IMMEDIATE FIELD DAMAGE RECONNAISANCE

B. H. Falconer* and G. J. Lensen**

Introduction

For some hours following the 5.24 a.m. May 24 earthquake, information reaching Wellington from the West Coast of the South Island was fragmentary. The available information was interchanged verbally following the normal morning opening of offices, and a decision was made for a field reconnaisance.

The authors met at Wellington airport at about 10.00 a.m., at which time the location of the epicentral area was not known; the consenus of reports suggesting that Greymouth had suffered most. Upon arrival in Nelson, a message was received that the epicentre might be off the West Coast near Westport; and that report associated with review of a prior fragmentary report of 9.00 a.m. about electrical sub-station damage and a casualty at Inangahua Junction, left the situation unclear.

The uncertainty about location of an epicentre caused the authors to hire an aero club Cessna in Nelson, in order to ascertain, if possible from the air, the area of highest damage both to the ground and to man made structures.

After flying to Murchison, the Buller River was followed and upon arrival at Westport it was clear that Inangahua had suffered most damage. Teleprinter messages to Wellington, from the Civil Aviation Department facilities at the airport control tower, accordingly were sent to the New Zealand Geological Survey, the Seismological Observatory of the Geophysics Division of the D.S.I.R., and the Earthquake and War Damage Commission.

Upon departure from Westport, the authors returned to reconnoitre Inangahua Junction and then continued south to Reefton and landed at Greymouth about 3.00 p.m.

Discussion

The first damage, seen from the air, that definitely could be attributed to earthquake, was found in Murchison 60 miles south-west of Nelson where some house chimneys collapsed. A few minor landslips in the hills to the north-east of Murchison were noted; but as they did not appear fresh were attributed to a severe rain storm of early April. The first fresh landslips were seen near Newton Flat in the Buller Gorge, at the fault zone of the White Creek Fault, which separates granite to the east from middle Tertiary sediment to the west. Further downstream, for the first few miles in the granite country between the White Creek and Lyell Faults, only a few instances of minor fretting and slips were noticed. This indicated that slips along the White Creek Fault zone were due mainly to the sheared and shattered nature of the rocks within that zone, and were rejuvenations of slips on this fault triggered by the Murchison earthquake of 1929.

+ Consultant, Earthquake and War Damage Commission
++ N.Z. Geological Survey, Lower Hutt

On approaching the Lyell Fault, which also separates granite from Tertiary sediment, the number and the size of slips increased rapidly until about two miles upstream from Lyell a very large rock avalanche was found, extending from near the crest of the ridge to the Buller River and across it. At that time, the slip did not entirely block the river and the river flow was very much impaired.

Further down the Buller River to Inangahua (Inangahua Junction is 22 miles west-south-west from Murchison) slips were visible continuously; and ranged from rock falls in the Tertiary limestone, rock slides in the jointed granite, rotational landslides in the Tertiary mudstone, to mudflows in Tertiary sediments. Increasingly, roads became blocked by slips either on to the roadway (fig. 1) or by slump of fill (fig. 2).

At Inangahua Junction two large mudflows covered part of a terrace, the northerly flow blocking the highway to Westport. Slips south of the Junction were noticed for about five miles, one spectacular slip at Oweka, involving at least two million cubic yards of blocky Tertiary sediments. At the Buller River, 1½ miles north-east of the Junction a large rock fall had demolished a house. Within a few miles further west the occurrence and size of landslips decreased rapidly.

Whilst at Lyell and New Creek, several but by no means all, chimneys had collapsed, in Inangahua Junction severe damage was evident also to tiled roofs, and a few brick veneer walls. Houses in several cases were either seen to be distorted, moved off piles, or suspected to be damaged because of proximity to ground fissures or earth slumps.

The prime severe damage to dwellings appeared to be confined in an area (later identified on map N.Z. 1:63360 sheet S31) from Stitt's Bluff (Berlin's) and Inangahua Landing to Inangahua Junction (distances of six and five miles) and upstream from the Junction to Lyall (distance of seven miles). For the purpose of the first immediate report, an indicative guess was made and reported that 10% of dwellings in the prime area had partially collapsed roofs, and that damage in the area, was at an average, one-third to one-half the value of building properties.

The town of Westport was inspected by a series of over flights, just off the lines of streets, when it was estimated that 3 per cent of chimneys had collapsed. The report, so sent, was confined to "chimney collapses", as "damage" obviously would require closer and more careful inspection than would be possible from the air. The first of the authors had made an appraisal of chimney damage in Westport one day after the May 10, 1962 earthquake, from a motor car driven along all streets, followed by sample inspections of building damage. From that experience, and a lack of debris on pavements, it was concluded provisionally that damage was generally less severe than in 1962; also that Westport in spite of a location 20 miles west of Inangahua Junction and a situation upon river and coastal sediments, had escaped serious damage.

