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Nucleic Acid Changes During Behavioral Events—LEONID Z. PEVZNER, Pavlov Institute of Physiology of The Academy of Science of the U.S.S.R.
Brain RNA—G. P. TALWAR and co-authors, All-India Institute of Medical Sciences

Macromolecules and Brain Function—JOHN GAITO, York University
Autoradiographic Examination of Behaviorally Induced Changes in the Protein and Nucleic Acid Metabolism of the Brain—JOSEPH ALTMAN, Massachusetts Institute of Technology

MACROMOLECULAR THERAPY
RNA and Memory—D. EWEN CAMERON, and co-authors, McGill University

CELLULAR LEARNING MODELS
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INDEX

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Differences in turnover rates rather than differences in primary structure of histone fractions from various tissues or species.

Barbara E. Wright (Huntington Memorial Hospital of Harvard University) reported on recent studies on control of carbohydrate synthesis in the slime mold (*Dictyostelium discoideum*). In this system differentiation is induced by a change in environment, the removal of exogenous nutrients. In the terminal stage of the differentiation, preformed cellular materials, such as protein, are converted to two complex carbohydrates in the cell wall. It is possible to synthesize labeled carbohydrates with uridine diphosphogluco-
cose-C\(^{14}\) in an in vitro system. The enzymes required for this synthesis are very labile in early stages of the differentiation but as differentiation proceeds the enzymes are more stable (or conversely less degradative conditions are encountered). For this reason, changes in enzyme levels cannot yet be measured. It has been established, however, that adequate enzyme levels are present long before cell wall polysaccharide accumulates. More closely correlated with the onset of cell wall polysaccharide synthesis is the accumulation of the precursor compounds, glucose, glucose-6-phosphate, and uridine diphosphogluco-
cose. The level of the latter compound and the kinetics of the cell wall synthesis indicate it is one limiting factor in the cell wall biosynthesis. The work of Wright thus focuses attention on intermediary metabolites as significant factors in differentiation quite separate from any role in a feedback system. In order to prevent regarding this as an oversimplification, she called attention to the fact that differentiation was ultimately a composite of a multiplicity of limiting factors.

James B. Walker (Rice University) discussed metabolite-repressor: receptor interaction during embryonic development. Of the several programmed metabolic events in this system (the chick embryo), few have proven to be subject to external perturbation with physiological compounds. One system is remarkably susceptible, however, and this is the enzyme system for the synthesis of creatine. Walker has shown that the metabolite repressor: receptor interaction of creatine introduced into the developing chick embryo follows saturation kinetics consistent with a reversible interaction with a macromolecule.
DISSYMMETRIES

THERMOSTATTED CELL

In a previous column of DISSYMMETRIES (see Science, February 19, 1965, p. 937; Anal. Chem., Vol. 37, No. 1, p. 66A), reference has been made to the numerous papers describing various ways of temperature control in light scattering measurements by means of Brice-Phoenix photometers. We are prompted to take up this subject again by the very interesting contribution of C. Smart from Unilever Research Laboratory in Port Sunlight, Cheshire, England [J. Polymer Sci., 44, 3015 (1965)]. He described a thermostating jacket which allows temperature control to within ±0.2°C in the temperature range of 0-70°C. The jacket consists of a short section of Pyrex 40 × 40 mm. semicircular glass cell which is clamped between two machined flanges. The lower flange sits on the cell table and the upper semicircular Pyrex 24 × 24 mm. Pyrex square cell that is immersed in liquid paraffin (Nujol). A similar setup apparently is possible with large and small cylindrical cells. (We may point out that our Catalog No. SC-200 temperature control cell holder for the small 1 cm square cell has certain similar features).

A screw cap tightly closes the jacket. Nujol is circulated in a completely enclosed system by pumping it through the jacket and glass heat-exchanger coils in a thermostatted oil bath by means of a small gear pump. The circulating liquid is continuously filtered in this closed system by passing through a Millipore filter before it enters the jacket. In this way the major disadvantage of similar devices where the cell is immersed in a thermostat liquid, i.e., the accumulation of dust particles, is avoided. Nujol as circulating liquid has the additional advantage of having a refractive index very close to that of Pyrex. This reduces stray reflections within the thermostating jacket as evidenced by values close to unity for the disymmetry obtained for water and dilute aqueous solutions.

