

present in pure nickel made it unacceptable for cathode cores, and a possible solution to the problem is the use of a 40 per cent tungsten-nickel alloy. Among the merits claimed for this is that a marked improvement in the ultimate strength can be obtained by a heat-ageing process which does not affect the ductility of the alloy. The low thermal conductivity of this alloy is also an advantage.

Grids in receiving valves are usually made by winding either fine molybdenum-tungsten or 5 per cent manganese-nickel alloy wire on to heavier supports of copper, nickel, alloys of these metals or nickel-plated iron. Molybdenum is, however, brittle and expensive; and it can cause poisoning of oxide cathodes if it becomes oxidized. On the other hand, 5 per cent manganese-nickel is not strong enough for many grids. Dr. Jenkins inquired as to the hope of a high-temperature nickel-alloy becoming available to ease this situation. For very fine grid wires, less than 0.001 in. in diameter, tungsten seems likely to be the only suitable material.

Other speakers referred to the difficulty experienced in preventing secondary emission from grids made of molybdenum and tungsten, and suggested that this might be overcome by gold-plating the helix wire; it is difficult, however, to obtain a non-porous plating and one which would still be satisfactory after the swaging of the grid to its support wires.

Receiving valves have relied mainly on envelopes of lime-soda glass, while those parts through which metal connexions are sealed are of lead glass. Increasing use is now being made, in cooled-anode transmitting valves, of the iron-nickel-cobalt alloy matched to a borosilicate glass: this is a very satisfactory combination in that the expansion match is correct over a wide range of temperature.

Probably the most important advance in the field of envelopes is in the use of vacuum-tight ceramics brazed to expansion-matching metals. Originally developed in Germany, this technique is being used extensively in the United States, and will undoubtedly be used in Britain for high-power valves for use at very high and ultra-high frequencies (30-3,000 Mc./s.) in the future. One other important material is pure copper for anodes of transmitting valves and for the blocks of magnetrons and klystrons. So far, it has been found essential to import the necessary high-quality copper; but it is much to be hoped that a satisfactory supply can be established in Britain.

Improvements in radio valves of all types are very dependent on new or improved materials; and this discussion should help towards obtaining these by encouraging co-operation between those engaged in fundamental research on materials, the suppliers of materials, and the valve manufacturers.

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## PHYLOGENY OF THE BASIDIOMYCETES

UNDER this title, D. B. O. Savile (*Canad. J. Bot.*, **33**, 60; 1955) has contributed an essay in which he first of all sets out a series of "phylogenetic principles", thirteen in all, including some that are original and have a particular application to the fungi.

Each principle is enunciated and then discussed. The first of these may be cited as an example. "New

major groups are never derived from climax groups of the parental stock, but always from unspecialized lower groups of great genetic plasticity; for it is only among the latter that revolutionary changes, usually fatal but occasionally a startling success, are to be expected." From this follows the author's second principle that, since new groups spring from plastic ancestral groups, most of the connecting links perish.

A further principle adopted by the author, though often viewed with caution by botanists, is the well-known one that ontogeny recapitulates phylogeny. That elaborate sexual mechanisms and self-sterility are, in general, of great antiquity appears to be borne out by primitive algæ and fungi. Parasitism is not to be regarded as a recent development.

His last principle states that, in cases of strict parasitism, the antiquity of the host reflects that of the parasite and *vice versa*, in that hosts and parasites evolve more or less together.

The application of these principles has led the author to the view that it is difficult to accept any starting point for the Basidiomycetes other than a primitive Ascomycete, very close to *Taphrina* and parasitic upon ancient ferns. The ancestral Basidiomycete gave rise to two main lines, one leading to the rust fungi; the other, by way of the parasitic Auriculariaceae, to the remaining Heterobasidiomycetidae and the Homobasidiomycetidae.

