# News of Science

## Hard Look at Missile Programs

The current inquiry of the Senate Preparedness Investigating Subcommittee is showing how difficulties arise in our missile programs because the new developments in science and weaponry do not fit readily into the present land-sea-air division of the armed services. The difficulties that are resulting from a separate Army, Navy, and Air Force include interservice rivalry, overlapping programs, and an involved superstructure of command. The subcommittee recessed on 17 December 1957, but on 6 January 1958 it will continue its efforts to find out what is wrong in the Department of Defense and what can be done about it.

So far testimony before the subcommittee, as well as the suggestions received from approximately 100 experts interviewed by the subcommittee's staff, shows that money alone is not the answer to the Soviet challenge. Something in the way of a new organizational set-up is also needed. Under the present system, the missile programs are spread among the three military services, with loose supervision by the Department of Defense. Although the power of William H. Holaday, director of guided missiles, was recently increased, it appears from the testimony that he does not exert fundamental control over the programs in the individual services.

Sentiment in favor of installing a missile chief who in fact does have full control seems to be growing in Congress. Senator Lyndon Johnson, Democrat of Texas and chairman of the subcommittee, said that the chief fault in the missile programs was the failure in the Pentagon to make "hard, firm decisions at high levels." He added that Neil H. McElroy, Secretary of Defense, should find an authoritative man for the job.

Testimony before the subcommittee also touched on the problems of outer space. Werner von Braun, civilian chief of the Army's ballistic missile program, urged the creation of a national space agency with an annual budget of about $1.5 billion. The new agency, Von Braun said, could undertake a 5-year program "to have a man orbiting the earth on a returnable basis" and a 10-year program for a manned space station. Both Von Braun and his military commander, Major General John S. Medaris, testified that their work on the 200-mile Redstone missile and the 1500-mile Jupiter was hampered by insufficient funds and by lack of a central missile authority.

## AAAS-Anne Frankel Rosenthal Award

Roy Hertz, chief of the endocrinology branch, National Cancer Institute, has received the 1957 AAAS-Anne Frankel Rosenthal Memorial Award for Cancer Research, which consists of $1000 that is provided by the Richard and Hinda Rosenthal Foundation. The award was presented during the recent meeting of the AAAS in Indianapolis, Ind.

For the past decade Hertz and his colleagues have been concerned with the endocrine factors involved in normal and cancerous growth. Their studies have been directed at both a basic and applied clinical level. In 1947 Hertz showed that hormone-dependent organs such as the breast and uterus require for their growth specific dietary factors such as folic acid. He further demonstrated the complete inhibition of such hormone-induced growth by administering folic acid or purine antagonists. These antagonists are so similar in chemical composition to corresponding dietary or metabolic factors that they prevent the normal growth function of these essential substances.

More recently, in collaboration with M. C. Li and D. M. Bergenstal, this knowledge of interference with abnormal tissue growth has been effectively applied in the treatment of a rare but highly malignant tumor of the uterus, namely choriocarcinoma. This tumor arises during or after pregnancy from the organ which would normally develop into the placenta. In women with choriocarcinoma this organ has turned into a malignant tumor which grows rapidly through the uterus and then spreads to the lungs and brain. It usually kills the patient in less than a year.

In 15 women afflicted with this rare condition, the application of an especially devised intensive regimen of treatment with a folic acid antagonist, methotrexate, has led to apparently complete suppression of the disease in five patients and almost complete suppression in five others. These ten women are now restored to normal living and have been entirely free of symptoms for periods ranging from 3 months to 2 years. Three of the group of 15 are still under treatment and two died during early phases of attempted treatment of their far-advanced disease. The full value of this treatment remains to be determined, but it is already entirely clear that patients with this type of malignancy can be markedly improved with the folic antagonists.

Hertz, in collaboration with William W. Tullner, has also developed the first nonhormonal drug capable of suppressing the output of cortisone and related hormones by the adrenal gland and by tumors arising in this vital organ. This inhibitory substance is called Amphenone. Amphenone is now used in patients suffering either from adrenal enlargement or from adrenal cancer in order to suppress the disorders produced by excessive adrenal hormones. These disorders, which are similar to those resulting from excessive cortisone administration, include diabetes, high blood pressure, acne, and mental abnormalities. However, this hormonal suppression is not accompanied by any restraining effect on the adrenal cancer. Moreover, the toxic side effects of Amphenone are such as to limit its practical usefulness to highly selected cases.

## Pay Up for Some Government Scientists

On 10 December the U.S. Government's Civil Service Commission announced pay increases for some 48,000 Government physical scientists and engineers. The increases, which will be made before the end of December, were necessitated, according to the commission, because "of evidence that the Government is unable to obtain critically needed scientists and engineers in sufficient supply at present rates."

The increases will not be across the board, but will be achieved by bringing all scientists in each grade to the top salary for that grade; those already receiving the top salary will get no increase. For those whose pay will rise, the increase will range from $135 to $1080 a year. Employees in grades from GS 9 to 17 will be paid the maximum salaries for their grades, as follows: 9, $6250; 10, $6725; 11, $7465; 12, $8645; 13, $10,065; 14, $11,395; 15, $12,690; 16, $13,760; 17, $14,835. The highest grade, GS 18, remains at $16,000, the top salary for a classified employee.

The raises apply to physical scientists —physicists, chemists, geophysicists, and so on—and to biochemists, but not to

bacteriologists and biologists. The raises were immediately criticized on several grounds: by the bacteriologists and biologists who thought that they had been unfairly left out and by those who had already reached the top salaries for their grades. The latter group objected to the elimination of pay differentials within their grades and to the provision that new employees would enter any particular level at the top salary for that level, a practice that would negate pay differentials on the basis of merit within a particular category.