INCREASED SENSITIVITY

In the same paper, Dr. Smart described a modification of the output circuit of the photometer that leads, in combination with a Phoenix potentiometric strip chart recorder, to a considerable increase in the sensitivity while maintaining a signal-to-noise ratio (about 100 : 1). The increase in the sensitivity is based on the fact that the recorder has a very high input impedance. Because of this, it is possible to increase the output signal by measuring the potential drop across a larger proportion of the cathode load resistance. By means of a switch, different fixed tapping points along the cathode load can be selected to give either normal sensitivity or two increased sensitivities.

As a check of the performance of the thermostating jacket described above, Dr. Smart determined the Rayleigh ratio of benzene and water at an angle of 90°, at room temperature. The absolute calibration was based on the use of an opal glass standard diffusor in combination with Brice's method. Both for benzene and water the results agree closely with the most reliable values from the literature. This is particularly significant in the case of Rayleigh ratio determination of water in smaller cells where stray light appears generally to be somewhat greater than in larger cells. Since water scatters so little, a small amount of stray light can easily lead to measured intensities which are too high.

LIGHT SCATTERING

BY PURE WATER

In connection with Smart's results for water, it may be of interest to note a very comprehensive study of the light scattering properties of water published recently by J. P. Kratochvil, M. Kerker and L. E. Oppenheimer of Clarkson College of Technology in Potsdam, N. Y. [J. Opt. Soc. Am., 54, 1194 (1964)]. One of the ships on which was slightly modified, and a variety of cells of different sizes and shapes were utilized. By carefully evaluating the problems of stray light, absolute calibration and presence of dust particles, and by critically reviewing the literature data, these authors were able to demonstrate a close agreement between the measured Rayleigh ratio of water at an angle of 90° and that calculated from Einstein's fluctuation treatment when corrected for observed depolarization. The best values of Rayleigh ratio, R∞, appear to be 2.6 × 10^{-4} and 1.8 × 10^{-6} cm^{-1} at 436 and 546 nm. The ratio of these values is very close to the theoretical ratio (2.62) for the same wavelengths. Brice-Phoenix Light Scattering Photometers are equally applicable to the solution of problems of more immediate practical concern such as polymer characterization, particle size determination, reaction rates in biological systems, etc.

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Medical Research, London) spoke on growth and developmental hormones as tools for the study of biosynthetic control mechanisms. He reviewed the effects of hormones on nucleic acid synthesis. It is now apparent that several hormones promote RNA synthesis in target organs as one of the very early observable effects. Tata presented data for the thyroid hormone induction of metamorphosis in the American bullfrog. The lag period for the precocious production of proteins which appear following thyroid hormone was shown to be one of active RNA synthesis. Density gradient studies during this period (40 to 60 hours after administering) showed newly formed polysomes, presumably bearing mRNA for the new protein synthesis that was to follow. It was stressed that an increase in mRNA is not the only means for increasing new protein synthesis. Stimulation of other RNA synthesis (ribosomal and sRNA) would effectively increase the synthetic machinery for the synthesis and, in fact, may be as important to hormone action as mRNA synthesis. Labeling patterns in the sequence of RNA polymerase increase during the combined action of growth and thyroid hormones on liver in hypophysectomized rats indicate that the two hormones act at different initial sites. In conclusion, Tata stressed that the many levels at which hormones act make the hormones versatile tools in exploring regulatory mechanisms in higher organisms during development.

Ulrich Clever (Purdue University) reported on the control of gene activity as a factor of cell differentiation in insect development. Certain insects are particularly suited to the study of gene activity because the “puffing” phenomena may be correlated with an active gene. The use of the hormone ecdysone to induce differentiation provides still another dimension to such studies. Clever described changes induced in chromosomes in *Chironomus tentans* and those genes which were directly affected by ecdysone. The primary target of the hormone appeared to be the same in different stages of development and in different tissues even though the final cell reactions were not the same. Also, certain genes must be active in order for other genes to respond to ecdysone (temporal and sequential action). These effects may be shown in two ways. First, the age of the insect (larva-pupa) is important to the action of the

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The application of actinomycin D may alter the course of the response to ecdysone. Some "puffs" may be activated in the absence of protein synthesis (puromycin resistant), while others require protein synthesis for activation.

