

Comments and Communications

Origins of Scientists

No DOUBT the preliminary announcement by Knapp and Goodrich (*Science*, 113, 543 [1951]) will arouse a good deal of comment. A question of interest may be the double-barreled criterion set up for the index, involving both a doctorate level and listing in *American Men of Science*. No reason is apparent why a listing in *American Men of Science* should not be the sole criterion. The double requirement given tends rather strongly to limit the field of inquiry to educational activities. A preliminary spot check of the listings in the current edition of *American Men of Science* indicates 68% with Ph.Ds., 10½% with Master's degrees, and 21½% with Bachelor's degrees only. Thus, to include everybody listed, the over-all total productive index would need to be increased by about 47% above the figures given in the article.

The writer lacks adequate data to indicate the extent to which the use of the listing only would change the comparative results, but it seems probable that a material bias attaching disproportionate importance to academic pursuits would be eliminated. The guess is ventured that, in a very real and practical sense, those listed in *American Men of Science* and holding only Bachelor's degrees are entitled to just a little more credit for their achievement than the Ph.Ds.

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Rats in Relationship to Man's Welfare¹

THIS series of films has made available for the first time a comprehensive coverage of the biology of rats in its relationship to man's welfare. They cover *Rattus norvegicus*, the Norway rat, and *Rattus rattus*, the roof rat. Filming was by the U. S. Army Signal Corps in collaboration with the U. S. Public Health Service. The primary purpose of the films is to aid in the training of members of the Armed Forces and others engaged in work in the fields of health, sanitation, and rodent control.

The films should be of general interest however, to many persons other than the groups for which they were primarily intended. Even the general presenta-

¹ Released by the Department of the Army Medical Illustration Service, Armed Forces Institute of Pathology, Washington 25, D. C.

NUMBER	TITLE	RUNNING TIME (Min)
TF 8-1669	The Rat Problem	26
TF 8-1670	Habits and Characteristics of the Rat, Part I, Norway Rat	28
TF 8-1671	Habits and Characteristics of the Rat, Part II, Roof Rat	14
TF 8-1672	Sanitation Techniques in Rat Control	22
TF 8-1673	Practical Rat Control—Ratproofing	19
TF 8-1674	Practical Rat Control—Killing	37
TF 8-1675	Rat Ectoparasite Control	12

All are black-and-white 16-mm sound films.

tion of the activities of rats, which are shown in these films, will be an eye-opener to those who have only worked with the laboratory breeds.

The first film sets the stage with a very brief presentation of habits of rats, with particular reference to the role of rats in transmitting disease to man. There follows a pictorialization of the cycle of transmission of such rat-borne diseases as food poisoning, Weil's disease, murine typhus, and plague. Interspersed through the film are brief scenes of the type of economic damage done by rats.

The second and third films of the series lay the groundwork for a thorough knowledge of the ecology of the rat, which is essential both for an understanding of the transmission of rat-borne diseases and for instituting control measures. Particular emphasis is placed on the life cycle of rats with respect to attainment of their basic needs, the obtaining of food and harborage, and the fulfillment of the reproductive process. Also illustrated is how the restriction of the opportunity of realizing any of these needs leads to intraspecific competition. Well documented are the several types of harborage and sources of food that rats utilize. Considerable time is devoted to routes of travel between established sources of food and harborage. In so doing there results a good coverage of manual ability and orientation. Construction of nests and burrows, mating behavior, birth of young, transportation of food, and both intra- and interspecific competition are also covered.

The final four films on sanitation techniques, ratproofing, killing, and ectoparasite control continually emphasize the need of a full appreciation of the ecology of rats in instituting proper control measures. The outworn concept of killing as a panacea is replaced by the concept of killing as a sometimes necessary temporary remedial measure, which must always be accompanied by appropriate sanitation and ratproofing procedures. Ratproofing refers to the placing of barriers to travel, to ingress or egress from buildings, or to access to sources of food or harborage. Sanitation here refers to the removal of as many sources of food and harborage as feasible, along with their disposal in such fashion as not to foster residual foci of rat populations. Such policies of restricting rat habitats lead to intraspecific competition and occasional emigration, with eventual death of sufficient numbers so that rats are no longer a health hazard, or an important factor in producing economic loss. All phases of these control procedures are amply documented.