The second line has been characterized by a trend towards increasing saprophytic ability, increasing frequency of clamp connexions, and increasing complexity of fruiting body. The author's views as to the probable phylogenetic relationships are depicted in a number of diagrams. He is emphatic that the phenomenon of parasitism, far from being a recent development and derived from an antecedent saprophytism, is generally ancient in the fungi. The view is advanced that the Ascomycetes originated from parasitic, aquatic Phycomycetes. Saprophytism, in general, takes its place as a derivative condition from an antecedent parasitism.

## WORLD CONGRESS OF MEDICAL PRACTITIONERS FOR THE STUDY OF PRESENT-DAY LIVING CONDITIONS

A CONGRESS of medical practitioners, representing thirty countries, was held in Vienna during May 23-25, 1953, with the object of studying present-day living conditions, and the report of the Congress has now been published\*. The report begins with the opening address of the honorary president, Prof. E. Štránský, emeritus professor of neuro-psychiatry in the University of Vienna, who accepted the honorary presidency on condition that its proceedings should be non-political; but he was compelled by ill-health to hand over the direction of the Congress to the president, Prof. P. Verga, director of the Institute of Anatomy and Pathological Histology of Naples, and director of the Cancer Research Institute in that city.

The main part of the report is divided into three parts: Part I is devoted to forty-two addresses given

\* Reports and Proceedings of the World Congress of Doctors for the Study of Present-Day Living Conditions—Vienna, 23-25 May, 1953. Pp. xvi+384. (Vienna: Congrès Mondial des Médecins; London: Caversham Centre, 23 Caversham Road, N.W.3.) 10s. 6d.

on living conditions in various countries; Part 2 includes the twenty-one addresses given on various aspects of the effects of the Second World War on the physical and mental health of the peoples of a wide variety of countries; and Part 3, which deals with the duties of doctors faced by the problems raised, consists of sixteen addresses on these problems and discussions of them. All these addresses are given in English, French, German and Russian.

The report ends with the three conclusions of the Congress as follows: (1) The medical study of the relationships between improvements in living conditions and improvements in health should be developed; there should be special study of bad

housing, lack of medical care, the incidence of tuberculosis, the infant death-rate and the effects of atomic and other forms of war on tuberculosis, mental illness and ill-health generally. (2) Doctors should not under any pretext depart from their obligation to defend life and health, and they cannot separate individual treatment from problems of social means; for this the free and permanent exchange of ideas and therapeutic methods is necessary. (3) The work begun by the Congress must go on, and an international secretariat should be maintained to make the work of the Congress known, to keep the various countries in touch with one another and to prepare a second Congress.

## EFFECT OF THERMAL SHOCK ON THE NUCLEIC ACIDS IN TOAD EMBRYOS DURING EARLY STAGES OF DEVELOPMENT

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THE quantitative change in content of nucleic acids of amphibian embryos in the course of development has been studied by Brachet and other investigators. All their results are given as values per embryo. Thus quantitative patterns of nucleic acids during amphibian development are shown, while subject to experimental modification.

In view of the importance of the nucleic acids in embryonic development, I have tried to follow the changes of the nucleic acids, after thermal treatment of eggs, during the development of the toad embryo.

Some common Japanese toads, *Bufo vulgaris formosus* (Boulenger), were collected in the middle of March, and eggs were obtained from the uteri and inseminated artificially. 50 min. after insemination, the fertilized eggs thus obtained were transferred to hot water (33°, 35° and 37° C.) for 10 min. They were then cultured at room temperature (10–15° C.) and allowed to develop. The embryos were fixed at several desired stages of development with absolute alcohol, and were used as the experimental series for nucleic acid measurement. Out of forty-nine females

(more than 6,000 eggs per female) three were used for obtaining eggs with the same amount of nucleic acid before fertilization as controls. The quantitative fractionation of the nucleic acids was carried out by the method of Schneider<sup>1</sup>, and ribo- and deoxyribonucleic acid were measured photometrically by the orcinol reaction and diphenylamine reaction, respectively. A hundred embryos were used in one nucleic acid determination, and an average was taken of five experiments.

