

Chu and Giles is the nucleolus organizer, it may exist as an undetected second arm in one of the telocentric chromosomes of *Cebus* and of *Callicebus*.

The mechanism of chromosome evolution suggested for the Cebidae does not apply in any obvious way to the Cercopithecidae. If centric fusions have any importance in the latter family, the evidence has been obscured by further specialization of the karyotypes through such mechanisms as pericentric inversion. It is significant, however, that while the genera *Papio* and *Cercocebus* do not appear to have any telocentric chromosomes, there are three pairs of telocentrics in *Cercopithecus mona mona* (see Table 1). If the  $2n=60$  species of *Cercopithecus* have no telocentrics, as appears to be the case from the photograph of Chu and Giles (3), then the number difference in this genus may well be explained by the centric fusion mechanism.

Although the studies of the chromo-

somes of the Primates which have been made to date have only scratched the surface, so to speak, it is already obvious that such studies can be of great help in the analysis of the problem of the evolution of this group. Studies are now in progress in our laboratory on the chromosome numbers and karyotypes of a second family of the Platyrrhina, the Callithricidae. Preliminary work is also in progress on the rather puzzling genus *Callimico*. It is hoped that these studies will both clear up the question of the taxonomic position of *Callimico* and answer the question of whether the Callithricidae are truly primitive primates or have evolved their seemingly primitive characters secondarily.

#### References and Notes

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7. This study was carried out under grants from the National Science Foundation (Nos. G-1760 and G-3272) to Professors W. L. Straus, Jr., of the laboratory of physical anthropology, and H. B. Glass of the department of biology, Johns Hopkins University. It was also aided by a post-doctoral fellowship granted to M. A. Bender by the National Institutes of Health, U.S. Public Health Service.
8. We are indebted to Mr. Arthur Watson, director of the Baltimore Zoo, for his kind cooperation.
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## News of Science

### Survey of Physics Teaching

A nationwide survey by the American Institute of Physics discloses a shortage of physics teachers in United States colleges and universities, overloaded teaching schedules, and a discouraging outlook for the immediate future. One result of the survey was the revelation that college and university administrators in the academic year 1957-58 provided sufficient funds for 403 new appointments of Ph.D. physicists, but the departments concerned estimated they would be able to appoint only 254 new Ph.D. physicists from the available supply.

Some of the findings of the survey, which was conducted by William C. Kelly, director of education at the AIP and former University of Pittsburgh faculty member, are as follows:

1) Of the 536 American colleges and universities that have a 4-year undergraduate major program in physics, 490—or 91 percent—took part in the survey. Some 451 institutions reported that their needs for physics teachers are not

being met in some degree and that they have had to resort to various substitutes for the services of full-time qualified teaching personnel. Only 39 educational institutions report that their needs for physics teachers are now being met.

2) Almost half of the institutions replying, or 49 percent, said that their physics teachers are carrying teaching "overloads." Another 30 percent reported that graduate or undergraduate assistants are being relied upon to an "undesirable degree" in teaching. Most of these assistants have had little previous teaching experience.

3) Forty-six percent of the colleges and universities responding said that the time available to physicists for research and other scholarly activities has been "markedly reduced" as a result of heavy teaching loads. It is recognized as important for all physicists to do scholarly work—research, writing of technical articles and books, and participation in the work of scientific societies—if they are to be effective educators.

4) Class teaching situations need im-

provement. Twenty-one percent of the physics departments report that they have had to cancel classes because of inadequate staff, another 36 percent report an increase of class size to an "undesirable degree," and one-third state that teaching duties have been assigned to part-time, although qualified, teachers from outside the institution's physics department.

5) Departmental chairmen estimate that approximately 688 Ph.D. physicists are needed to correct the shortages in these colleges and universities. The total number of Ph.D. degrees granted in 1956-57 amounted to 444 in the U.S. More than half of the 444 did not go into teaching because they took full-time research jobs.

6) The situation in the small physics department is disturbing. Half the shortage of physics teachers occurs in physics departments with staffs of six or less people, and half of the bachelor's degrees in physics in 1957 were granted by these same physics departments.

### Nuclear Propulsion

A study of the feasibility of employing controlled nuclear explosions for propulsion has been authorized by the Air Research and Development Command, it was announced on 2 July by Roy W. Johnson, director of the Advanced Research Projects Agency. The authorization is for a contract with the General Dynamics Corporation's General Atomic Division, San Diego, Calif.

This is one of a series of investigations involving new means of propulsion for space applications. Conceptually, this study, which was proposed by General Atomic, differs from other proposals under consideration in that it looks to the employment of a series of controlled detonations within the atmosphere and beyond. The initial commitment for this study calls for the expenditure of \$1 million during fiscal year 1959. Research will be conducted, in the main, at General Atomic's John Jay Hopkins Laboratory for Pure and Applied Science in San Diego. Continuation of the program will be based upon the results of the study during the initial phase.

