The work at Reefton is being carried out in conjunction with geophysical investigations. Intensive mapping near the auriferous lodes has shown that these occupy shear planes at or near the axes of folds in old sedimentary rocks. It is hoped to trace the more persistent folds into that part of the Reefton "run" of lodes between Merrijigs and Waiuta, where, for a distance of six miles, no commercial ore-body has hitherto been discovered. This considerable tract is largely gravel-covered, except along deep-cut streams, and presents great difficulties to ordinary surface prospecting. The fortunate discovery of the Birthday lode, now worked by the Blackwater Company, was made in similar country, which may yield comparable results to geophysical examinations localized by close geological work.

The Whakaea Subdivision includes the important alluvial fields of Wakaia and Waikaka from which much detrital has been obtained. The gold occurs not only in the flood plains and terraces of existing streams, but also in ancient gravels that faulting has preserved from denudation. The investigations will make the earth structure clear, and thereby aid mining.

Modern conditions more and more require the intelligent foresight that distinguishes civilized man from the savage. Long-range planning, which introduces scientific practice into public affairs, shows the growing pressure on our natural resources. It is the duty of the Geological Survey to ascertain the facts of mineral occurrence from which the capacity for production and the rate and extent of depletion may be estimated, and essential to this are the detailed areal mapping, the determination of the rock sequence, the working-out of the earth structure, and other investigations usually designated as fundamental research. These must always form a substantial part of the work of the survey if the development and conservation of our mineral resources are to be realized. Of late years other services imposed by special demands of local, temporary, or economic kinds dismembered the staff and have overshadowed the primary function of the survey, more especially the prompt publication of the results. If the economic investigations are to continue on the same scale, the rate of basic research must be increased, and this is only possible by restoring the staff to its former strength.

OBSERVATORIES.

The Department maintains three astronomical and geophysical observatories—the Dominion Observatory, Christchurch Magnetic Observatory, and Apia Observatory—which are worked as far as possible in co-ordination.

The Dominion Observatory controls the time service of the Dominion. Time signals are received from a number of overseas short-wave stations, and the Observatory clocks are also checked frequently by astronomical observations. Seismological observations are an important part of the programme of work, and monthly seismological bulletins are published which give sufficient data for the immediate determination of the epicentres of the most important earthquakes. In addition to these reports a number of special bulletins on the seismology of New Zealand were published during the year.

The Magnetic Observatory at Christchurch carries out magnetic, seismic, atmospheric electricity, and meteorological observations. Additional observations are now being made to assist in forecasting for aviational purposes. The Carnegie Institute of Washington has sent to Christchurch one of its continuously recording cosmic-ray meters, which has been housed in a special building near the Observatory.

Apia Observatory, Western Samoa, carries out comprehensive geophysical and meteorological observations, and earthquake-recording instruments are also installed. The Department is indebted to the Carnegie Corporation for financial assistance in the work of the Observatory.

PHORMIUM TENAX.

Up to the present the main aim in the selection and breeding of flax has been to secure strong, bold fibre for cordage purposes. It now appears that the woolpack industry, and possibly later a sacking industry, will create a large local market for our fibre. The class of fibre which these weaving industries demand is very different from the ideal cordage fibre, and intensive selection and breeding of varieties which possess the desired fineness of fibre is being carried out.

Some 25 acres of the Easton area near Shannon have now been planted with pedigree varieties, and some hybrids which have already been tested have given very promising results.

The Department's chemist at Foxton is investigating problems connected with the softening and lubrication of the fibre for spinning, and experiments already in progress justify the hope that distinct improvements may be made.

A knowledge of the chemical composition of the flax-leaf is essential for a complete understanding of its properties, and an attack on this problem was begun during the year at the Dominion Laboratory.

An investigation of methods of decortication is urgently required, and next year it is hoped to proceed with the design and manufacture of a tail stripper attachment.

MINERAL CONTENT OF PASTURES.

The continuous efforts of the Department in collaboration with the Cawthron Institute to discover the curative element in soil drenches and limonites found to be effective in the treatment of deficiency diseases of sheep at Nelson and Southland have now been rewarded. There were sound reasons for assuming that an element other than iron was effective in curing these diseases, and the