Jean D. Wilson (University of Texas Southwestern Medical School, Dallas, Texas) and Peter M. Loeb reported on their studies on control by estrogen and androgen of cell biosynthesis in target organs, delineating still further the site of action of the sex hormones in target organs. Wilson and Loeb have studied labeled-testosterone localization in the preen gland of the duck. They concluded that testosterone label localized in an area of the cell actively synthesizing RNA in this tissue.

Using the crested newt as test material, they showed by autoradiography that tritiated estradiol localizes in the lampbrush chromosomes in ovary nuclei, presumably the site of active gene transcription. These studies suggest the mechanism of action of estrogen and androgen involves the regulation of specific gene activity. In the case of testosterone, this regulation appears to involve some types of reaction with the histone or protein associated with the DNA.

Regulation of enzyme action by metabolites was discussed by Carl Frieden (Washington University, St. Louis, Missouri). The enzymes considered were those whose activity is influenced by metabolites or end products which are not substrates for the enzyme. Several such examples are now known. This form of enzyme control is involved in three types of regulation: (i) those enzymes whose control will influence the particular metabolic pathway relative to other possible metabolic pathways; (ii) those enzyme-metabolite interactions which will affect enzyme subunit interaction to affect enzyme activity and thus metabolic rate; and (iii) those enzyme-metabolite interactions which affect primarily enzyme kinetics. All three types of regulation may be explained as allosteric effects.

Some forms of human disease can be considered in terms of regulatory mechanisms that involve control genes and structural genes. Genetic regulatory mechanisms as exemplified by human disease was discussed by Alexander G. Bearn (Rockefeller Institute). Bearn cited genetic studies on the transferrins, gamma globulins, bisalbuminemia, and others as specific ex-
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Examples of structural gene mutations that have been studied for human plasma proteins. In the erythrocyte proteins a very impressive series has been accumulated, including the several known hemoglobin variants, Thalassemia (several suspected structural mutations, at least), and blood group substances. Several examples were also furnished for human disease that have been analyzed as control gene mutations (for example, high fetal hemoglobin, hemophilia A and B, and an α₁ antitrypsin disease which produces an unusual emphysema).

Altered template stability in rat hepatomas has been shown to be an important aspect of tumors by Henry C. Pitot and co-workers (McArdle Laboratory, University of Wisconsin, Madison). Studies reported by Pitot have shown enzyme template stability in several minimal deviation hepatomas to vary considerably. In some of these highly differentiated tumors half-life of the template, as studied by the duration of the actinomycin D resistant period, may be very near or even greater than the normal liver stability, but in others the corresponding value is much decreased.

Since it has been known for some time that hepatomas fail to respond to normal enzyme inductions (for example, synthesis induced by substrates or hormones), it is possible this defective control of enzyme synthesis in hepatomas is related to the altered template stability.

Marvin D. Siperstein (University of Texas Southwestern Medical School, Dallas, Texas) has made a comparison of feed-back mechanisms of cholesterol metabolism in liver and hepatoma. The normal liver is subject to control of cholesterol biosynthesis at the point of conversion of β-hydroxy-β-methylglutarate to mevalonate by an end-product inhibition. The control appears to be related to a site in the membrane portion of the liver microsome fraction. This control is absent in hepatoma for which Siperstein postulates a steric alteration of the site.

In a paper on regulatory steps in the replication of mammalian cell nuclei Gerald C. Mueller (University of Wisconsin) presented evidence for sequential steps in replication. Cultures of HeLa or human lymphocytes, synchronized by temporary amethopterin block, were studied. Some distinction in the replication cycle could be shown by inhibition of replication if the analog 5-bromodeoxyuridine were incor-

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Corporated into early replicated DNA but not in late replicated DNA. This late replicated DNA is essential for cell division, because blockage by phleomycin is selective for this portion of DNA replication. Inhibition by phleomycin, puromycin, or parafuorophenylalanine showed that both RNA synthesis and protein synthesis were required for triggering replication.