### Zoological Nomenclature

The International Commission on Zoological Nomenclature has announced that, beginning 6 December 1958, it will start voting on the following cases involving the possible use of its plenary powers for the purpose specified against each entry. Full details of these cases were published on 6 June in the *Bulletin of Zoological Nomenclature* (vol. 16, part 2); (i) *Mysis* Latreille, [1802-1803], designation of type species for, and validation of neotype for species (*Cancer oculatus* Fabricius, 1780) so designated (Class, Crustacea; Order, Mysidacea); (ii) *Dactyloceras* Hyatt, 1867, designation of type species for (Class, Cephalopoda; Order, Ammonoidea: Jurassic); (iii) *gemmascens* Esper, [1794] (*Madrepora*), validation (Class, Hydrozoa; Order, Stylasterina). Comments should be sent as soon as possible in duplicate to the assistant secretary to the commission, R. V. Melville, 28 Park Village East, Regent's Park, London, N.W.1, England.

### Oil from Shale

The Denver Research Institute of the University of Denver has announced the successful operation of a pilot plant which extracts oil from oil-bearing shale at a cost which is reported to be commercially competitive. This process, should it prove capable of expansion to industrial scale, would open the nation's oil shale reserves to commercial development and greatly augment our total resources of petroleum.

A reduction in cost of up to 50 percent over other extractive processes has been reported by the institute's director, Shirley A. Johnson, Jr. In a projected source-to-market problem, this reduction would allow a producer to sell Colorado-produced oil on the West Coast for \$1.42 to \$1.92 a barrel. The current cost of crude oil produced by drilling is about

\$1.40 per barrel of medium grade, according to a major marketer.

To extract oil from shale by the new process, metal or ceramic balls—thermospheres—are heated and then run counter to a flow of finely crushed shale in a retort. This heats the shale to a point at which it releases its hydrocarbons. The resulting shale coke, which retains some of its combustible elements, is then burned in a furnace to provide heat for warming the thermospheres. This process is one of four considered feasible by experts in the field of shale-oil extraction [*Sci. Monthly* 84, 275 (1957)].

The pilot plant, which has a daily capacity of 24 tons, has been in operation for the past 9 months. The work is being done by the Denver Research Institute for the Oil Shale Corporation, owner of the Western Hemisphere rights to the process. A Swedish engineer, Olof Aspergen, holds the patent rights on the basic process.

### Grants, Fellowships and Awards

*General.* The closing date for U.S. Government awards for 1959-60 authorized under the Fulbright and Smith-Mundt acts is 1 October. These grants are for university lecturing and advanced research in Europe, the Near East and Africa, and the Far East. Application forms and additional information are obtainable from the Conference Board of Associated Research Councils, Committee on International Exchange of Persons, 2101 Constitution Avenue, Washington 25, D.C.

*Physiological Sciences.* The 21st International Congress of Physiological Sciences will be held in Buenos Aires, Argentina, 9-15 August 1959, under the sponsorship of the International Union of Physiological Sciences. The United States adheres to the International Union through the National Academy of Sciences, which has established a National Committee for this purpose. The National Committee is seeking funds to provide a limited number of allotments in support of travel to the congress for scientists residing in the United States who may require such assistance. Individual allotments will not exceed \$750 each.

Application for a travel allotment should be submitted in duplicate in the form of a letter giving information on age, training, publications, academic or professional title, and society affiliation. Applicants who plan to submit papers for presentation at the congress should include the proposed title of each paper. Such letters must be submitted *before 15 October 1958* to the Chairman, U.S.A. National Committee on the International Union of Physiological Sciences, 2101 Constitution Avenue, NW, Wash-

ington 25, D.C. Applications for assistance toward travel expenses are entirely separate from applications for registration and for the submission of papers.

*Poliomyelitis.* Deadlines of 1 September and 1 December have been established for application to the National Foundation for Infantile Paralysis for postdoctoral fellowships in research and academic medicine or in the clinical fields of rehabilitation, orthopedics, and preventive medicine. Applications for fellowships in the medical associate fields or physical therapy teaching and occupational therapy teaching should also be filed by these dates. For further information write to: Division of Professional Education, National Foundation for Infantile Paralysis, 301 E. 42 St., New York 17, N.Y.

*Social science.* The Social Science Research Council, 230 Park Ave., New York 17, N.Y., has announced that international conference travel grants equivalent to round-trip, tourist-class fare are offered to social scientists residing in the United States for attendance at meetings outside North America. These grants are offered only for meetings designated in advance by the council.

The tentative list of meetings in 1958 through 1960 follows. The approximate number of grants to be offered for each meeting is shown in parentheses: Congress of the Interamerican Society of Psychology, Rio de Janeiro, December 1958 (3); Congress of the History of Science, Barcelona, August-September 1959 (6); Conference of the International Union for Scientific Study of Population, Vienna, August-September 1959 (5); Congress of the International Sociological Association, Perugia, September 1959 (5); International Institute of Administrative Sciences, West Germany (6); Congress of the International Statistical Institute, 1959 (if held outside North America—10); International Congress of Historical Sciences, 1960 (36); Congress of the International Union of Scientific Psychology, 1960 (15).

Forms for application for travel grants will be supplied by the council on request. Applications for grants for the December 1958 Interamerican Psychological Congress will be due 15 October, and grants for this meeting will be announced as soon as possible thereafter. Applications for all meetings to be held in the summer of 1959 will be due 1 December 1958, and grants will be announced 1 March 1959 or earlier.

### Atmospheric Sciences

The National Science Foundation announced on 7 July the establishment of a Program for Atmospheric Sciences in the Division of Mathematical, Physical,