the equatorial zone and even to minutely localized parts of this zone because (i) this membrane is marked by about 8000 fixed points (the insertions of ciliary basal bodies), (ii) an equal number of new basal bodies become inserted in precise orientations during fission, and (iii) nearly all outer membrane growth occurs in association with fission. Experimental rotation of a small part of the surface through 180 degrees reversed the polarity of the growth of this part. A local differentiation of the membrane (the anterior suture), devoid of basal bodies, arises only from part of the cleavage furrow and does not reform during regeneration of an amputated anterior region.

S. E. Luria (Cambridge, Massachusetts) discussed colicins and the bacterial cell envelope. He described a new approach to isolation of bacterial mutants with altered membrane properties. These mutants are isolated as tolerant to the action of colicins and appear to have defects in some of the membrane proteins.

S. Dales (New York) described his attempts to characterize the proteins and lipids composing the envelopes of vaccinia virus and to ascertain the time of their synthesis. Experiments with inhibitors of protein synthesis revealed that pools of protein accumulate in the infected host shortly before the appearance of vaccinia-specific membranes. Judging from the incorporation of choline into lecithin of the membrane, nascent phospholipids are integrated into the viral envelopes at the time of their being assembled.

Two special group discussions were held. One session, organized by A. Mauro (New York), dealt with problems of thin lipid films of the Mueller-Rudin type. Two distinct views concerning the structure of these films emerged. The majority of the workers thought that "additives" (decane, tetradecane, and alpha-tocopherol) are inserted between the fatty acid chain of the phospholipid with their long axes perpendicular to the plane of the film. A minority view favored a structure in which the hydrocarbon additives are concentrated in a central planar thin layer, thus giving rise to a triple-layered structure, phospholipid-hydrocarbon-phospholipid. It was generally agreed that the large variations in electrical resistance observed in these films are most likely due to leakage around the torus of bulk lipid at the edge of the aperture. It was also agreed that the simple diffusion theory, subject to partitioning of water in the oil phase, accounts for the water fluxes observed and that the disparity in the values obtained with tagged-water versus osmotic-flow measurements can be accounted for by inadequate stirring, which results in too low values for the tracer measurements. The equality of the two coefficients is consistent with a continuous lipid phase without "pores" or "channels" (*12*). There was also complete agreement that the films, unless modified, are inert as electrical elements and impermeable to electrolytes. The original observation, that extracts from *Aerobacter cloacae* cultures can reduce the resistance of the films by several orders of magnitude, has now been extended. Cyclic peptides and polyenes, in addition to the fall in resistance, also produce an electromotive force which depends on cations in the case of valinomycin and anions in the case of the polyene amphotericin. It is thought that these compounds may create specific "pores" or act as "carriers." It became clear that the phospholipid-hydrocarbon film is an interesting system for the study of chemistry and physics of ultrathin structures. How useful it will be as a model for biological membranes remains to be seen.

The second group discussion on genetic approaches to functional complexes in membranes was organized by S. E. Luria (Cambridge, Massachusetts). The discussion centered on the question of mutations that affect enzyme functions through altered organization of enzyme complexes. P. Sweetly reported immunological differences in structural protein isolated from wild-type and "petite" mitochondria in yeast. Luria reported on the recent work of Puig and co-workers in Marseilles with mutations that affect the supramolecular organization of enzymes concerned with terminal steps of anaerobic catabolism in bacteria.

The conference was sponsored by the University of Rome and supported by a NATO Advanced Study Institute grant. Additional financial support was received from the Italian Ministry of Public Education, the Italian Ministry of Foreign Affairs, and the Consiglio Nazionale delle Ricerche. Part of the travel expenses for American participants was provided by the National Science Foundation.

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Antimicrobial Agents and Chemotherapy

New penicillins, cephalosporins, and antibiotics were described at the Seventh Interscience Conference on Antimicrobial Agents and Chemotherapy in Chicago, Illinois, 25–27 October 1967. Of the 1133 scientists registered at this meeting, 113, representing 17 countries, came from abroad.