A. Clark Griffin (University of Texas M. D. Anderson Hospital) made a comparison of protein-synthesizing systems from normal and tumor tissues. Studies were carried out on in vitro amino acid incorporating systems isolated from Novikoff ascites tumor cells, rat liver, and *Escherichia coli*. The ascites tumor and liver components were completely interchangeable in terms of amino acid activation or incorporation. Synthetases from tumor or liver would form the aminoacyl-sRNA (for sixteen amino acids that were tested) in the presence of sRNA isolated from liver or tumor. The tumor synthetase fraction catalyzed the formation of arginyl-sRNA in the presence of yeast sRNA while liver synthetase fraction failed to catalyze this reaction.

Specificity of the transfer enzymes was also studied. Carbon-14-labeled aminoacyl sRNA's were added to the ribosomes along with energy components. In each system the corresponding transfer enzyme fraction was essential for amino acid incorporation, as measured by insolubility in hot trichloroacetic acid. Tumor and liver systems were interchangeable while *E. coli* ribosomes would not respond to the mammalian transfer enzymes.

It is important that a means of studying gene combinations in cells of higher organisms be available. Hybridization of cells presents the most direct approach currently available for such studies. In discussing hybridization of somatic cells and phenotypic expression, Boris Ephrussi (Western Reserve, Cleveland, Ohio) reported on his work in this field.

From studies of the phenotypic expression of hybridized cells, examples of production of two forms of β-glucuronidase were cited, each form deriving originally from the parent strain. In other cases enzyme forms have been suppressed in hybrids by a regulatory interaction, because under other conditions of culture the enzyme (esterase) could be made to reappear. These findings are interpreted as consistent with the modern form of the deletion theory.
of carcinogenesis which states that carcinogenesis involves deletion or alteration of a regulatory mechanism, not a structural gene.

Since 1950 a traditional highlight in this symposium is the presentation of the Bixler Award for Outstanding Achievement in the Field of Cancer Research. This year’s recipient was Erwin Chargaff (Columbia University College of Physicians and Surgeons, New York). In the award presentation by R. Lee Clark (University of Texas M. D. Anderson Hospital and Tumor Institute) Chargaff was cited for his numerous contributions to nucleic acid chemistry, and particularly for the careful analytical studies which established the adenine-thymine and guanine-cytosine regulatorities in the base composition of DNA. After accepting the award, Chargaff spoke on the biological consequences of base-pairing in nucleic acids. The lecture began with some thoughtful comments on contemporary science, then briefly reviewed some of the contributions of Chargaff and his co-workers concerning base-pairing.

A final subject of the lecture concerned recently gathered evidence for the symparallel or antiparallel polarity of the strands in native DNA. Josse, Kaiser, and Kornberg have presented nearest-neighbor frequency studies of in vitro, enzymatically synthesized, DNA which indicate an antiparallel alignment. Chargaff’s studies approach the problem using native DNA as the material investigated and a detailed analysis of the resulting isostiches containing one or two bases. The isolated isostiches can be analyzed for their sequence (for example, pApGp versus pGpAp) and the resulting distributions of isostich-two content compared with that expected for a syn- or antimodel of DNA strands. The data are in accord with the antiparallel model, thus affording experimental support for assumptions that have long been held for native DNA.

The symposium was supported by grants from the National Cancer Institute, U.S. Public Health Service, and the American Cancer Society, Texas Division. The full text of the papers will be published as a monograph entitled “Developmental and Metabolic Control Mechanisms and Neoplasia.”

Darrell N. Ward
Department of Biochemistry,
University of Texas M. D. Anderson Hospital and Tumor Institute, Houston

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November


28-31. Radiological Soc. of North America, Chicago, Ill. (M. D. Frazer, 713 Geneseo St., Syracuse, N.Y.)

