrated the capacity of the young animal to compensate for large losses of brain mass, but with not always predictable results.

Results of experimental cortical ablation suggested that with the maturation of subcortical motor systems, the presence of the inhibitory functions of the localized areas of the cortex become increasingly important, although not necessarily a function, of the mass of cortical tissue removed. The inability of the operated adult or older infant subjects to do better on testing would appear to be intimately associated with the appearance of hyperactivity and distractability. These studies point to the need for both long-term clinical...
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evaluation and the assessment of dysfunction not quantitated by standard psychological testing.

Analyses of the cerebral pathology in subjects continuously institutionalized with histories of perinatal trauma or hypoxia were presented. The distinctive neuropathology of the premature was employed to differentiate the effects of anoxia from those of direct trauma. The cerebral cortex of the premature, unlike the full-term infant, is relatively resistant to hypoxia. A description was given of a possible sequence of hypoxia, venous stasis, and thrombosis leading to hemorrhagic infarction consistently located in the periventricular area in the premature or in the full-term infant with prenatal anoxia.

The role of trauma to the neck leading to cerebral damage was emphasized by showing, in 17 percent of perinatal deaths, one or both vertebral arteries were damaged. Despite the serious difficulties in the analysis of late effects of birth trauma, it was thought valid to correlate the distribution of lesions produced in adults by vertebral artery damage with functional deficits typical of cerebral palsy—cortical blindness in association with lesions of the calcarine cortex, ataxic cerebellar dysfunction, and temporal lobe epilepsy with scarring in the area supplied by the vertebral arteries.

The contrasts were reviewed between reaction to injury of the adult brain, typically the formation of dense gliad scar, with that of the immature brain of the rat. The latter is characterized by rapid resorption of the necrotic tissue by lipid-filled macrophages, dissolution, and formation of a smooth walled cyst by the end of the second week. It was postulated that the more rapid removal of necrotic tissue might be due to the higher water content of the immature brain or a difference in metabolic activity of the macrophages. Of clinicopathologic significance is the fact that application of adult reaction patterns may lead to false impressions as to the etiology of diseases such as porencephaly, hydranencephaly, and aqueductal stenosis.

Most attractive were the elegant biophysical analyses of prenatal obstetrical events. The mechanical energy associated with uterine contractions may cause fetal distress by application of pressure directly to the fetal body (chiefly the vertex); by occlusion of the umbilical cord; and by impeding venous outflow or arterial inflow in the intervillous space. The application of sophis-

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ticated techniques to the recording of alterations in amniotic fluid pressures, fetal heart rate, EEG, and acid-base balance, all rapidly related in time sequence to fetal-maternal exchange, provides a sensitive measure of physiologic events during labor. It would appear that anoxia due to physiologic effects on the infant's cardiovascular system is not due to trauma itself and is potentially responsible to pharmacologic manipulation.

Also presented was an analysis of simultaneous recordings from intrauterine pressure receptors and fetal heart rate. Decelerative patterns coinciding with the maximum peak of uterine contraction, called type I dips, are abolished by atropine and thought to be due to cephalic compression and a transient stimulation of the vagus nerve, but do not alter the Apgar score. Decelerative dips, type II, occurring after the uterine contraction are associated with hypoxia, acidosis, and a low Apgar score in the neonate. Monitoring to detect these changes has considerable clinical application.

Current epidemiologic studies of perinatal trauma all focus on the obstetrical history and the classical criteria for retardation. Drawing upon material from the Collaborative Study on the Etiology of Cerebral Palsy, Mental Retardation, and Other Neurological Disorders, offspring identified as having cerebral palsy or mental retardation seemed to provide evidence that obstetric history has only a minor effect on WISC performance while racial-socio-cultural factors are associated with major deviations.

Other reports of data from the Collaborative Perinatal Research Project drew statistical correlations between the size of the maternal pelvis, position of the fetal head during delivery, and forceps delivery with neuropsychological outcome. It is suggested that as early as the time of birth, sufficiently lateralized neuropsychological differentiation appears to have taken place for injury to have an effect on the individual's intellectual capacity. The mean Binet scores of all reported groups was in the 104 to 110 range which would not fit accepted definitions of mental retardation.