On the route south from Inangahua Junction for the 20 miles to Reefton, the incidence of damage was seen to decrease rapidly, but not as rapidly as on the route to the west. From an overflight of Reefton, 20 per cent "chimney collapses" were estimated, and moderate structural damage to buildings was assumed. Building damage seen south of Reefton reduced gradually and steadily with distance, however the incidence of damage at Greymouth and vicinity again rose. From an overflight of Greymouth and suburbs a provisional estimate was made of 15 per cent of chimneys collapsed.

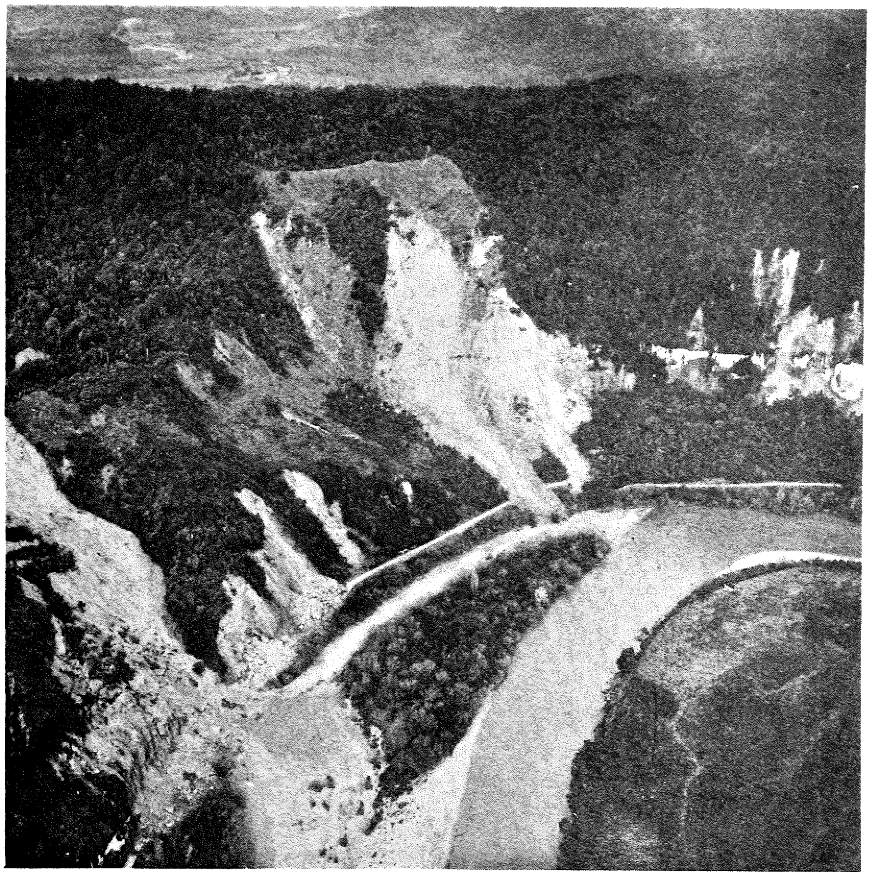

Fig. 1. Slip in Tertiary sediments blocking Inangahua to Westport Highway. photo N.Z.G.S. L. Homer