The successes resulting from chemical modification of antibiotics continue to be reported. Those mentioned at this meeting included: (i) Carbenicillin, a new semi-synthetic penicillin with high activity against *Pseudomonas* and other gram-negative bacteria; (ii) Cephalexin, a semi-synthetic cephalosporin which gives high blood levels and can be orally administered; (iii) two aminoalicyclic penicillins (Wy-4508 and Wy-7953 from the Wyeth Laboratories) which give high blood levels and have low-serum binding coefficients, and are more slowly excreted than ampicillin though they are somewhat less active against gram-negative bacteria; (iv) potassium-6-(D-α-azidobenzyl-acetamido)-penicillin, a new, clinically useful penicillin from Astra Research Laboratories, Sweden; and (v) a series of lincomycin derivatives with antimalarial activity in tests on a variety of animals. All of these studies showed that by rather close cooperation between chemists, microbiologists, and pharmacologists it is possible to prepare new drugs with many desired features. Perhaps, in time, "custom ordering" of antibiotics will be possible.

This latter concept was explored to some extent in a symposium on "Relationship of Chemical Structure to Mechanism of Antibiotic Action," convened by F. C. Neuhaus (Northwestern University). The specific requirements for "genetic code misreading" type antibiotics were discussed by Julian Davies (University of Wisconsin) and cell-wall peptide synthesis inhibition at the cycloserine sensitive "spot" by Neuhaus. As more information is gained on the relations of structures to mechanisms of action, it should be feasible to modify other antibiotics in such a manner to include the moieties having the needed features.

Among the new antibiotics mentioned which will probably have an impact on chemotherapy on infectious diseases were: (i) Monensin, an acidic antibiotic with high anti-coccidial activity in laboratory and field tests. The chemistry of this antibiotic has been worked out in the Lilly Research Laboratories and the structure proposed (on the basis of x-ray analyses and chemical degradations) shows it to be one of a new family of antibiotics containing linked pyran rings; (ii) Tenemycin, a new member of the neomycin group with much lower toxicity than any of the reported deoxystreptamines; and (iii) Halomicin, an anti-gram positive bacteria product from *Micromonospora* species.

In other papers presented at this meeting aspects of the chemistry of stendomycin and saramycetin were reported and the complete structures of streptovaricin A and streptozotocin proposed. (The latter may be of long term interest due to its diabetogenic activity in a variety of animals.)

Other features of the meeting included a roundtable discussion on "Optimal Duration of Antibiotic Therapy in Severe Bacterial Infections" organized by W. M. M. Kirby) in which the participants stressed the factors behind the great variability that exists between medical centers in the treatment of pyelonephritis, meningitis, endocarditis, pneumonia, and gastroenteritis. In the course of a symposium on "Antibiotic Synergism and Antagonism" E. Jawetz mentioned that Maimonides' advice (given 800 years ago) "If one can manage well with one drug, one should not use a compound one . . . one should use medications compounded of multiple ingredients only when compelled to do so" should be recognized as still useful.

Most of the papers presented at this conference will appear in *Antimicrobial Agents and Chemotherapy–1967*, which will be published in June 1968 by the American Society for Microbiology, 115 Huron View Boulevard, Ann Arbor, Michigan 48103.

Plans for the 1968 Interscience Conference are already under way. The sessions will be held 23–25 October 1968 in the Commodore Hotel, New York City. C. W. Pettinga (Eli Lilly and Company) will be chairman. The deadline for abstracts of papers to be presented at this 1968 meeting is 1 July 1968.

The conference was sponsored by the American Society for Microbiology and the sessions on clinical subjects are arranged with the support of the Infectious Diseases Society of America.