The epidemiologic problems of postnatal head injury were introduced and a statement was made that a conservative estimate of the annual incidence of head injury in infants and children was 3 percent of the population under the age of 6 years. However, the incidence of significant postnatal trauma is low:
but there are no reliable estimates of postnatal injury as a cause of less than optimal performance in the noninstitutionalized.

Preliminary results from longitudinal interdisciplinary clinical study seeking to investigate the early and long-term effects of head injury in children from birth to 14 years showed a rapid regression of posttraumatic neurological deficits with a plateau reached by 3 months.

Impairments in adaptive behavior were considered in conjunction with intellectual deficits in children and adolescents following protracted coma due to accelerated concussion. The sequelae which are constant after moderate or severe concussion are mainly subjective: anxiety or irritability, difficulty with sustained mental concentration, impaired memory, distractibility, perseveration, and excessive liability to fatigue. The severity of these symptoms is related directly to the period of posttraumatic amnesia. A newer group of more severely retarded patients were those resuscitated after the hypoxic insult of cardiorespiratory arrest.

As summarized it would appear that the perinatal problem is much larger than that of postnatal trauma. Although perinatal trauma and anoxia together may be causative in 10 percent of institutionalized retardates (Malamud) and birth trauma alone related to 16 percent of the diagnosed cases of retardation or cerebral palsy in 7-year-olds (Drorbaugh and Clifford), the much greater effect of racial-socio-cultural factors performance on standard I.Q. tests by the school age population deserves appropriate consideration. Postnatal trauma is a much less significant cause of severe retardation but the population at risk is enormous and the problem of head injury deserves both full demographic analysis and pragmatic efforts at prevention or amelioration of severity. The estimation of incidence of both perinatal and postnatal injury is obscured by the icebergs of cerebral dysfunction, and there is a need for long-term follow-up with attention to selected indices of complex performance. Animal models were considered to offer a challenging and hopeful field of investigation to outline precise behavioral changes with respect to neurological lesions defined as to location, extent, and time.

The delineation of the role of hypoxia and of direct trauma in the production of perinatal brain damage was a major achievement of the conference. The recurring theme of sequential hy-
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oxia, acidosis, stasis, thrombosis, and infarction scored the crucial nature of obstetrical factors. The pathophysiology of placental function would seem deserving of attention, at least equal to that lavished on liver and kidney. Hon and Dodge were among those emphasizing the need for centers of perinatal biology capable of the application of sophisticated methodology to the biophysical and biochemical events of labor. Such centers would bring together obstetricians, pediatricians, physiologists, biochemists, biomedical engineers, and other specialists to focus on the most vulnerable period in the life of the child.

The meeting was sponsored by the U.S. Department of Health, Education, and Welfare, National Institutes of Health, National Institute of Neurological Diseases and Stroke (NINDS). The detailed proceedings of the conference will be published by NINDS.

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Calcified Tissues

Useful, new contributions to the field of calcified tissues were reported at the Sixth European Symposium on Calcified Tissues held in Lund, Sweden, 21–24 August 1968.

In the first session, specialized instruments offered hope for the future. The presentation by Hobdell (London) on scanning electron microscopy was of interest since it brought into perspective how bone is constructed at the ultrastructural level. Bones from different animals were fixed and extracted with fat solvents, mounted, and then scanned at magnifications up to 20,000. Such specimens showed a great deal of detail of the lining of the lacunae, the nature of the interlamellar material, and the pattern of mineral collagen fibers and fiber bundles. Removal of collagen by solvents resulted in a pattern of the mineral front alone, suggesting that it separates one collagen fiber bundle from the next one overlaying it.