In general, Government scientists, who thought the increases inadequate and belated, doubted that the changes would be effective in stemming the loss of scientists to industry, since top pay in each category was not changed. Some also doubted the realism of the Civil Service Commission's expectation that the increases would enable the Government to obtain 4000 additional scientists and engineers within the next year.

Other critics pointed out that the increases pose problems for the future: within a year or so some means will have to be found to provide for progressive increments in salary and for merit increases if the Government is to compete effectively for scientists and engineers.

## Evolutionary Terminology

Julian Huxley [*Nature* **180**, 454 (7 Sept. 1957)] believes that the time has now come when there is need to define the major types of evolutionary process more strictly. He recognizes three such processes, leading, respectively, to divergence and variety ("cladogenesis"), to adaptedness and biological improvement ("anagenesis"), and to stabilization and persistence of type ("stasigenesis"). *Cladogenesis* and *anagenesis* have been taken over (the latter with some extension of meaning) from Rensch [*Neuere Probleme der Abstammungslehre* (Stuttgart, Germany, ed. 2, 1954)], whereas *stasigenesis* is a new term. "Clades" are delimitable monophyletic units resulting from "cladogenesis." "Grades" are delimitable and persistent "anagenetic" units produced by "stasigenesis." Most delimitable taxa therefore will at once be both clades and grades, yet others are grades which may or may not also be single clades. "Evolutionary areas" will appear when "anagenetic" improvement is plotted against "cladogenetic" divergence on a two-way graph with time eliminated.

Huxley believes that the implications of these three cooperating evolutionary processes have not been made explicit and that taxonomy will have to contemplate a two-way system of classification which gives due consideration to the facts of biological improvement and persistence of type as well as to the facts of phylogenetic divergence. This will, he thinks, presumably involve some new terminology.

No one interested in and believing in evolution will attempt to deny the existence of the general evolutionary processes which Huxley discusses, despite his dubious recognition of stasigenesis as something fundamentally apart from anagenesis and his use of the essentially anthropocentric term *biological improvement*. Yet it seems doubtful whether all of his proposed terms will really be of any great help in understanding the phenomena of evolution. The only justification of any new term is its demonstrable need. One major source of new terms stems from a real need for ease of communication, from a need for the ability to describe things, or phenomena, or even concepts tersely, with great conservation of words. On the other hand, far too many technical terms represent nothing other than pretentious coinage—to wit, the subconscious human need to cover our ignorance of a phenomenon by assigning to it a high-sounding technical exoticism. I do not wish to do Huxley an injustice, but I cannot help but wonder whether some of his proposed evolutionary terminology does not properly fall into this category. His proposal of *cron* (to denote 1 million years as "the basic unit of evolutionary time"), *kilocron* (for $10^9$ years), and *millicron* (for 1000 years) as the basis of "a suitable chronological terminology" does nothing to remove this suspicion. Current estimates of geological time are at best mere approximations and, as such, are constantly subject to revision. The use of fancy terms for such approximations can only serve to clothe them with a spurious reality.

Similarly, one reads with misgivings the proposal of the "gradal" term, *Psychozoa,* for man. In justification, Huxley states that "cladogenetically man constitutes only the single family Hominidae; but anagenetically he constitutes a grade equivalent in evolutionary importance to all other organisms taken together." When viewed historically, Linnaeus' optimistic designation of man as *Homo sapiens* may well be forgiven. It may be that I am unduly pessimistic; yet it seems a bit presumptuous for man to confer upon himself the designation "Psychozoa" in these days of increasing disintegration of human interpersonal and intersocial relations—disintegration that is occurring despite (and, paradoxically, as a result of) his tremendous material and technological achievements. This is scarcely a "biological improvement." It must be admitted, however, that man may yet justify the statement that "he constitutes a grade equivalent in evolutionary importance to all other organisms taken together"—either by eventual mastery of himself as well as of his environment or, ironically, by virtual annihilation of himself and the rest of the living world through the material accomplishments of his unparalleled and perhaps overspecialized brain.

The introduction of new scientific terms is inevitable and often highly desirable. It is a bit disturbing, however, to find one of the leading living students of organic evolution advocating a wholesale introduction of new, unnecessary terms that can only serve to burden this area of biology with a jargon—a jargon that is not needed by the specialist and which will only tend to confound and mislead the nonspecialist.

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## German Scientific Council

Federal Chancellor Adenauer and the Minister-Presidents of the States of West Germany signed in Bonn on 5 September an agreement to establish a German Scientific Council and an agreement on a federal subsidy to the states of 22 million marks in the current fiscal year for expanding engineering school facilities. Adenauer stated of the Scientific Council that West Germany will now have an organization that can provide an over-all survey of scientific work.

The task of the council will be fourfold: (i) to work out a plan for promoting science in the Federal Republic; (ii) to coordinate the plans of the federal and the state governments, and indicate priorities in research; (iii) to formulate an annual "first priority" program; and (iv) to recommend the use of funds provided for the advancement of science in the budgets of the federal and the state governments.

Formal constitution of the Scientific Council and appointment of members will probably require several months. The council will consist of 39 members who are either scientists or closely associated with science, or persons recognized in public life. The federal president will appoint 22 members, 16 of these through joint recommendation of the German Research Society, the Max Planck Society, and the West German Rectors' Conference, and six on the joint recommendation of the federal and state governments. These members will serve a 3-year term and may be reappointed. Seventeen members will be appointed by the federal and state governments, six of these by the federal government and one by each state government including the Saarland and Berlin.

The agreement on federal financial aid for engineering schools is intended