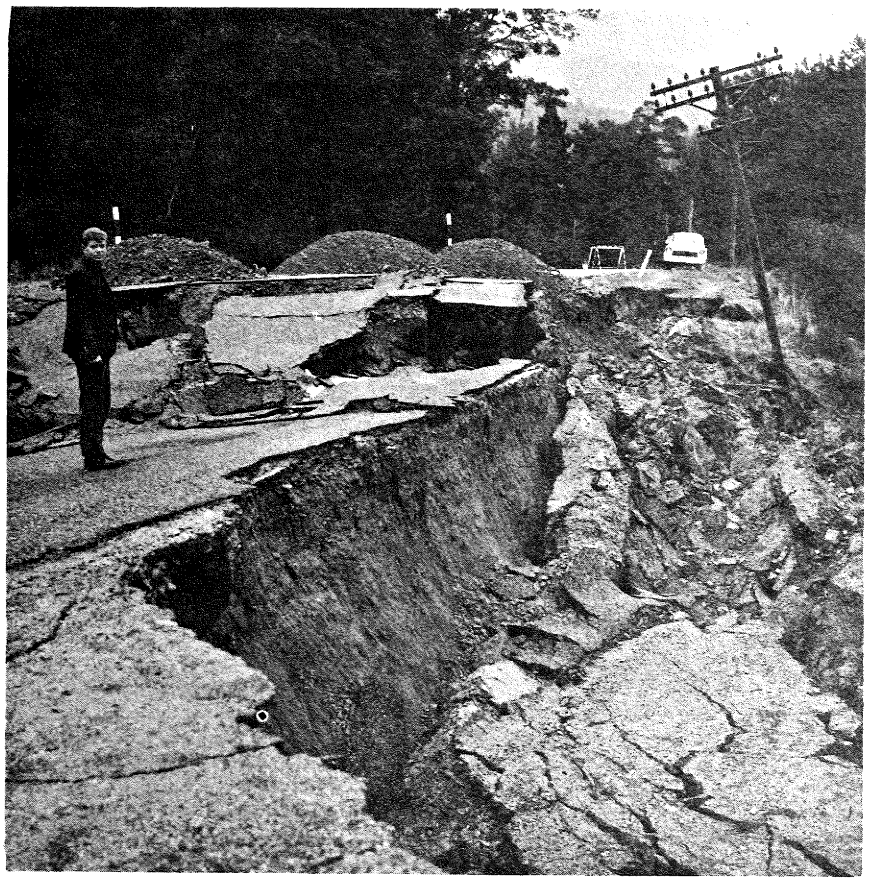

Fig. 2. Failure of roadbed on fill along Inangahua to Murchison Highway. photo N.Z.G.S. L. Homer

In Greymouth the authors met again Mr R. Darling of the Earthquake and War Damage Commission staff who had set up an insurance claims office, and other members of the Geological Survey team, all of whom had continued directly to Greymouth by N.A.C. flight. Notes were compared. An inspection was made, indicatively, of a dozen damaged commercial and industrial buildings under the guidance of the Acting Borough Engineer, for the purpose of sharing information and impressions. Reports were sent to Wellington by telephone.

At dawn on May 25 the first author and Mr T. Osborne, insurance assessor, joined a helicopter flight from Reefton to Inangahua Junction and commenced work on an assessment of property damage, whilst the second author and his colleagues on a separate helicopter flight continued their study of geology and general aspects.