Höhling (Münster) provided further evidence of the power of probe methods in establishing the nature of mineralization at the subcellular level. Hitherto, electron-probe analysis has been a somewhat crude technique, incapable of locating the site of the mineral deposit.
that calcium, phosphorus, and sulfur can be detected with increasing precision. Dentine, both mineralized and mineralizing, was studied. The results show that the ratio of calcium to phosphorus is somewhat lower in the mineralizing front than it is for fully formed apatite. However, in predentine there is little phosphorus, with calcium apparently bound to an unresolved organic matrix.

Fleisch (Berne) reported some effects of diphosphonates on calcium metabolism, the thesis being that these compounds (which are close structural analogues of pyrophosphate) might stabilize hydroxyapatite crystals and inhibit bone resorption. Two diphosphonates were found to inhibit the dissolution of calcium phosphate in vitro and to inhibit aortic calcification induced by vitamin D in rats when they were given subcutaneously or orally. These compounds blocked parathyroid-induced bone resorption in tissue culture and partially or completely prevented hypercalcemia induced by parathyroid extract in thyroparathyroidectomized rats. A monophosphonate was found not to possess these properties.

Gudmundsson (London) reported that the blood calcitonin level in six normal subjects was 80 to 250 mU per liter of plasma. Foster had administered intravenous calcitonin to several patients with disorders of calcium metabolism and found an increase in urinary calcium and phosphorus in the first 3 hours. In some patients this increase was associated with hypocalcemia. Bijvoet (Leiden) had administered calcitonin to four patients with Paget's disease and observed a small fall in plasma calcium and a large fall in plasma hydroxyproline. Urinary calcium was increased and then decreased.

Heaney (Omaha) described the use of a circumferential counter with which radioactivity in 3-inch segments of the forearm was determined after intravenous administration of strontium-35. The combination of the retention data with the plasma specific activity values permitted calculation of turnover in the forearm which amounted to about 0.5 to 2.0 of calcium per segment per day, being higher in cancellous than in compact bone. Patients with rheumatoid arthritis had substantially higher accretion ratios in all joint regions than the controls, whereas whole-body turnover values did not reveal this discrimination.

Several useful techniques were
described in relation to radioisotope uptake. In particular, Rekonen (Finland) reported some interesting observations of uptake of strontium-35 in joints damaged by rheumatoid arthritis. The scanning methods were sufficiently precise to allow a good comparison between various tissues; the advantage of technetium-99 as a tracer was also illustrated. Later, Ahlback (Stockholm) gave details of the radiographic observation of a new syndrome which he called osteonecrosis of the knee; he outlined the history, symptoms, and the results of physical examination.

Of special interest was the nature of the radiolucent focus and the degree of nonuniformity from late radiographic changes. The following paper by Bohne (New York), using a slightly different technique of emission scintimetry, came to much the same conclusions—unusual radiolucent lesions in the medial femoral condyle. In this case, data were quantitated and the patterns of figures led to some sharp discussion as to the significance of the findings.

The cinematographic evidence of Ascenzi on the properties of single osteons was well received. For the first time we were able to see compression curves superimposed upon actual pictures of changes in single osteons isolated by techniques for which the Pisa Laboratory is well known. The degree of reproducibility was convincing, particularly with respect to the point of failure of osteons from different parts of bone. It is too early at this stage to be overcritical about the results but the general support of Gebhardt’s theories is to be expected.

A new model for the study of hydroxyproline turnover was produced by Flanagan (Boston). He incubated rat metaphyseal bone slices in Krebs-Ringer solution for up to 6 hours and studied the time course of accumulation of hydroxyproline in the media. An early exponential release was attributed to solubility, and a linear component was attributed to new synthesis and release with resorption. Using labeled proline it was shown that there was no significant pool of free intracellular proline and that the rate of release of labeled hydroxyproline in the medium rose exponentially for 3 hours and then continued linearly for at least 6 hours.

Russell (Oxford and Davos) infused 3°-cyclic AMP into the renal arteries of ten thyroparathyroidectomized dogs. They were able to demonstrate a large increase in phosphorus excretion from
the infused kidney after a few minutes at cyclic AMP concentrations from $10^{-4}$ to $10^{-3}M$. This work provided additional evidence for the intermediary role of cyclic AMP in the action of parathyroid hormone on the kidney.