28-4. Odontological Federation of Central America and Panama, San Jose, Costa Rica. (R. Pauly S., Univ. of Costa Rica, San Jose)


29-3. Phytopharmacology, intern. conf., Amsterdam, Netherlands. (California Chemical S.A. Française, 19, avenue George V, Paris 8\textdegree)

29-4. Space Technology and Science, 6th intern. symp., Tokyo, Japan. (D. Mori, Inst. of Space and Astronautical Sci., Univ. of Tokyo, 856 Koma-ba-machi, Meguro-ku, Tokyo)

29-8. Rehabilitation of Persons with Dulled Sensory Perception, intern. conf., Braunschweig, Germany. (Sonnenberg Intern. Center, P.O. Box 460, 33 Braunschweig)


December


1-3. American Water Resources Assoc., first annual, Univ. of Chicago, Chicago, Ill. (AWRA, P.O. Box 434, Urbana, Ill.)


2-3. Society of Plastics Engineers, regional technical conf., Newark, N.J. (SPE, 65 Prospect St., Stamford, Conn. 06902)

3-3. Leptospirosis, intern. colloquium, Antwerp, Belgium. (A. Gare, Inst. de Medicine Tropicale, Prince-Leopold, Antwerp)

3-5. Academy of Psychoanalysis, midwinter meeting, New York, N.Y. (H. Davidman, 125 E. 65 St., New York)

3-5. American Psychoanalytic Assoc., fall meeting, New York, N.Y. (APA, 1 E. 57 St., New York 10022)

3-4. Macromolecular Metabolism, symp., New York, N.Y. (New York Heart
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If you use any of these specialty gases

<table>
<thead>
<tr>
<th>Acetylene</th>
<th>Deuterium</th>
<th>Iodine Pentfluoride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Diffuorodiene</td>
<td>Isobutane</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Dimethylamine</td>
<td>Krypton</td>
</tr>
<tr>
<td>Argon</td>
<td>Dimethyl Ether</td>
<td>Methyl Allen</td>
</tr>
<tr>
<td>Boron Trichloride</td>
<td>Ethane</td>
<td>Methyl Fluoride</td>
</tr>
<tr>
<td>Boron Trifluoride</td>
<td>Ethyl Acetylene</td>
<td>Methane</td>
</tr>
<tr>
<td>Bromine Pentfluoride</td>
<td>Ethyl Fluoride</td>
<td>Methyl Acetylene</td>
</tr>
<tr>
<td>Bromine Trifluoride</td>
<td>Ethyl Chloride</td>
<td>Methyl Bromide</td>
</tr>
<tr>
<td>Bromo-trifluoromethane</td>
<td>Ethylene</td>
<td>2-Methylethene-1</td>
</tr>
<tr>
<td>1,3 Butadiene</td>
<td>Ethylene Oxide</td>
<td>2-Methylethene-2</td>
</tr>
<tr>
<td>Butane</td>
<td>Fluorine</td>
<td>3-Methylethene-1</td>
</tr>
<tr>
<td>cis-2-Butene</td>
<td>12, 13, 13B1, 14,</td>
<td>Methyl Chloride</td>
</tr>
<tr>
<td>trans-2-Butene</td>
<td>21, 22, 23, 114,</td>
<td>Methyl Mercaptan</td>
</tr>
<tr>
<td>cis- and trans-2-Butene</td>
<td>115, 116, 1428,</td>
<td>Monomethylamine</td>
</tr>
<tr>
<td>Carbonyl Fluoride</td>
<td>152A, C-318, 1132A</td>
<td>Monomethylamine</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Helium</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>Carbon Sulfide</td>
<td>Hydrogen</td>
<td>Nee</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Hydrogen Bromide</td>
<td>Nickel Carbonyl</td>
</tr>
<tr>
<td>Chlorine Trifluoride</td>
<td>Hydrogen Chloride</td>
<td>Nitric Oxide</td>
</tr>
<tr>
<td>Chlorotrifluoromethane</td>
<td>Hydrogen Fluoride</td>
<td>Nitrogen</td>
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<td>Cyanogen</td>
<td>Hydrogen Iodide</td>
<td>Nitrogen Dioxide</td>
</tr>
<tr>
<td>Cyclopropane</td>
<td>Hydrogen Sulfide</td>
<td>Nitrogen Trifluoride</td>
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<tr>
<td></td>
<td>Hexafluoropropylene</td>
<td>Nitrogen Trioxide</td>
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<tr>
<td></td>
<td>(PLUS THOUSANDS OF GAS MIXTURES)</td>
<td>Nitrosyl Chloride</td>
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Nitrous Oxide | Nitrosyl Fluoride | Oxygen
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Perfluoropentane | Propane | Phosphorus Pentfluoride
Sulfur | Propylene | Silane
Dioxide | Sulfur Hexafluoride | Silicon Tetrafluoride
Sulfur Tetrafluoride | Sulfuryl Fluoride | Thienyl Fluoride
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- Society for Industrial and Applied Mathematics (J. H. Griesmer, IBM, Yorktown Heights, N.Y.)