The quantitative changes of the nucleic acids at each stage of development of the eggs treated thermally are shown in Table 1. The ribonucleic acid content of control eggs did not increase until the blastula stage, but after that it increased remarkably. However, in the case of the eggs treated thermally, it was recognizable that the ribonucleic acid content slightly decreased immediately after treatment.

Afterwards, at the two-cell stages, the ribonucleic acid content decreased considerably after treatment at 37° C.; after this drop, it did not increase until the sixteen-cell stages. Then it began to increase rapidly,

Table 1. NUCLEIC ACID CONTENT (%) DURING THE DEVELOPMENT OF EGGS SUBJECTED TO THERMAL SHOCK (per 100 embryos)\*

Exp. stage	Control		33° C. Treatment		35° C. Treatment		37° C. Treatment	
	RNA	DNA	RNA	DNA	RNA	DNA	RNA	DNA
Before fertilization (egg)	581.3±1.24	66.9±0.28	581.3±1.27	66.9±0.26	581.4±1.25	66.8±0.24	581.2±1.28	66.9±0.22
After fertilization (egg)	—	—	580.2±1.33	66.8±0.29	578.3±1.22	66.8±0.27	575.6±1.31	66.9±0.27
2-cell stage	581.2±1.36	66.8±0.34	570.1±1.26	66.7±0.24	562.5±1.38	66.7±0.23	549.8±1.34	66.7±0.26
8-cell stage	581.4±1.21	66.8±0.26	570.4±1.37	66.8±0.31	562.3±1.40	66.8±0.31	549.4±1.31	66.7±0.26
16-cell stage	581.8±1.48	66.9±0.35	570.3±1.34	66.9±0.28	562.4±1.36	66.7±0.34	549.5±1.33	66.8±0.33
Morula	581.6±1.38	67.1±0.36	575.6±1.24	67.1±0.32	572.7±1.31	66.9±0.37	554.7±1.37	66.9±0.36
Blastula	581.4±1.33	69.4±0.42	578.6±1.32	69.3±0.35	576.6±1.42	68.5±0.28	562.6±1.42	68.1±0.41
Early gastrula	583.6±1.44	74.8±0.44	581.8±1.43	74.8±0.41	578.8±1.54	74.8±0.39	571.3±1.46	71.4±0.39
Gastrula	586.5±1.58	86.8±0.37	585.4±1.48	86.8±0.39	582.5±1.61	84.3±0.47	579.4±1.51	80.3±0.47
Neurula	590.8±1.63	124.6±0.43	588.6±1.49	124.6±0.43	588.4±1.58	121.4±0.46	586.5±1.47	116.7±0.51
Tail-bud stage	593.6±1.64	185.4±0.52	597.3±1.57	184.5±0.46	597.8±1.62	178.3±0.47	595.3±1.52	169.4±0.57

\* Average of five experiments

Table 2. NUCLEIC ACID CONTENT (%) IN EMBRYOS WHICH STOPPED DEVELOPMENT AT THE MORULA, BLASTULA AND GASTRULA STAGES DUE TO THERMAL TREATMENT (per 100 embryos)\*

Exp. stage	Control		33° C. Treatment		35° C. Treatment		37° C. Treatment	
	RNA	DNA	RNA	DNA	RNA	DNA	RNA	DNA
Morula stage	581.6±1.38	67.1±0.36	570.1±1.42	66.9±0.31	568.1±1.35	66.9±0.28	550.8±1.42	66.9±0.37
Blastula stage	581.4±1.33	69.4±0.42	573.2±1.38	67.1±0.34	570.8±1.51	66.8±0.36	556.8±1.48	66.8±0.39
Gastrula stage	586.5±1.58	86.8±0.37	577.3±1.46	70.4±0.33	572.3±1.47	67.4±0.35	564.8±1.51	67.1±0.35

\* Average of three experiments