Finally, there was some light from Sledge (Massachusetts) on the subject of heparin and related compounds in the release of lysozome from embryonic cartilage. A flourishing finish to a successful symposium in which old subjects were aired once again and one or two promising new starters stumbled under questioning.

The proceedings of this symposium are published in the supplement to volume 2 of Calcified Tissue Research.

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Calendar of Events

**Courses**

**Electron Microscopy in the Biological Sciences**, Boston, Mass., 15–27 June. This is the 11th session of a 2-week intensive program in the preparation of biological materials as electron microscope specimens, electron microscopy, and interpretation of results. Designed for doctoral level investigators who wish to use the electron microscope in their research, but who have little or no experience in the field. Advanced graduate students will be considered. Limited to 12 students. (Prof. Clifford Youse, Center for Continuing Education, Northeastern University, 360 Huntington Ave., Boston 02115)

**X-ray Diffraction Theory and Practice**, Chicago, Ill., 16–20 June (elementary) and 23–27 June (advanced). The elementary course will include the study of physics of x-rays, elementary crystallography, elements of x-ray diffraction theory, techniques of x-ray diffraction analysis, procedures and interpretation of x-ray powder diagrams, elementary indexing procedures, identification of unknown substances, and precision lattice parameter determination. The advanced course will include sessions on the reciprocal lattice concept, development of theory for x-ray intensity, single-crystal techniques, Laue method, the rotating crystal technique, preferred orientation, and quantitative analysis. Tuition for each course is $250, or $400 for both (Prof. Paul Gordon, Metallurgical Engineering Department, Illinois Institute of Technology, Chicago 60616).

**Marine Sciences**. Courses will be offered at Cape Henlopen Marine Laboratory during the summer of 1969. Marine biology, coastal vegetation, geology of Recent sedimentary environments, and engineer-
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3. American College of Psychiatrists, Bal Harbour, Fla. (M. Sabshin, P.O. Box 6998, Chicago, Ill. 60680)

4-5. American Soc. for Clinical Investigation, Atlantic City, N.J. (D. H. Nelson, Last-Down-Saints Hospital, Salt Lake City, Utah 84103)

4-6. American Soc. for Adolescent Psychiatry, Miami Beach, Fla. (H. D. Staples, 24 Green Valley Rd., Wallingford, Pa. 19086)

4-7. American Inst. of Chemical Engineers, 65th natl. mtg., Cleveland Ohio. (The Institute, 345 E. 47 St., New York 10017)


4-8. American Soc. of Brewing Chemists, Baltimore, Md. (Executive Secretary, The Society, 501 N. Walnut St., Madison, Wis.)

4-8. Soc. of Plastics Engineers, 27th, Chicago, Ill. (Director, Member Activities, The Society, 65 Prospect St., Stamford, Conn.


4.9. Aerospace Dynamic Balancing. 2nd symp., San Francisco, Calif. (G. E. Henning, Boeing Co., P.O. Box 3868, Mail Stop 85-93, Seattle, Wash. 98124)

5-6. Theory of Computing Symp., Marina del Ray, Calif. (M. A. Harrison, Dept. of Computer Science, Univ. of California, Berkeley, Calif. 94720)


3. Society of Aeronautical Weight Engineers, 28th, San Francisco, Calif. (C. R. Pullen, Aerospace Corp., P.O. Box 95085, El Segundo, Calif. 90045)


5-8. Radiation Biology of the Fetal and Neonatal Animal, Richland, Wash. (M. R. Sikow, Biology Dept., Battelle-Northwest, P.O. Box 999, Richland 99352)

5-9. American Psychiatric Assoc., 125th, Bal Harbour, Fla. (Public Information Officer, 1700 18th St., NW, Washington, D.C. 20009)