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Animal Behavior Soc. (E. M. Banks, Univ. of Illinois, Urbana)
Herpetologists' League. (F. B. Turner, Univ. of California, Los Angeles)

Zoological and Botanical Sciences

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Ecological Soc. of America (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)
Western Soc. of Naturalists. (J. M. Craig, San Jose State College, San Jose, Calif.)

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Alpha Epsilon Delta. (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y.)
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The Mystery of Matter. Prepared by the American Foundation for Continuing Education. Louise B. Young, Ed. Oxford Univ. Press, New York, 1965. 726 pp. Illus. $10. One hundred selected writings on the following topics: Can matter be measured? (1 paper); Is matter infinitely divisible? (10 papers); Is matter substance or form? (9 papers); What is the secret of atomic energy? (13 papers); Is the universe asymmetric? (6 papers); What is the origin of living matter? (11 papers); Is living matter immortal? (10 papers); Does order arise from disorder? (8 papers); What is life? (13 papers); Will fallout affect the course of evolution? (8 papers); and Is science destroyer or creator? (11 papers).

Neighbors of the Earth: Planets, Comets, and the Debris of Space. Thornton Page and Lou Williams Page. Eds. Macmillan, New York, 1965. 352 pp. Illus. $7.95. The Macmillan Sky and Telescope Library of Astronomy, vol. 2. A compilation of 113 articles published during the last 34 years in The Telescope, The Sky, and Sky and Telescope. The topics are: The warmer planets: Mercury and Venus (21 papers); Mars, abode of life? (23 papers); the major planets and Pluto (26 papers); Asteroids: Bits or pieces? (4 papers); Comets, so different from the rest (10 papers); Meteors, meteorites, and meteoroids (9 papers); Atmospheres, aurorae, and exospheres (12 papers); and The debris of interplanetary space (8 papers).


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Frandsen—Anatomy & Physiology of Farm Animals

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a symposium (Burg Wartenstein), Sep-
tember 1961. Viking Fund Publications in

S. A. Egberth and A. L. Bachi-
rach, Eds. Williams and Wilkins, Balti-
more, 1965. 426 pp. Illus. $11. Fifteen
papers.

The First Year of Life. A psycho-
analytic study of normal and deviant
development of object relations. René A.
Spitz. International Universities Press,

Flora of Japan. Jisaburo Ohwi. Trans-
lated from the Japanese editions (Tokyo,
1953 and 1957) by Jisaburo Ohwi, Fred-
erick G. Meyer and Egbert H. Walker,
Translation Eds. Smithsonian Institution,
$25.

Fluorine Chemistry. vol. 4. Harold C.
Hodgkin and Frank A. Smith. Academic
$28.

Foundations of Anesthesiology. vols. 1
and 2. Albert Falkoner, Jr., and Thomas
$38.50.

Fundamentals of Acid-Base Regula-
tion. James R. Robinson. Blackwell,
Paper.

Fungal Genetics. J. R. S. Fincham and
P. R. Day. Davis, Philadelphia, ed. 2,

1, The Fungal Cell. G. C. Ainsworth
and Alfred S. Sussman, Eds. Academic
$24. Twenty-nine papers; the sections
are Introduction (2 papers); Cell Com-
ponents (12 papers); Nutrition and
Growth of Cells (14 papers); and Gene
Action (1 paper).

Genetic Analysis. William K. Baker,
Illus. Paper. $2.50. Riverside Studies in
Biology Series, edited by Theodosius
Dobzhansky and H. Bentley Glass.

Genetics in the Atomic Age. Charlotte
Auerbach. Oxford Univ. Press, New

Genetik der Pilze. Karl Esser and Ru-

The Geography of Evolution: Col-
lected Essays. George Gaylord Simpson.
$5.50. Seven essays.

