

concept, boldness in design and a desire on the part of scientists to explore important but relatively neglected fields. While there appear to be large untapped resources for research in the colleges, universities and other non-profit institutions in the United States, the Foundation has discovered many areas of great scientific interest needing additional support, and nearly 75 per cent of its financial grants went to institutions previously participating least in Federal research support. About 52 per cent of these financial grants was spent on direct assistance to graduate students and other research assistants. Of the sixty-eight grants, totalling 762,675 dollars, for biological and medical research, molecular biology claimed the most, particularly the physical chemistry of proteins and related substances found in living tissues. In this programme the work on photosynthesis is of special interest, and the Foundation, along with other agencies, is supporting photo-biological research in various institutions. Much support has also been given to research on regulatory biology and to systematic biology.

In the physical sciences, 29 grants, totalling 311,300 dollars, were awarded, and the report stresses the Foundation's obligation to support integrated attacks upon borderline and inter-disciplinary problems. In the engineering sciences, the Foundation's programme places its emphasis on such fields as fluid mechanics, strength of materials, heat transfer, corrosion, and thermodynamics, which are common to several branches of engineering, and it is also encouraging research designed to fill gaps in the basic information at present available to the engineer. Special attention is being given to projects bearing on the extension of the use of strategic materials, their replacement with new, hitherto unknown, materials and the better understanding of the conversion of energy. In the terrestrial sciences, the Foundation's programme is expected to embrace eventually more or less equally studies of the atmosphere, the waters, the surface, and the interior of the earth and their interrelations, and especially microphysical processes basic to the discovery and understanding of geophysical and geochemical principles.

Of the 624 graduate fellowships in the sciences awarded in April 1952 for the academic year 1952-53, 55 were made to post-doctoral applicants. Of the remainder, 169 went to those entering their first year of graduate study, 170 to second-year graduates and the remaining 230 to advanced pre-doctoral students. Biological sciences claimed 158 fellowships, chemistry 140, physics 137, engineering 75, mathematics 62, the terrestrial sciences 36, agriculture 7, astronomy 6 and anthropology 3. While this fellowship programme immediately affects the shortage of scientific men, the Foundation recognizes that the eventual correction of that shortage requires a long-range attack on defects in the educational, social and economic structure of the United States. At present the annual output of trained men of science in the United States is ten per cent or more below demand, and the 3,600 new doctorates in the sciences each year—rather less than 10 per cent of the output of graduates—is too low to meet the expanded current needs of technology; and the situation is expected to become more critical. Meanwhile, the operation of the present National Scientific Register, for which the Foundation assumed financial responsibility after the passage of the National Science Foundation Act of 1950, was to be discontinued after December 31, 1952, when the Register should have completed the initial regis-

tration and analysis of data on scientists trained in chemistry, chemical engineering, physics, psychology, agricultural and biological sciences, geosciences, and veterinary medicine. The Foundation has established an office to assist the professional scientific societies in compiling information on scientific workers in various fields on a uniform basis.

Its survey of publications has led the Foundation to believe that no continuing Federal support of scientific periodicals is desirable at present, though in critical cases temporary emergency support may be appropriate. The development of improved methods for compiling scientific information and for its rapid handling, economical storage, and efficient distribution is being followed, and the Foundation is also giving attention to the international exchange of scientific literature, particularly the availability of foreign scientific literature in the United States. A complete survey is being made of the present pattern of distribution and processing of Russian scientific literature in the United States.

UGANDA FOREST DEPARTMENT ANNUAL REPORT FOR 1951

THE annual report of the Forest Department, Uganda, for 1951* gives full evidence that the Government of Uganda is intent on putting into force its declared forest policy. This is noteworthy, since during the present century (a forest policy was first laid down in India during the past century) such a policy has been enunciated for several forestry departments of the British Commonwealth and remained a dead letter. The general forest policy in Uganda comprises the maintenance of an adequate forest estate for protective and productive purposes, the management of the estate to fulfil those objects, the teaching to the people of the value of forests, and the encouragement of the practice of sound forestry by local authorities and private enterprise. To carry out these objects the forest officer requires the full support of the civil administration in the district and of the headquarters Government presided over by the Governor. That the Uganda Forest Department has the full support of the civil administration is evidenced by its present position in professional matters and the great strides that have been made in recent years.

To a considerable extent this progress must have been aided by the statement on "Land Policy of the Protectorate Government in Uganda", issued by the Government in 1950. This reaffirms that rural lands are being held in trust for the use and benefit of the African population; it further goes on to state that, while the Protectorate Government retains the forest rights, the Governor may, at his discretion and regard being had to the circumstances of each case, make an *ex gratia* payment to the African local government concerned of a portion of the income derived from Crown forest rights.

That good professional administration is possible under the present régime is shown by the progress made in the enumeration of the growing stock in the forests, the preparation of working plans and the striking silvicultural investigations being undertaken by the research staff, the plantation work being

* Uganda Protectorate. Annual Report of the Forest Department for the Year ended 31st December 1951. Pp. iv+38. (Entebbe: Government Printer, 1952.) 2s.

carried out for both the people and for industrial use such as tobacco, etc. The great trouble being experienced is the want of labour, and some provisions of the working plans have had to be modified for this reason. Arrangements have been made, through longer leases of forests being granted, for improvement in milling and extraction. An important part of the work is connected with the conservation and protection of forests, especially in catchment areas of rivers and streams, and on the maintenance of this work so much of the future progress and prosperity of the people will depend.