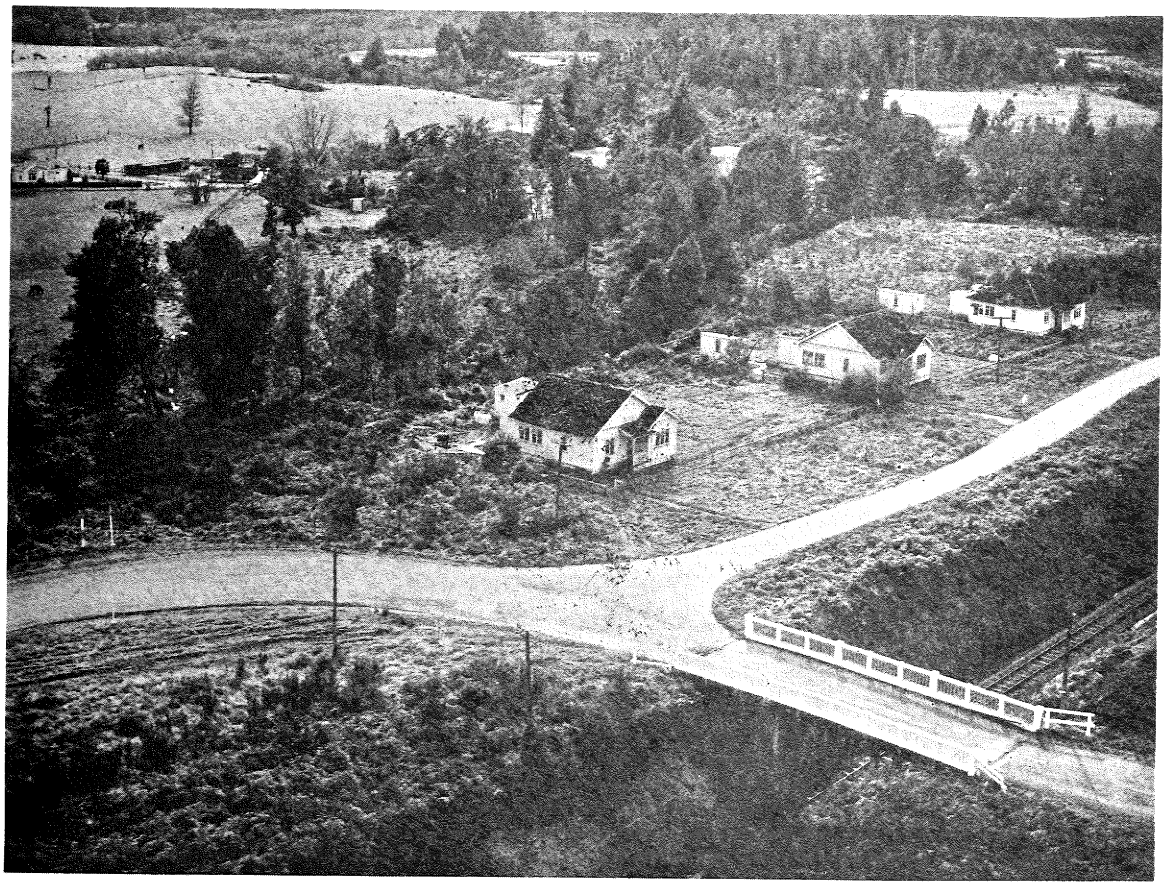

Fig. 3. Aerial view of part of Inangahua Camp showing damage to chimneys and tile roofs. photo NZGS L. Homer

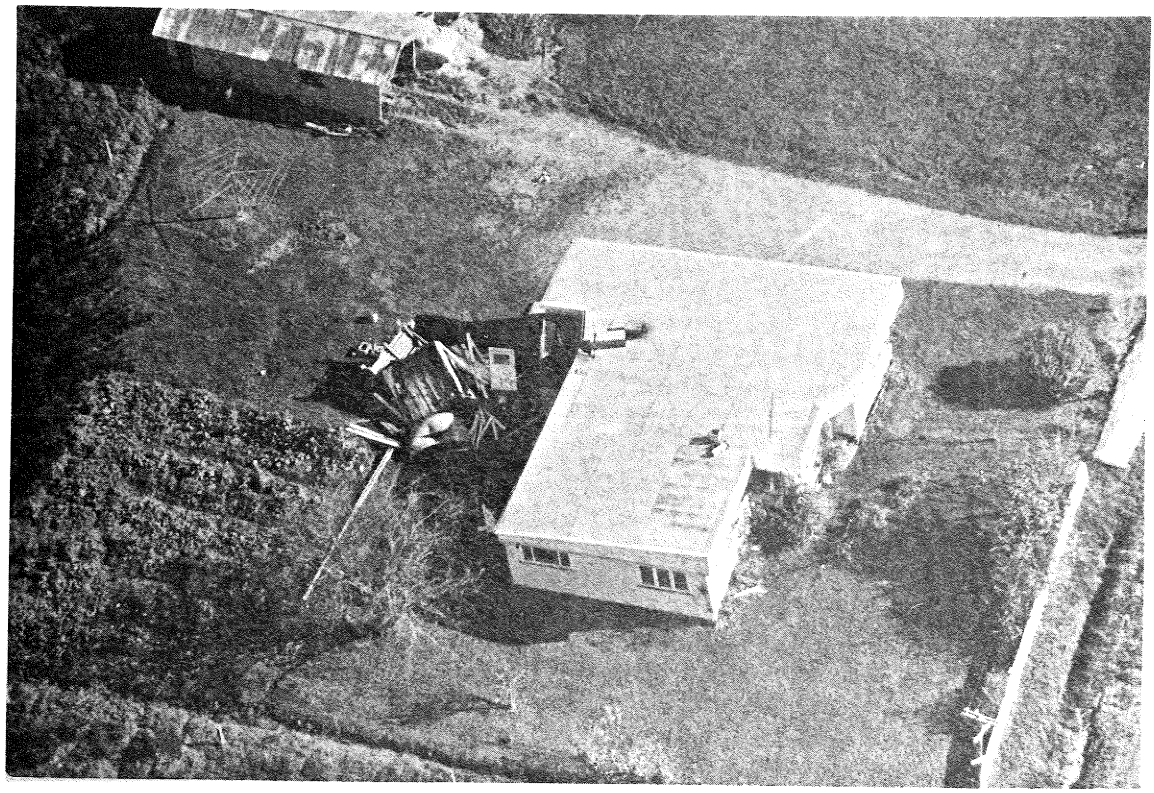

Fig. 4. Aerial view of damaged dwelling, showing the collapsed chimneys and tank stand. photo B.H. Falconer