Moulds as Metabolic Models. By Jackson F. Foster, Department of Bacteriology, University of Texas, and Oak Ridge National Laboratories.

Under controlled laboratory conditions certain fungi are known to accumulate organic acids; the acid accumulated is dependent upon the substrate used. *Rhizopus nigricans*, which accumulates fumaric acid when grown on ethanol, was used to determine the validity of the Wood-Werkman reaction. Using labeled compounds it was found that the formation of a C$_4$ compound (i.e., fumaric acid) results from the condensation of two C$_2$ molecules and that carbon dioxide enters into the reaction only after prefixation. In the case studied the Wood-Werkman reaction is probably not the mode of genesis of the C$_4$ acids.

The same methods were utilized in the study of the formation of citric acid with the exception that *Aspergillus niger* was substituted for *R. nigricans*. In this case citric acid may be formed by the condensation of three C$_2$ molecules and not by the classical method (C$_1$ + C$_3$ → C$_4$ : C$_4$ + C$_2$ → C$_6$).

These studies seem to support the hypothesis put forward by Thunberg some twenty years ago; and suggest that the currently accepted Krebs cycle and connected schemes may be of less importance than is now generally assumed.

R. H.

Ecology of Pelagic Daphnia. By John Brooks, Instructor, Department of Zoology, Yale University.

In certain parthenogenetic fresh water forms, the body proportions of genetically identical generations have been found to show seasonal variation. This phenomenon has been termed cyclomorphosis. The discussion was confined to seasonal variation in relative length of the head in *Daphnia retrocurva*. Seasonal samplings of a population of *D. retrocurva* in Bantam Lake, Connecticut, showed that relative head length was at a minimum in early April but increased in successive generations to a maximum in late June and early July. Individuals with elongate heads and those with short heads showed the same vertical distribution patterns throughout this period, the greatest part of the population being confined to the upper strata of the lake. The general validity of Woltereck's hypothesis that relative head length determines distribution is thus brought into serious question. During
the summer the water in these upper strata becomes warm and turbulent. Culture experiments indicate that these environmental factors may be important determinants of relative growth.

R. R., JR.

February 1, 1950

ORGANIZATION OF THE TELEOST BLASTODERM. By Jane M. Oppenheimer, Professor of Biology, Bryn Mawr College.

Comparison of the eggs of the trout and the killifish, Fundulus heteroclitus, demonstrated that the slower development and higher degree of differentiation in the former at the time of closure of the blastopore can in great measure be correlated with its larger yolk content. In trout gastrulae, regions of the blastoderm explanted to yolk sac epithelium differentiate into characteristic tissue complexes. Repetition of this operation on Fundulus resulted only in differentiation of pigment and red blood cells. The opinion was expressed that these observations do not necessarily demonstrate a difference between the two forms as to degree of determination of the blastoderm, but may rather illustrate differences in external milieu required for cellular differentiation. An instance in Fundulus of differentiation of pronephros, from posterior blastoderm which had been transplanted to anterior blastoderm, to some extent supports this hypothesis. Thus the term “dependent differentiation” should be accompanied by information as to the factors upon which a differentiating part is dependent.

R. R., JR.

YALE MEDICAL SOCIETY

February 8, 1950

THE CLINICAL USES OF STREPTOKINASE-STREPTODORNASE. By William S. Tillett, Professor of Medicine, New York University College of Medicine.

The use of a streptococcal concentrate containing a fibrinolysin (Streptokinase) and a deoxyribonuclease (Streptodornase) was described in clinical conditions requiring the removal of fibrin and purulent exudate. Streptokinase acts as a kinase in the plasminogen-plasmin fibrinolytic system, and consequently requires the presence of plasminogen. Streptodornase produces liquefaction of pus by direct action on deoxyribonucleoprotein which comprises 70% of the solid sediment of purulent exudate. Treatment is by topical application.

A series of successfully treated cases was presented, including hemothorax, sterile and septic empyema, draining pleural sinus, purulent maxillary sinusitis, lung abscess and burns. In addition to facilitating drainage by lysis of pus and fibrin, the treatment in some cases permitted access of antibiotic and chemotherapeutic agents. Failure of treatment in some cases was attributed to the absence of plasminogen and to organization of fibrin. Toxic side effects consisted of a pyrogenic reaction with
leucocytosis, chills or chilly sensations, and arthralgias. Possible additional inapparent toxicities are now under investigation.

The potentialities of the enzyme approach to the removal of pathological tissue was discussed.

R. T. M.

PHARMACOLOGY SEMINAR
February 9, 1950

RECENT ADVANCES IN ANESTHESIA. By Wesley Bourne, Chairman, Department of Anesthesiology, McGill University.

A review of recent experimental work in the field of anesthesiology was prefaced by remarks on advances in education in this field.

