organelles revealed by the electron microscope, there may still be good justification for tying taxonomy fairly closely to ultrastructural features. In carrying these ideas further, Poljansky (Leningrad) discussed the tendency toward decrease in the number of organs in the evolution of Metazoa. By contrast, among Protozoa the evolutionary tendency seems to favor increase in the number of organelles—for example, multiple nuclei of the same (amoebas) or different (ciliates) types or duplication of kinetic apparatus as in several flagellates. Often the tendency is carried even further, in that some forms of Protozoa are polyploidized and new forms emerge precipitously as a consequence.

In the area of research on protozoan parasites, progress in explaining the differential nutritional requirements of the related flagellates, *Leishmania, Leptomonas,* and *Crithidia* was reported by Gutmann (New York). Efforts to achieve artificial immunization against humoral parasites are beginning to show success, according to reports by Weiss (Michigan) on malaria parasites and Soltys (Cambridge) on the trypanosomes. The immunization against malaria involved immunization of mice by a noninvasive strain of *Plasmodium berghei.* This particular strain is noninfective for mice, but does infect rats. It was developed by culturing the parasite in a tissue culture containing hamster serum. The administration of these forms to mice, followed by booster injections of parasites 2 weeks later, conferred immunity to the parent strain of *Plasmodium* which was still lethal to control mice. An initial, sensitive period (4 weeks following the booster injection) to the challenge dose was recorded during which the experimental mice appeared more sensitive than the controls. However, this sensitive period was followed by clear, and in some cases total, immunity lasting as long as 4 months.

Landau (Paris) reported work with a new species of rodent malaria parasite, *Plasmodium chabaudi,* which shows several behavioral characteristics which may prove to be of great value in laboratory work; specifically, it appears to be easier to transmit through mosquitoes than *P. berghei* from mice or *P. cynomolgi* and *P. knowlesi* from monkeys. Also, the new species produces greater numbers of exo-erythrocytic forms than any of the above species.

Further work on *Hartmanella castellanii,* the free-living amoeba that has been implicated in human infections, was reported by Culbertson (Indiana). He described successful efforts to infect rabbits and mice with the amoebas and to develop immunity against such infections in mice. Culbertson reported that of the seven human cases of apparent invasion of brain and other tissues with *H. castellanii,* reported to date, none have been confirmed by culture studies. Conversely, work reported by Kučera (Prague), Frenkel (Kansas), and Yeager (New Orleans) strengthened the conclusion that *Pneumocystis carinii* is truly a pathogen of man.

The conference itself passed three resolutions: (i) a request that the World Health Organization call a meeting for discussion of means for international cooperation in preservation of strains and types of Protozoa; (ii) support for establishing an abstracting service for protozoological literature; and (iii) acceptance of the invitation from the Russian delegation to hold the next international conference on protozoology in the U.S.S.R.

The papers presented at the conference were published in shortened versions as *Progress in Protozoology* (International Congress Series No. 91, Excerpta Medica Foundation, Herengracht 119-123, Amsterdam-C, Netherlands). This volume was given to each delegate as he registered; it replaces the usual reports of congresses which often do not appear for several years after the meeting has ended.

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Molecular Basis of Differentiation

The cross-fertilization between embryology on the one hand and genetics and biochemistry on the other is responsible for the new impetus which research in the field of differentiation is experiencing. However, progress in this area of research is often hampered by the lack of communication among specialists in different disciplines. In order to bring together in an informal way biologists working in diverse fields, a workshop on the Molecular Basis of Differentiation was held at the International Laboratory of Genetics and Biophysics, Naples, Italy (22–26 February 1965).

In order to encourage communication among the participants, it had been decided that no formal papers should be presented; instead, some of the participants were asked to introduce a subject for discussion. Each participant had to submit a list of questions which he wished to have brought up for discussion. The list of questions was circulated in advance. The principal question which loomed in the background was: What can we learn about the problem of development by applying the conceptual and methodological parameters of molecular biology?

The discussion was opened by C. H. Waddington, who focused attention on some of the problems for the solution of which the embryologist is in the greatest need of help from biochemists. The results of D. D. Brown (Baltimore) on the synthesis of the various species of RNA during oögenesis and development served as a basis for the discussion. Particular attention was paid to the role of the nucleolus in the control of synthesis of ribosomal RNA, a problem which has been illuminated by the work of Brown and Gurdon on the anucleolate mutants of *Xenopus,* and by S. Spiegelman (Urbana) with his work (with Ritossa) on *Drosophila* with genotypes carrying various doses of the nucleolar organizer.

One of the central problems of differentiation is that of regulatory mechanisms. At the molecular level, the question can be studied by investigating control of synthesis and repression of enzymes. The subject was introduced by A. B. Pardee (Princeton) and A. Kepes (Paris), who discussed bacterial systems. The question arose as to how far the results obtained on microorganisms can be extrapolated and applied to more complex cells and to higher organisms. This led to interesting discussions from the enzymological point of view by S. Kaufman (Bethesda), G. L. Cantoni (Bethesda), and E. Antonini (Rome). P. A. Marks (New York) and E. Scarano (Naples) then presented some of their data on erythroid cells and embryos, respectively. A mathematical model for the interpretation of regulatory mechanisms was discussed by B. Goodwin (Edinburgh).

H. Kroeger (Zürich) introduced the subject of control of chromosomal puffs by focusing on the role of ionic balance. E. Hadozn (Zürich) presented his findings on long-term cultures of imaginal discs of *Drosophila* in vivo. S.

Ranzi (Milan) discussed his results on specific induction by nucleic acid preparations from different organs.

Two special systems were then taken up in greater detail—the embryo of the sea urchin and the hemoglobin-synthesizing system. S. Spiegelman showed some new approaches using both in vitro systems and hybridization techniques. P. R. Gross (Providence) dealt mainly with early protein synthesis in the embyos and its activation. This latter problem, especially from the point of view of activation and controls, was discussed by A. Monroy (Palermo), M. Nemer (Philadelphia), J. Runnström (Stockholm and Naples), and A. S. Spirin (Moscow). The last session was devoted to the synthesis of hemoglobin, a subject which has recently contributed much to the progress of our knowledge of the mechanism of protein synthesis; the discussion was led by P. A. Marks (New York) and C. Baglioni (Naples).

The sponsoring institutions were the Italian National Research Council, the International Union of Biological Sciences, and NATO. It is hoped that this type of interdisciplinary discussion can be resumed at a second international workshop, planned for the spring of 1967 in northern Italy.

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Forthcoming Events

February

15–17. **Radioisotope Applications in Aerospace**, symp., Dayton, Ohio. (P. Polishuk, Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio)

15–18. Treatment and Storage of Highly **Radioactive Waste**, symp., Richland, Wash. (W. H. Regan, Jr., U.S. Atomic Energy Commission, Washington, D.C. 20545)

16–17. **Voluntary Health**, 2nd natl. conf., Chicago, Ill. (Dept. of Community Health and Health Education, American Medical Assoc., 535 N. Dearborn St., Chicago)

16–18. Practical **Space Applications**, symp., San Diego, Calif. (C. Tross, Box 931, Rancho Santa Fe, Calif.)

16–19. National Soc. of **College Teachers of Education**, Chicago, Ill. (E. H. Goldenstein, Administration Bldg., 413, Univ. of Nebraska, Lincoln 68508)

16–19. Institute of **Management Sciences**, annual mtg., Dallas, Tex. (W. M. Campbell, Atlantic Refining Co., P.O. Box 2819, Dallas 75221)

17–19. American **Educational Research**