Purely from the viewpoint of the quality of the photography, these films rank with the best that have been produced in the way of wildlife moving pictures. One might wonder how it was possible to secure such extensive films of rats, which are both nocturnal and notoriously wary animals. Rats readily become ad-

justed to the intense light necessary for photography so long as they are in familiar surroundings. The most difficult problem to surmount was sound. Rats would scurry for cover at the least whirr of a camera or sound of a human voice. By the continuous use of a nonsense sound track at high volume, all extraneous noises were drowned out, and the rats went about their normal activities. Three types of movies were produced: (1) Rats in their native surroundings; (2) sets of houses, etc., were superimposed upon the native surroundings of rats; (3) rats were introduced into prepared sets. In this latter case rats were induced to act by first letting them become familiar with the set and, second, by shooting the scenes when the rats were at the height of their activity cycle.

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Geode Note

IN 1940 the writer presented a new working hypothesis to account for the formation of geodes, which are found so abundantly in the Warsaw and Keokuk formations. It was suggested that these "geodes were syngenetically deposited on the sea bottom as colloidal masses of hydrated silica" (*Trans. Illinois State Acad. Sci.*, 33, 168 [1940]) and that later, when the colloidal masses were in an environment where moisture was removed from the sediment or sedimentary rock, the loss of water from the gel produced the chalcedony shell that forms the outer layer of the geodes in those formations.

Geological evidence presented at that time has multiplied through the ensuing years to favor this hypothesis. Perhaps the most striking is offered by contact geodes. Not infrequently two geodes are found with a flat plane of contact and with a hollow in each geode. It is difficult to see how such pairs could be formed by any processes involving solution of cavities and subsequent filling, but it is understandable that colloidal masses coming in contact could produce a flat common surface and that each eventually dried and left its own cavity.

In 1944, a second paper (*Trans. Illinois State Acad. Sci.*, 37, 93 [1944]) showed that it was possible experimentally to produce silica gel balls under conditions very distantly approximating natural conditions. These, on being dried, gave shells not unlike the chalcedony shells of geodes.

There have been two questions that have never been satisfactorily answered: (1) By what process could colloidal silica, in such form and at such concentrations as is normally carried into the sea by rivers, become coagulated into stiff enough gels to form geodes, as postulated by this working hypothesis? (2) By what process are the quartz crystals, which line the majority of the geodes in the Warsaw and Keokuk formations, developed?

The first of these questions remains unsolved. However, the same question can be raised in considering

how primary chert could have been deposited in the ocean, and if that question can be settled, the problem of the balls of stiff silica gel could probably be settled also. At present, studies are in progress of conditions that quite closely approximate those found in nature, and that could produce silica gel in sea water, and they may furnish light on the problem of chert and geode formation.

Regarding the formation of the crystals, it was suggested in our original paper that "loss of electrons produces a condition favoring deposition of crystalline quartz." This idea has been completely abandoned. Work by Richard Naken in Germany (A. C. Swinnerton. *Report of Investigation in European Theater*, Signal Corps Engineering Laboratories, Bradley Beach, N. J. [Jan. 1946]), by Buehler and Walker in this country (*Sci. Monthly*, 69, 148 [1949]), and by others has suggested a new line of procedure, which is now being investigated to determine if it is possible to develop quartz crystals on the inside of chalcedony shells similar to geodes, and under conditions that are similar to those found in nature.

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La Cellule Nerveuse

THE purpose of this note is to draw attention to an excellent, but not well-known, source of information concerning early work in neurocytology. The book referred to is *La Cellule Nerveuse*, by M. G. Marinesco (Vols. 1 and 2, published by O. Doins et Fils, Paris, in 1909). These volumes are Nos. 10 and 11 in a series known as the "Bibliothèque de Physiologie," published under the direction of J. P. Langlois. The edition was probably small, judging from the few copies in medical libraries and the infrequent reference to this classical treatise in current reports of neuroanatomical research.

Volume 1 of *La Cellule Nerveuse* deals exhaustively with the normal neuron. Volume 2 is concerned, in equal detail, with the cytology of experimentally and pathologically altered neurons. The book is not impressive physically, and the illustrations are of only fair quality. However, the text material will be a delight to every student of the nervous system, especially since many of the original sources are now inaccessible because of actual scarcity or language difficulties. A few branches of science are based on such new concepts and techniques that the older literature is of little interest. This is not the case with neuroanatomy. No present-day student in this field can afford to ignore the brilliant and meticulous work done in Europe more than half a century ago. *La Cellule Nerveuse*, together with Cajal's better known *Histologie du Système Nerveux de l'Homme et des Vertébrés*, are major chapters in the neurocytologist's Old Testament.

To learn of the availability of *La Cellule Nerveuse*, a query was directed to 104 member libraries of the