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Calender of Events

Courses

Biology of Mollusks, Hawaii Institute of Marine Biology, 17 June–6 September. A graduate research training program in molluscan biology, sponsored by the National Science Foundation. Participants will explore structure, function, and adaptive radiation in the mollusks, with emphasis on such topics as functional systems, developmental biology, analysis of behavior, population biology, and role of mollusks in biotic communities. (Dr. Philip Helfrich, Summer Training Program, Hawaii Institute of Marine Biology, Coconut Island, P.O. Box 1067, Kaneohe 96744)

Neuromuscular Diseases of Children, Chicago, 3–14 June. An intensive didactic and clinical course designed for pediatricians, orthopedists, neurologists, psychiatrists, and physiatrists interested in the care and treatment of children with neuromuscular handicaps. Emphasis will be placed on the practical clinical aspects of treatment and rehabilitation procedures. Fee: $315. (Registrar, Cook County Graduate School of Medicine, 707 South Wood St., Chicago, Ill. 60612)

Fracture Mechanics Summer Series, Bethlehem, Pa. The two courses offered are for practicing engineers and scientists working in research and development, design and materials selection, manufacturing, quality control and inspection, testing, and/or failure analysis. **Workshop in Fracture Mechanics** (2–14 June) will encompass theoretical and physical foundations, stress intensity analysis, electron fractography, experimental testing, and design applications. Fee: $375. **Advanced Fracture Analysis** (9–14 June) will encompass the analysis of fracture criteria, separation mechanics, viscoelasticity, fracture of inhomogeneous media, multiple mode failure and dynamic crack behavior through the use of two- and three-dimensional stress analysis and advanced mathematical models. Fee: $225. (Universal Technology Corp., 1388 Research Park Drive, Dayton, Ohio 45432)

Oceanography, Stanford Oceanographic Expedition 20, 16 September–1 December. The expedition will leave Guayaquil, Ecuador, on 16 September for research in the eastern tropical Pacific, and will terminate in Monterey, Calif., on 1 December. The cruise will provide the opportunity for almost all types of "blue-water" biological oceanographic research, but will tend to concentrate on the reproductive cycles and food chain relationships of the abyssal benthic communities of the region. The expedition represents an intensive 15 quarter-unit graduate level course in biological oceanography given at sea by a faculty of three. Ten NSF awards covering room and board, transportation to and from the vessel, and full tuition are available. Applicants must be research-oriented graduate students in biology, in good academic standing and excellent physical and emotional health. *Deadline for applications: 1 June.* (Professor Malvern Gilmartin, Hopkins Marine Station, Pacific Grove, Calif. 93950)

Research Instrumentation, Brooklyn N.Y., 20 July–10 August. A laboratory course in basic electronics and instrumentation techniques designed for engineers, physical and biological scientists, and science educators who must use instruments in their work. Fee: $50. *Deadline for applications: 15 May.* (Professor Kenneth R. Jolls, Department of Chemical Engineering, Polytechnic Institute of Brooklyn, Brooklyn, N.Y. 11201)

Physical Measurement and Analysis, Massachusetts Institute of Technology, 11–21 June. Is intended for professional people who make and analyze measurements or who design experimental equipment incorporating measuring apparatus. Fee: $400. (Director of the Summer Session, Room E19-356, Massachusetts Institute of Technology, Cambridge 02139)

Freeze Etching and Scanning Electron Microscopy of Biological Materials, University of California, 24–28 June. Is designed to provide theoretical background and laboratory experience in the use of the scanning electron microscope in conjunction with freeze etching. Participants are expected to have a background in biological electron miscroscopy. Fee: $300. (Letters and Science Extension, University of California, Berkeley 94720)

European Library Study Tour, 22 July–12 August. The trip is open to students currently enrolled in library schools, to professional librarians, and to persons meeting the entrance requirements of the Library School. Enrollment is limited to 30. Participants will visit Dublin, London, Copenhagen, Gothenburg, Stockholm, Frankfurt, Amsterdam, Brussels, and Paris. The study tour will carry four quarter credits at the graduate level. Fee: $140 plus $10 admission fee. Travel cost: Approximately $981. *Deadline for applications: 5 June.* (Mrs. Margaret D. Warrington, Administrative Assistant, Graduate School of Library Science, Drexel Institute of Technology, 33rd and Lancaster Ave., Philadelphia, Pa. 19104)