The report was written by Mr. C. Swabey, the recently appointed conservator in Uganda, and Mr. Swabey has written a letter to me in which he takes exception to certain remarks I have made in the reviews of Uganda forest reports for 1949 and 1950 (see *Nature*, 168, 507 (1950) and 169, 1005 (1952)). In the 1949 report it was stated that local African governments were being encouraged to take over forestry work in areas where there was sufficient forest estates and that the district forest officer would act less and less in his official and trained capacity in those forests. In the report for 1950 it was stated that during the year the proposed devolution of the management of local forest areas was further developed. Past experience has shown time and again that, in the ultimate resort, the forest authority has no power to enforce regulations made by the civil authority. When the people become dissatisfied with the restrictions inevitable in good forest management, they commence to ignore them, with the result that friction arises which may easily go further. To avoid this in the past, the methods of forest management have had to be modified, at the instance of the civil authority. Improvements in the forest area and its usefulness may then disappear in a very short time. This will be the final test for a Department which, as the present report demonstrates, is making magnificent progress with the full support of the Governor and civil administration behind it.

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STRYCHNINE AS A DEPRESSANT OF PRIMARY INHIBITION

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THERE have been many investigations on the convulsive action of strychnine¹⁻⁷; but it has hitherto not been possible to determine the essential nature of the action. For example, it would still be possible to hold that strychnine transforms inhibitory synaptic action into excitatory action, or alternatively that it merely intensifies excitatory synaptic action. No decisive experimental test has been possible because the testing reflexes have always been evoked by afferent volleys composed of admixtures of excitatory and inhibitory impulses. Even a pure group I afferent volley from a muscle nerve will exert, by virtue of its group Ia and Ib components respectively, excitatory and inhibitory actions on homonymous motoneurons and inhibitory and excitatory actions on antagonist motoneurons⁸⁻¹⁰. Perhaps the only significant evidence is that in sub-convulsive doses strychnine has little or no effect on

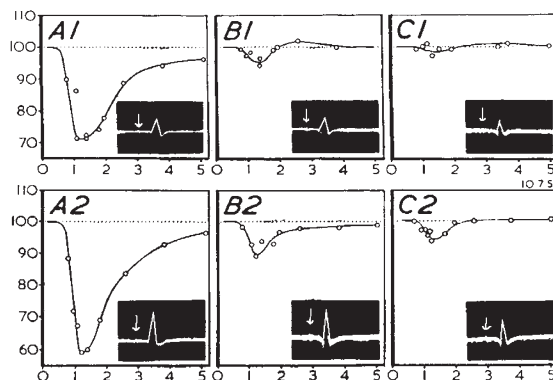


Fig. 1. Height of test reflex spike resulting from a single maximal afferent volley on biceps-semitendinosus nerve. Recorded from 3₁ ventral root, and preceded at various intervals by an inhibitory volley in quadriceps nerve. Ordinates, heights of test reflexes as percentages of control height. Each point is mean of twenty observations as determined by method of superimposed tracings. Abscissae: interval in milliseconds between inhibitory and test afferent volleys as recorded by an electrode in contact with the L₄ dorsal root close to its entry into the spinal cord

the monosynaptic reflex discharge, while there is a great increase in polysynaptic discharges^{1,2,5,6}. Since the monosynaptic discharge evoked by group Ia impulses would occur before the complicating disynaptic inhibitory effect of the group Ib impulses⁹, this evidence indicates that strychnine does not appreciably intensify the monosynaptic excitatory action of group Ia impulses.

The present communication is principally concerned with the effect produced by strychnine on the direct inhibitory action which group Ia impulses in the quadriceps nerve exert on the antagonist biceps-semitendinosus motoneurons. The initial requirement of this investigation was to distinguish between group Ia and Ib impulses in the afferent volley. In some, but not all, low spinal cat preparations under nembutal anaesthesia, a group I afferent volley set up in the quadriceps or biceps-semitendinosus nerves gives a double spike potential when it is recorded triphasicly by a surface lead from a dorsal root as it is about to enter the spinal cord (cf. Fig. 3 and the lowest two inset records of Fig. 2). The second spike has a higher threshold than the first, and often it is possible to have the first spike more than half maximal with no detectable contamination by the second, as is shown in Fig. 3, in which the first stimulus was varied in strength from just above group Ia threshold to about three times this strength, while the second stimulus was about three times

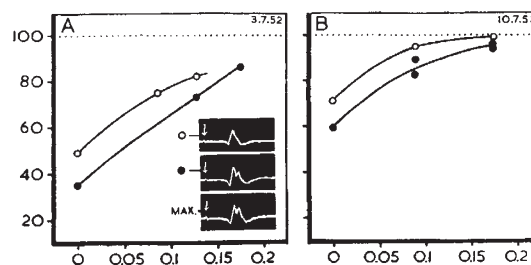


Fig. 2. Plots of test reflexes taken at the interval after the inhibitory afferent volley giving maximal effect (cf. Fig. 1), and expressed as percentages of control test reflexes (ordinates) against dosage of strychnine (mgm./kgm. body-weight: abscissae) in two experiments. In each experiment two sizes of inhibitory volley have been used. In graph A, the smaller inhibitory volley (open circles) contained little, and the larger (filled circles) considerable group Ib contribution (see in inset dorsal root spikes for corresponding symbols). In graph B the two inhibitory volleys are those used in Fig. 1