

The second part of the analysis deals with the relation between radio data and sunspot data, and to do this an estimate was made of the average number of bursts per hour for each month; Fig. 7 gives a comparison of the three-month running means (number of bursts per hour) with the monthly average sunspot areas and numbers for the period referred to earlier. From this figure the following conclusions are drawn: (1) time plots of the burst index are similar at different frequencies; (2) there is a good correlation between the burst index and the sunspot area and number. Additional important results are the coincidences between flares and excess radio noise; at least 99 per cent of all flares are accompanied by excess radio emission in some part of the frequency-range, but it is admitted that this high correlation may be due to chance coincidences. So many other matters are dealt with that it is impossible to consider them all here. One further point, however, may be mentioned, namely, magnetic storms and world-wide crochets, briefly referred to in the appendix. On four occasions, listed in Table 6, the sudden commencement of a magnetic storm was preceded by a burst but not a flare, the time delay between burst and commencement of the magnetic storm varying between 20h. 58m. and 29h. 13m.; Table 7 lists eleven world-wide crochets, not accompanied by a reported flare, associated with bursts, between February and November 1950. These phenomena, it is stated, appear to be genuine and may be supposed to have a flare-like origin, judging from their association with bursts.

EARTHQUAKES DURING OCTOBER 1954—JANUARY 1955

DURING the last three months of 1954 there were in the world twenty-four earthquakes having instrumental magnitude 6 or greater. The greatest two had magnitude 7 and occurred on October 21 in the South Indian Ocean, and on December 16 near Fallon, Nevada. The latter caused moderate property damage. The earthquake of deepest focus during the period had a focal depth of 650 km. and occurred on November 25 in the Fiji Islands region. There were two minor British earthquakes. On the afternoon of October 23 South Elmsall (Yorkshire) was affected by a severe tremor which shook furniture and crockery. The shock was also felt at Hemsworth and Pontefract. On November 15 at 6.25 a.m. Winster, in Derbyshire, was shaken by an earth tremor felt with Modified Mercalli intensity 4, which rattled crockery, pictures and furniture. The shock was also felt at Birchover and Elton. Both these earthquakes were accompanied by low rumbling sounds. Previous tremors at Winster occurred in February 1952, and before that in 1903-4.

In other parts of Europe, earth tremors were reported to have occurred in October near Trieste, near Innsbruck and in Spain. On November 16 an earth tremor occurred forty miles south of Rome, and on November 23 at Grisi, near Palermo, in Sicily. The following month nearly all the houses on Salina Island (about fifty miles from Messina) were damaged in an earthquake swarm which began on December 23. Possibly associated with this, there was a lava flow accompanied by steam from the crater of Stromboli, while from Etna there issued a column of

smoke mixed with ash. Shocks and volcanic activity ceased by January 3. On December 23 an earthquake occurred in western Peloponnesus, injuring nineteen people and causing the collapse of several houses.

Elsewhere, on December 4 an earthquake with instrumental magnitude $6\frac{1}{2}$ and depth of focus 60 km. occurred near Trinidad. One person was killed, several injured, and there was extensive property damage, including damage to Government House and both the Anglican and Roman Catholic Cathedrals. On December 21 an earthquake of instrumental magnitude $6\frac{1}{2}$ occurred in Humboldt County, California, injuring several persons and causing extensive property damage.

During January of this year there were reports of eight earthquakes with magnitude 6 or greater. The greatest occurred on January 13 in the Fox Islands (Aleutian Islands). It was felt at Unalaska and had logarithmic magnitude 6.9. The shock with the greatest depth of focus occurred on January 22 in the Fiji Islands, its depth of focus being 650 km. The only shock reported as having caused property damage occurred on January 25 on the Tennessee-Arkansas-Missouri borders. The damage was of a minor character.

FORMATION AND CHARACTERISTICS OF LATERITE

THE dark-red, hard, barren, slag-like, acre-wide sheets of laterite commonly seen in the tropics have led many to conclude that this is the final wretched residue of soil-forming processes and represents the death of the soil. The origin of these impressive formations has long been disputed. Weathering has apparently been associated with removal of silica and bases; but that seems to be the case also with two other materials: Buchanan's laterite, a soft, vesicular, red earth which hardens on exposure and has long been used as building stones; and the deep, very friable, porous, dark-red, well-drained soils of forested slopes. Each of these materials consists largely of sesquioxides, and it has seemed remarkable that they differ so strikingly in their physical properties.

Dr. J. D'Hoore, director of the Service Pédologique Inter-africain and a distinguished member of the staff of the Institut National pour l'Étude Agronomique du Congo Belge, has thrown a welcome light on this problem by distinguishing 'absolute' and 'relative' accumulation of sesquioxides in soil*. He remarks that the concentration of a salt solution can be increased by adding salt (an absolute accumulation) or by removing solvent (a relative accumulation). Similarly, a low-lying area can receive an inflow of ferruginous solution, an absolute accumulation, and a high-lying area can suffer loss of silica and bases and thereby exhibit a relative accumulation of sesquioxides.

In the case of the low-lying area attention is given to the physical and chemical nature of the substrate (for example, mixed colluvial material) that receives the absolute accumulation of sesquioxides, and in the case of the upland area attention is given to the

* Publications de l'Institut National pour l'Étude Agronomique du Congo Belge. Série Scientifique No. 62: L'Accumulation des sesquioxides libres dans les sols tropicaux. Par Dr. J. D'Hoore. Pp. 132. (Brussels: Institut National pour l'Étude Agronomique du Congo Belge, 1954.) 80 Belg. francs.