7-9. American Assoc. of Genito-Urinary Surgeons, Pebble Beach, Calif. (H. M. Spence, 4105 Live Oak St., Dallas, Texas 75221)

7-10. American Assoc. for Child Care in Hospitals, Ann Arbor, Mich. (D. E. Lidgard, University Hospital, Univ. of Michigan Medical Center, Ann Arbor 48104)

7-10. Association of University Radiologists, San Francisco, Calif. (A. Gottschalk, 950 E. 59 St., Chicago, Ill. 60637)


8-10. American Assoc. for the History of Medicine, Baltimore, Md. (C. W. Bode-
mer, Biomedical History Dept., Univ. of Washington Medical School, Seattle 98105)


9-10. Arthritis Seminar, Roanoke, Va. (R. H. Brumfield, Jr., P.O. Box 1531, Roanoke, 24007)


11-14. Fluid Controls Inst., Inc., Sea Island, Ga. (P.O. Box 1485, Pompano Beach, Fla. 33061)

11-15. Institute of Food Technologists, 29th, Chicago, Ill. (C. L. Willey, 221 N. Lasalle St., Chicago 101)


12-16. Soc. of Photographic Scientists and Engineers, Los Angeles, Calif. (The Society, 1350 Massachusetts Ave., NW, Washington, D.C. 20005)


16-17. Symposium on Oil Pollution of the Sea, Cambridge, Mass. (J. A. Fay, Room 30246, Massachusetts Inst. of Technology, Cambridge 21391)


19-21. Aerospace Electronics Conf., Dayton, Ohio. (J. E. Singer, 5704 Coach & Four Dr. East, Kettering, Ohio 45440)

19-21. Interdisciplinary Conf., 1st, Houston, Tex. (M. A. Wright, Humble Oil and Refining Company, Box 2180, Houston 77001)

19-21. New Dimensions in Legal and Ethical Concepts for Human Research, New York, N.Y. (L. Ladimer, Mt. Sinai School of Medicine, Fifth Ave. and 100 St., New York, 10029)

19-23. Western Anesthesiology Conf., Salt Lake City, Utah. (J. Stringham, 11 S. 5th E., Salt Lake City 84106)

19-30. Selected Applications of Computers in Engineering, Ann Arbor, Mich. (Engineering Summer Conf., Univ. of Michigan, Chrysler Center, Dept. 58, Ann Arbor 48105)


22-23. Diseases in Nature Transmissible to Man, 19th southwestern conf., San Antonio, Tex. (S. S. Kalter, P.O. Box 2296, San Antonio 78206)


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<th>Type</th>
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<th>Water regain (g H₂O/g dry gel)</th>
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<td>1.0 ± 0.1</td>
<td>40-120 (beads)</td>
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<td>Sephadex G-15</td>
<td>up to 1,500</td>
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<td>40-120 (beads)</td>
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25–27. Drug Information Assoc., Detroit, Mich. (J. J. Harris, Public and Professional Relations Committee, c/o Schering Labs, 1011 Morris Ave., Union, N.J. 07083)


26–27. Rheumatoid Factors, New York, N.Y. (H. Bartfeld, St. Vincent’s Hospital, 153 W. 11 St., New York 10011)

26–28. Symp. on Advances in Instrumentation for Air Pollution Control, Cincinnati, Ohio. (A. P. Altschuller, Natl. Air Pollution Control Administration, 5710 Wooster Pike, Cincinnati 45227)


**International and Foreign Meetings**

**May**

26–30. Spectroscopy, 15th intern. colloquium, Madrid, Spain. (Secretary, XV Colloquium Spectroscopicum Internationale, Serrano 119, Madrid 6)

27–31. International Assoc. of Thalassotherapy, 14th, Eforie Nord, Roumania. (Prof. Bineescu, Strada Transilvaniel, 47, Bucharest, Roumania)

27–31. German Congr. for Medical Continuation Studies, 18th, Berlin. (Kongressgesellschaft fur Arltiche Fortbildung, Klingosrstr. 21, Berlin 41)