The advantages and disadvantages of several synthetic relaxant drugs related to d-tubocurarine, with emphasis on decamethonium iodide ("C10") and tolserol, were described. Attention was called to the recent observation that curare is useful in preventing a fall in blood pressure during surgical procedures carried out in the proximity of pressure receptors and nerves which reflexly control the heart rate, and further, the observation that coronary dilator drugs are useful for their anti-fibrillary action.

New anesthetic tools such as the oximeter and a plastic endotracheal tube for children with a non-rebreathing, nonresistant valve were described.

Recent theories on the mode of action of anesthetics in producing unconsciousness provided a provocative conclusion.

V. L. S.

BEAUMONT CLUB
February 17, 1950

BOYLE AND BAYLE, THE SCEPTICAL CHYMIST AND THE SCEPTICAL HISTORIAN. By Dr. George Sarton, Professor of the History of Science, Harvard University.

The second half of the seventeenth century was marked by an upsurge of experimental science, philosophy, and the arts. The tremendous amount of intellectual activity during this period is not at all surprising when one considers the catalogue of great men of letters living at this time. From their intellectual keenness stemmed the development of the experimental method and the wisdom of a skeptical spirit and a rationalistic attitude towards the truths revealed by, and the conclusions drawn from, its use.

Two representative personages who lived during this half-century were Robert Boyle and Pierre Bayle, one a scientist, and the other an historian. They both crusaded against irrationalism, superstition, intolerance, and gullibility. Boyle struck out against the unscientific and superstitious literature of the alchemists by writing a book entitled The Sceptical Chymist. The book's approach is that of a discussion among proponents of the
Aristotelean, Paracelsian, and atomist schools of philosophy regarding the physical-chemical nature of matter. Although an atomist himself, Boyle did not propagandize for atomism because this theory had not yet been proved, thus preserving objectivity which runs as an undertone throughout the book. He felt, apparently, that once people really understood the many diverse views that existed, the logical outcome would be the development of a skeptical spirit and tolerance rooted in rationality.

While Boyle was carrying on his work in England, Bayle was in Holland concerning himself with religious intolerance. He came from a Protestant sect in France which had been persecuted by the Catholics of that country. Taking refuge in Holland, he met many Catholics there who, conversely, had been persecuted by the Protestants in England. From their and from his own experiences, Bayle developed a deep resentment toward religious intolerance and persecution. He subsequently wrote and spoke his conviction of the need for rationalism and tolerance as the common ground upon which men of diverse beliefs could meet. He championed the cause still further by being instrumental in the publication of a new journal, The Republic of Letters, the purpose of which was to bring learned men together and teach them to regard problems in an objective manner. He also wrote and published The Dictionary Historical and Critical for which he is probably known best. Bayle's apparent modus vivendi of truth above all is what prompted him to undertake this literary endeavor. The Dictionary is a compilation of historical and contemporary events written in an objective fashion which hitherto had not been done. Historians previous to Bayle were prone to let their personal views color their text, thus lending bias and obscuring the truth.

Boyle and Bayle, scientist and historian, each developed the skeptical spirit so necessary for the effective use of observation and experiment.

J. B. LeR.

ANNUAL LECTURE
YALE CHAPTER OF ALPHA KAPPA KAPPA
February 24, 1950

RECENT ADVANCES IN MEDICINE. By Major General Raymond W. Bliss, Surgeon General, U.S. Army.

General Bliss cited briefly some of the more recent accomplishments made in medicine by the Army to illustrate the very significant role the Army has had in medical research.

Extensive investigations of the effects of radiation have shown that the cytoplasm, and perhaps more particularly certain enzyme systems within the cytoplasm, rather than the nucleus, is first affected. No significant increase in tolerance to radiation has been achieved to date by the use of drugs. Severe burns have been found to heal very well by using an undressed or open wound technique with early skin grafting. A rather
ingenious technique for following the progress of infection in burn cases and for determining the relative effectiveness of the various antibiotics was described. The drugs under question are contained in separate, insoluble tablets which can be embedded in blood agar media; the drugs diffuse into the media immediately around the tablets. The burn is swabbed and the agar plate streaked; the relative effectiveness of the different drugs in inhibiting growth is easily ascertained by this procedure.

Procaine-penicillin in the treatment of streptococcal upper respiratory infection has shown promising results in preventing any subsequent rheumatic fever. It has also been found that of the men followed after being rejected by the Army in World War II because they had hypertension at the time of examination, many now have no hypertension. Treatment of blood plasma with ultraviolet light has proved very effective in preventing homologous serum jaundice. A rat repellent called anti-dione is so effective that when offered no other alternatives, the rat will starve to death rather than contaminate himself with it to get at food.

The medical student is likely to view the science of medicine in terms of the specific medical problems which individual patients represent; though such an approach is wholly valid, General Bliss suggested that much can also be learned by a more impersonal or global approach. It is largely on the latter precepts that Army medical research is based, and the above illustrations of medical progress are ample indication of the importance and fruitfulness of the Army research program.

K. G. B.