

MAP-MAKING from aerial photographs: By means of the precision stereoscope on the left the heights of features shown in the aerial photographs can be calculated, and the contours plotted directly on to the paper on the right. The apparatus shown is known as a "stereocomparagraph"

MAPS ARE BACK AGAIN

FROM 1939 until last year, New Zealand's map-makers worked behind carefully closed doors. The Lands and Survey Department—the Dominion's principal mapping organisation — was practically mobilised, with many of its men in uniform at home as well as overseas; and the public had to go without current maps since almost every type was withdrawn from sale. But to-day maps are available again. One series, showing New Zealand as at November 27 next, has been selling briskly to those interested in discovering how they are affected by the revised electoral boundaries.

Like so many other technical processes, map-making has benefited by improved techniques in recent years. By

the end of last century a complete coverage of New Zealand had been made by triangulation, but this type of mapping simply showed the areas covered as plane surfaces. A geodetic survey, in which allowance is made for the curvature of the earth's surface, did not come until 1911. This latter survey is that on which the military grid, overprinted on Army maps, is based, and it is also the basis for all survey traverses of land boundaries, roads, rivers and so on.

In 1935, however, map-making entered a phase in which great progress has since been made. In that year a national mapping scheme was started, using the aerial photograph as the basis for a topographical projection. The first aerial mapping done here was carried out by the Air Force, and the first area covered was one of 1,500 square miles in Hawke's Bay.

This new technique reduced to a minimum the task of the surveyor in the field, whose work was now confined to the fixing of prominent points, the identification of known survey points, and the identification and description of features not easily recognised in the photographs.

Interpreting Photographs

At the same time a new draughting room instrument, a precision stereoscope, was introduced to handle the aerial photographs. By means of this stereoscope, through which the aerial photographs are seen in relief, not only can the natural features be directly transferred to paper (as shown in the illustration at the top of this page), but even heights can be calculated and contours accurately plotted.

To take these photographs, the aircraft flies at a predetermined height (generally 11,000ft.) in parallel east-and-west flight lines. Each individual photograph overlaps its predecessor 60 per cent., and each line overlaps the adjoining lines 25 per cent. No photograph, to be of use, may have a fore-and-aft tilt of more than two per cent., or vary more than two per cent. from the specified scale.

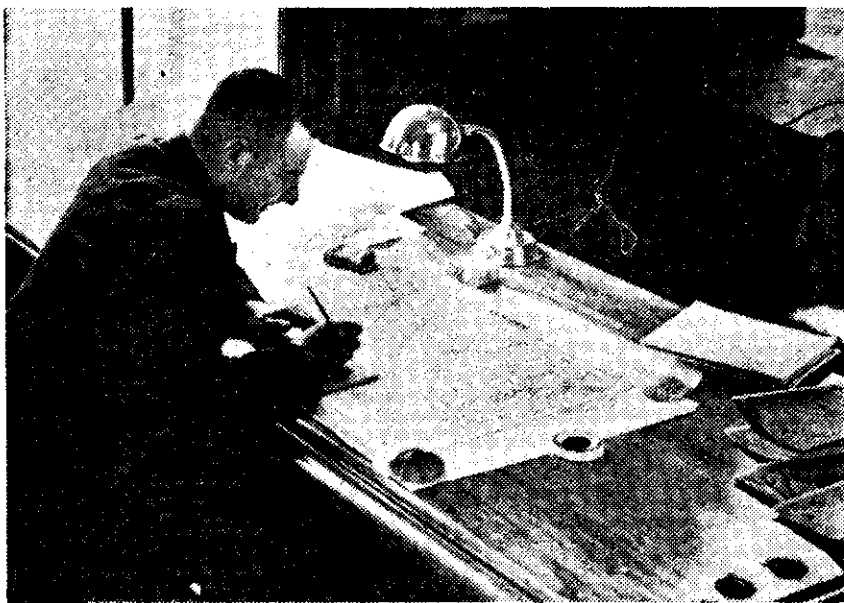
Just before the war, a 3,000-mile mapping programme was in progress, but this had to be dropped temporarily when the Department was called on to concentrate on work for the armed forces. When war actually broke out, the Department assumed responsibility for the production of all military maps, a duty which rests wholly on the Army in other countries.

The first job done for the Army was the drawing of maps of the fortress areas on the scale of 1:25000, or 32 chains to the inch. This series, covering an area of 1,000 sq. miles, includes all of the Auckland, and parts of the Wellington, Christchurch and Dunedin fortress areas. There are 30 maps in the series, printed in six colours, and showing remarkable detail. Every house in the areas is clearly indicated.

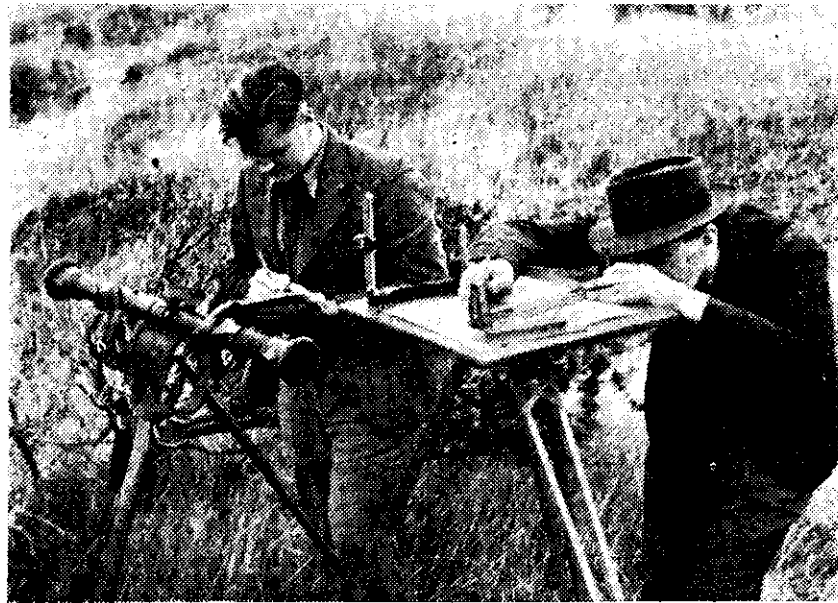
Work in this series was held in abeyance in 1941 to concentrate on a series of one-mile-to-the-inch maps of strategic areas urgently required by the Army. In the early stages of this new task there was only limited help from aerial photographs, so 13 mapping parties were established in various parts of the country. But by the end of 1945, 50,025 sq. miles had been mapped and 146 map-sheets, covering 40,300 sq. miles had been published.

Aeronautical and navigational maps for the Air Force, covering areas stretching from New Zealand to the Solomons, were also produced, and the Navy was helped in preparing charts of vital areas in the Pacific.

For the last 30 years, the Surveyor-General told *The Listener*, New Zealand has been a market for the recruitment of surveyors who are to-day working in Malaya, Sarawak, East Africa, Venezuela, Trans-Jordan, and other parts overseas. In 1939, 75 New Zealand surveyors were practising abroad, some of them employed by oil companies, others in the British Colonial Service.



IN the final stages: A draughtsman puts the finishing touches to a topographical map of the Lumsden district



TWO Surveyors at work in the field. The apparatus on the right is the plane-table, that on the left is a range-finder