Die Homosexualitat beim Mann. Kurt

Medicinal Plant Alkaloids. An intro-
duction for pharmacy students. Stephen
K. Sim. Univ. of Toronto, Toronto,
$3.95.

Methoden der Organischen Chemie
(Houben-Weyl). vol. 10, pt. 3, Stickstoff-
verbindungen I. Rudolf Stroh, Ed.
DM. 255.
Anthropology, No. 41, edited by Sol Tax. Challenge and Change in American Education. Seymour E. Harris, Kenneth M. Deitch, and Alan Levenson, Eds. McCutchan, Berkeley, Calif., 1965. 358 pp. $12.50. Sixteen papers presented at a seminar held at Harvard University in 1961 and 1962. The sections are Government and education (5 papers); Challenges in educational planning (5 papers); Management of colleges and universities (6 papers).

Comparative Cardiology (Ann. N.Y. Acad. Sci. 127). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1965. 875 pp. Illus. Paper, $12.75. Fifty-one papers presented at a conference held in April and May 1964. The topics considered were Comparative morphology of the cardiac conduction system and the comparative physiology of cardiac excitation (9 papers); Comparative aspects of intramural spread of excitation and recovery (6 papers); Comparative aspects of normal and abnormal heart sounds and murmurs (6 papers); Comparative dynamics of the cardiorespiratory system (7 papers); Some spontaneous cardiovascular diseases in animals (10 papers); and Comparative pathology of vascular lesions (13 papers).

Education and Public Policy. Seymour E. Harris and Alan Levenson, Eds. McCutchan, Berkeley, Calif., 1965. 359 pp. Illus. $12.50. Sixteen papers on the following topics: Political issues (5 papers); Qualitative issues (3 papers); Economic issues: The cost of education (4 papers); and Economic issues: Government and education (4 papers). Based on a seminar at Harvard University in 1962 and 1963.


Methodology of Plant Eco-Physiology. Proceedings of a symposium (Montpellier, France), April 1962. F. E. Eckardt, Ed. UNESCO, Paris, 1965. 555 pp. Illus. $20 (order from UNESCO Publications Center, New York). The 56 papers, which were given at the symposium, are in English or are summarized in English; discussions are included.


state nucleus in nuclear fission" by J. R. Huizenga; "Recent advances in nuclear radiation detectors" by A. T. G. Ferguson; "Fast electronics in nuclear physics" by P. R. Orman; and "Data processing" by J. V. Kane.


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Air Products and Chemicals Inc. 1078
Allied Chemical 957
American Edelstaal Inc. 1065
American Optical Co. 1092
Appleton-Century-Crofts 1065
Bausch & Lomb Inc. 952, 1070, 1081
Beckman Instruments, Inc. 942, 966
Bel-Art Products 1086
Bishop, J., & Co. 1080
Blackstone Ultrasomics, Inc. 1083
Booz-Allen Applied Research Inc. 1088
Control Data Corp. 963
Corning Glass Works 1075, 1077, 1079
Distillation Products Industries 948
Edmund Scientific Co. 1083
Exterline Angus Instrument Co., Inc. 968
Galileo Corporation of America 1068
Glass-Col Apparatus Co. 962
Hacker, William J., & Co., Inc. 1071
Hamilton Co. 1086
Hotpack Corp. 1085
International Equipment Co. 970
Klett Manufacturing Co., Inc. 1068
Labconco 1068
Labindustries 1066
Lea & Feibiger 1084
Leeds & Northrup 1071
London Co. 949
Mallinckrodt Chemical Works 1082
Matheson Co., Inc. 1069, 1088
McBee Systems 956
Nalge Co., Inc. 1085
Nega File 1076
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iques. Knowledge of histology, histological tech-
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ASSAy technique. Prefer Ph.D. in Biochemistry or
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and assay procedures and development of vaccines.
Salary open. Experience in research and teaching in
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Wanted Senior Laboratory Technician for modern
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Salary, Prefer Midwest or West. To: Box 284, SCIENCE.

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and university teaching. Salary $6,000. To: Box
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SCIENCE, VOL. 150