29–3. International Assoc. for Accident and Traffic Medicine, 3rd, New York, N.Y. (M. Helpert, % Office of Chief Medical Examiner, 520 First Ave., New York 10016)


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4-6. Automated Analysis, intern. congr., Chicago, Ill. (J. E. Golin, Technicon Corp., Ardsley, N.Y. 10502)

4-7. Union of Textile Chemists and Colorists, 21st congr., Baden-Baden, Germany. (The Union, Rohsbacherstr. 78, Heidelberg, Germany)


5-7. Mineralogical Assoc. of Canada, Montreal, P.Q. (J. Beland, Dept. of Geology, Univ. of Montreal, Montreal)

5-11. Forensic Sciences, 5th intern., Toronto, Ont. Canada. (L. Ball, Center of Forensic Sciences, Dept. of Attorney General, 8 Jarvis Street, Toronto 2)


8-14. Canadian Medical Assoc., 102nd, Toronto, Ont. Canada. (The Association, 170 St. George Street, Toronto, Canada)


9-13. Clean Air Congr. and Exhibition, Dusseldorf, Germany. (V. Deutscher, Postfach 1139, 4 Dusseldorf 1)

9-14. Canadian Assoc. of Pathologists, Toronto, Ont., Canada. (D. W. Penner, Winnipeg General Hospital, Winnipeg 3, Manitoba)


11-14. Canadian Psychiatric Assoc., 19th, Toronto, Ont. (W. A. Blair, 225 Lisgar St., Ottawa, Ont.)

14-20. Canadian Assoc. of Gastroenterology, 8th, Toronto, Ont. (The Association, 426 170 St. George St., Toronto 5)

15-18. Chemical Inst. of Canada, 19th, Montreal, P.Q. (The Institute, 151 Slater St., Ottawa 4, Ont.)

15-20. Canadian Anesthesiologists Soc., 20th, Toronto, Ont. (E. R. Campbell, 178 St. George St., Toronto 5)


16-21. Triennial Congr. of Intern. Federation of Automatic Control, Warsaw, Poland. (Organizing Committee, Ul Czackiego 3/5, P.O. Box 903, Warsaw 1)

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Another Look at Atlantis. And Fifteen Other Essays. Willy Ley. Doubleday, Garden City, N.Y., 1969. x + 230 pp., illus. $5.95.


The Biosynthesis of Deoxyribose. Peter Reichard. Wiley, New York, 1968. x + 82 pp., illus. $7.95. Ciba Lectures in Medical Biochemistry.


Boolean Methods in Operations Research and Related Areas. Peter L. Hammer (Ivănescu) and Sergiu Rudeanu.

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A Classification of the Major Groups of Human and Other Animal Viruses. Burton I. Wilner. Burgess, Minneapolis, ed. 4, 1969. x + 250 pp., illus. $7.50.

Clinical Interpretation of Laboratory Tests. Raymond H. Goodale and Frances K. Widmann. Davis, Philadelphia, ed. 6, 1969. xii + 568 pp., illus. $11.50.


Composition of Peripheral Nerves. Ian A. Boyd and Mary R. Davey. Livingstone, Edinburgh, 1968 (U.S. distributor, Williams and Wilkins, Baltimore), viii + 58 pp., illus. + 4 plates. $7.50.

Comprehensive Index of API44-TRC Selected Data on Thermodynamics and Spectroscopy. Thermodynamics Research Center, Texas A & M University, College Station, 1968. xx + 508 pp. Paper, $14. TRC Publication 100.


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Syokabo, Tokyo; McGraw-Hill, New York, 1968. xii + 178 pp., illus. $12.95.


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Union Catalog of Medical Periodicals II. Medical and paramedical periodicals in existence prior to 1950; including, also, nonsubstantive items later than 1950, that were excluded from the companion volume, UCMP/I. Holdings of 83 libraries in the New York metropolitan area are listed, as of 1 September 1968. Medical Library Center of New York, New York, 1968. xii + 516 pp. $11.50.


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