

Business Studies, which is organized by the Society in collaboration with the London Chamber of Commerce. There were 152 candidates for the first-year examinations, and 64 for the second; the number of colleges presenting candidates increased from 12 to 18.

For the parallel scheme for the award of the Ordinary Certificate in Business Studies to candidates at centres outside the British Isles, which is administered by the London Chamber of Commerce on behalf of the two bodies, entries for the first-year examinations were received from 11 candidates at a college in Nigeria. There is every indication that there will be an increasing demand for this scheme from colleges in various parts of the world.

Details are also given of progress with the Certificate in Office Studies. In March 1963 the Minister of Educa-

tion decided to introduce a new national award, the "Certificate in Office Studies", for young office workers who wish to pursue courses of further education but do not possess the educational qualifications required for entry to a course leading to the Ordinary National Certificate in Business Studies. It is hoped that employers will encourage their young office workers to take the two-year course of study by granting them day or block release. The Society, together with other examining bodies approved for the purpose, will organize examinations for the Certificate, the administration of which is in the hands of a National Committee comprising representatives of the Ministry of Education, of associations of teachers, employers and Trade Unions, and of national and regional examining bodies. The examinations will be offered for the first time in June 1965.

## ATYPICAL MYCOBACTERIA

**A**MONG the many items of interest in the eighteenth annual report of the Queensland Institute of Medical Research\* is one describing various investigations of atypical mycobacteria. Points of special interest recorded include the value of bone-marrow culture in the diagnosis of human infection with atypical mycobacteria, the isolation of *M. ulcerans* from a chronic ulcer and of what appears to be *M. balnei* from a water tank, the profusion of mycobacteria of many types in water and wet environments, and the possible use of thiosemicarbazone in classification.

The culturing of bone-marrow specimens obtained by needle biopsy has proved a valuable means of investigation. The finding of atypical mycobacteria in the sputum may be of doubtful clinical significance, as these organisms may be present as commensals on the surface of lesions caused by other processes such as bronchiectasis and congenital abnormalities. On the other hand, their presence in the bone marrow is clear evidence of invasion.

A portion of each specimen was cultured without pretreatment, and another after treatment with sodium hydroxide. All tubes were incubated for six months, and primary growth was observed in some cases only after four months' incubation. Bone-marrow cultures were made and held for six months from 31 patients, most of whom had acid-fast bacilli in the sputum. Thirteen, or 42 per cent, were positive. Of the sixteen strains isolated from the thirteen specimens, eight belonged to group 4 and five to group 5; three are not yet typed. An attempt will be made to assess the significance of both positive

and negative findings against repeated clinical examinations by a chest physician.

A strain isolated from a skin ulcer was identified as *M. ulcerans* by the foot-pad inoculation method. The patient was a timber-getter who developed a scaly lesion on the forearm which later progressed to an ulcer with undermined edges. Numerous acid-fast bacilli were seen in the pus. Cultures made after treatment with sodium hydroxide were incubated at 30° and 37° C. No growth appeared at 37° C but, after four months, some growth was seen at 30° C. On sub-culture, the mustard-coloured colonies grew in four weeks.

Mycobacteria occur in great numbers in water, mud and beach sand. During 1962, swimming pools, rain-water tanks and city water supplies were examined. Specimens of open water and swabs from the walls of swimming pools and reservoirs were used.

The types of mycobacteria which were isolated from water were similar to those found previously in dust, animal glands and tonsils, and they occurred in similar proportions. The number of organisms in the moist habitats is much larger than in dusts.

One organism which conformed with the cultural and serological characters of *M. balnei* was isolated from a rain-water tank. Epidemics caused by *M. balnei* were reported among bathers elsewhere, but it has not yet been isolated from local swimming pools.

*M. balnei* shows a characteristic type of pathogenicity when injected into the foot-pad of mice, and other strains of atypical acid-fast organisms show a similar predilection for the foot-pad. This method is being applied to the further characterization of strains in the Institute's collection.

\* Eighteenth Annual Report of the Council of the Queensland Institute of Medical Research for the year ended 30th June, 1963. Pp. 16. (Brisbane: The Council of the Queensland Institute of Medical Research, 1963.)

## SIMULTANEOUS MEASUREMENTS AND SPECTRAL ANALYSIS OF MICROPULSATION ACTIVITY

By R. L. KOMACK and A. S. ORANGE  
U.S. Air Force Cambridge Research Laboratories

F. X. BOSTICK, JUN.  
University of Texas

AND

DR. T. CANTWELL  
Geoscience Inc., Cambridge, Mass.

**D**URING the autumn of 1962 a series of simultaneous measurements of telluric current micropulsation activity were made in Texas, Puerto Rico and Trinidad. The frequency range covered was from 0.01 to 0.25 c/s.

This article presents the initial results of spectral analysis and investigations of dependence on latitude.

For this series of measurements, spectral analysis reveals a peak occurring around periods of 20-30 sec.