First, there were the short-period seismographs distributed widely in New Zealand, and intended to yield records of earthquakes originating in the country. Secondly, there were the teleseismic instruments to provide records of distant earthquakes. These functions, however, interlocked, and every seismograph gave some useful information in both categories. The discontinuance of recording at New Plymouth in 1958 left the network somewhat critically dependent on the operation of the station at Tongariro, but the standard of coverage was successfully maintained. The *New Zealand Seismological Reports* for 1958 and 1959 give details of the installations at all the stations together with timing arrangements and the readings of the seismograms. Further, there is a list of instrumentally determined epicentres, an index of felt earthquakes, and a list of staff together with a note of their publications during the two years.

The principal New Zealand earthquakes of 1958 and 1959 are discussed in the *Reports*, and maps are given showing: (1) epicentres of normal earthquakes; (2) epicentres of deep-focus earthquakes; (3) isoseismals for some earthquakes. In 1958 the level of earthquake activity in New Zealand was low: 55 earthquakes were reported felt only in North Island, 15 only in South Island and 6 in some parts of both Islands. In 1959, 58 earthquakes were felt in North Island only, 19 in South Island only, and 5 in some parts of both Islands. On May 22, 1959, a large shallow shock with magnitude 6 and an epicentre in the Marlborough Sounds region caused as much damage as any shock in New Zealand since the Wairarapa earthquakes of 1942. Picton suffered most severely. In all, some 460 insurance claims were lodged with the Earthquake and War Damage Commission. These mainly concerned old property. Two shallow shocks had magnitude 5·5, but reported intensities from them did not exceed *MM*4. On the other hand, a shock of magnitude 4·8 on July 30, 1959, centred some 20 miles north of Marton, gave rise to 40 insurance claims for damage in the Wanganu district.

Dry-acid Descalers for Oil Wells

Carbonate scale is frequently a serious factor in inhibiting flow of oil to the pumps in oil wells, especially those past peak production but economically active and where water is produced along with the crude oil. After a time, scale builds up and clogs the perforations at the bottom of the casing, gradually restricting the flow of oil from the surrounding reservoir rock. Until recently the time-honoured practice of pumping hydrochloric acid into the well to remove this scale was customary, but this often involved long-distance delivery in tank-trucks to remote pumping sites, was costly, and frequently hazardous to the oilmen concerned. Much research into the possibility of using a 'dry-cleaner' descaler has been rewarded by the discovery and commercial production of an easy-to-handle compound based on sulphamic acid. This is packaged in 100-lb. drums and is known as 'Visco 900', according to a recent issue of the *Dupont Magazine* (58, No. 2; March–April 1964). The Nalgo Chemical Co.'s Visco Division, Sugar Land, Texas, began marketing 'Visco 900' in early 1961, and the response from oilmen has been very favourable. In 1960, Du Pont approached the Nalgo Chemical Co. with the idea of using inhibited sulphamic acid. After testing sulphamic with Visco Division's additives for nearly a year, a suitable dry-acid cleaner was found. Many practical advantages are claimed for these sulphamic-based descalers, among which are: reduction in costs in equipment and labour; in many cases a 'slug' of the compound, dry or in slurry form, is added at the well-head, displaced by the pump to perforation level, and left to do its work without further attention; shipping and handling dry; convenient storage at well-site; no fume damage to equipment or personnel; non-irritating to unbroken skin; easy removal by washing off with water, etc. Examples of the results of this dry-acid descaling treatment are given in the article, one of which happened at the Standard Oil Co. of Texas oilfield near Sivells Bend, Texas; output of two pumping wells had dropped to 17 and 21 barrels per day, respectively; after cleaning with 'Visco 900', following pretreatment with 'Visco 1111' (a surfactant), at the end of a 17-day period, the first well increased production by 10 barrels, the second by 15 barrels per day. Water-injection wells, used for pumping water back to re-pressure the oil reservoir and flush the oil ahead of it to adjacent wells, and salt-water disposal wells, likewise have their scale-plugging tendencies; here again the use of the sulphamide-based descaler has met with success.

Jacobian Elliptic Functions

Volume 7 of the series of *Mathematical Tables* issued by the National Physical Laboratory, Teddington, consists of tables of Jacobian elliptic functions the arguments of which are rational fractions of the quarter period (Department of Scientific and Industrial Research: National Physical Laboratory. *Mathematical Tables*, 7. By A. R. Curtis. Pp. iii+81. London: H.M.S.O., 1964. 15*s*. net). They were prepared in order to facilitate computations occurring in a method of filter design described by S. Darlington (*J. Math. Phys.*, 18, 257; 1939). The 70 pages of tables list the functions $sn\left(\frac{mK}{n},k\right)$, $cn\left(\frac{mK}{n},k\right)$ and $dn\left(\frac{mK}{n},k\right)$ to 20 decimal places for integral values of n from 2 to 15 inclusive, and for m up to $(n-1)$. In place of uniform intervals of k or $\sin^{-1}k$, Jacobi's nome q, related to k by $q=\exp(-\pi K'/K)$, is used. Equally spaced values of q correspond to a k-distribution which is very dense in the region close to $k=1$. The range covered by the tables is $q=0$ to 0·35 at intervals of 0·005, corresponding to $k=0$ to 0·99933. . . . The calculations were performed using the *Deuce* computer, and the programmes and method used are described in the introduction to the tables. An alternative method of construction of the tables, which is perhaps more convenient when k is used as argument, is also outlined.

Use of Red Phosphorus as a Fertilizer

The potential use of red phosphorus as a fertilizer has been investigated by H. P. Rothbaum, of the Dominion Laboratory, Department of Scientific and Industrial Research, Wellington, New Zealand (*New Zealand Journal of Science*, 7, No. 1; March 1964). The oxidation rate of red phosphorus in four moist soils of different phosphate-retention capacity has been examined and the reaction is shown to be chemical, almost independent of phosphorus/soil ratio, and dependent on temperature, particle size, and the presence of catalysts. The products of oxidation are phosphites and phosphates. Explosion hazards of red phosphorus in superphosphate have been investigated, and the results suggest that mixtures can be made which would be safe and economic long-term fertilizers, with the possibility of reducing phosphate fixation. Small amounts of copper may be useful in regulating the rate at which red phosphorus becomes available. Together with W. Tuft, Rothbaum has also made extended investigations on oxidation rate of red phosphorus. Chemical methods of estimating small amounts of red phosphorus in soils have been developed. The rates of oxidation of red phosphorus in moist and in dry soil, obtained by using chemical methods, were shown to be consistent with results obtained by using radioactively labelled phosphorus. The chemical method also demonstrated that the rates of oxidation determined by radioactive methods apply over longer periods. The rate of oxidation of red phosphorus alone in air was also determined; it was found to be slower than in soil and unaffected by the presence of water.