

in million bushels, were (figures for the previous year in brackets): United States, 1,719.9 (1,686.1); Canada, 546.3 (639.5); Argentina, 76.0 (87.2); and Australia, 103.4 (37.5).

Total exports of wheat and wheat flour, in terms of wheat, from the four major wheat exporting countries in the August 1958 - July 1959 period (the Canadian crop year) increased 9 per cent to 934,700,000 bushels from 856,200,000 bushels in the preceding Canadian crop year. The year's shipments from the four countries, in million bushels, were (totals for the previous year in brackets): United States, 456.3 (396.4); Canada, 294.1 (320.3); Argentina, 106.2 (77.6); and Australia, 78.1 (61.9).

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DEFENCE RESEARCH ACTIVITIES

Defence Research Board scientists at Suffield Experimental Station (SES), near Medicine Hat, Alberta, are conducting a fundamental research programme to investigate shock and blast waves and their effects on model structural configurations. Explosive charges of TNT, ranging from eight to 200,000 pounds, will be detonated on three prairie ranges within the station's 1,000 square mile experimental area.

Scientists have been gathering data relative to nuclear explosions since the first atomic weapon was detonated in the United States. The Canadian effort, however, probably represents the first comprehensive investigation by a Western nation of the fundamental phenomena associated with shock and blast waves from explosive charges exceeding a few tons. Studies are also being undertaken to interpret associated laboratory investigations with the explosions carried out during the field experiments.

The data obtained will lead to a better understanding of the response to blast forces of field defences and shelters and other types of construction. The programme should permit the scientists to suggest design features leading to blast-resistant characteristics and methods of minimizing damage effects within shelters. Because there are no radiation or thermal effects from the explosives used at SES, the programme constitutes no danger to persons or animals in the Suffield locality.

The programme has arisen from the participation of SES scientists in conducting measurements of blast waves during the United Kingdom nuclear tests in Australia in 1956 and 1957. Close co-operation has continued with U.K. laboratories which are maintaining a keen interest in the SES experiments. Canadian and U.K. scientists co-operated in conducting shock measurements during the recent Ripple Rock demolition off Canada's West Coast.

United States scientists have also shown interest in the SES programme and have been

invited to make scientific observations at some of the forthcoming tests.

Planning for the programme began two years ago and outdoor ranges have been prepared at localities with such picturesque names as Dead Man Gulch, Watching Hill and Drowning Ford. By August 1958, an eight to 60 pound explosive range was completed and a second, capable of assessing the effects of charges up to 2,000 pounds, was finished this summer. It is expected that 100-ton or simulated sub-kiloton nuclear explosions will eventually be detonated.

High-speed photographic techniques have been developed to study in detail the shock and blast effects associated with explosions. Smoke rockets provide a background grid pattern to facilitate measurement of the movement and other actions of shock waves.

The first of a long series of medium explosions was successfully carried out in July when a 500-pound hemispherical ground burst charge of small TNT blocks was detonated. Associated air pressures and other related data were obtained.

The TNT charges, cast in the form of spheres and hemi-spheres, are produced at the station following the development of a new technique for building large hemispherical shapes.

Dr. Ross B. Harvey, a physical chemist and formerly of Moose Jaw, Saskatchewan, who led the SES group at the nuclear tests in Australia, is directing the shock and blast research programme at the prairie establishment.

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GOVERNMENT FINANCES

Mr. Donald M. Fleming, Minister of Finance, has released the regular monthly statement of the Government's financial operations for August, 1959, and the first five months of the current fiscal year.

For August, budgetary revenues were \$403.4 million, expenditures were \$507.1 million and there was a deficit of \$103.7 million. For August 1958, revenues were \$360.8 million, expenditures were \$368.9 million and there was a deficit of \$8.1 million.

For the first five months of the current fiscal year, budgetary revenues were \$2,068.5 million, expenditures were \$2,133.8 million and there was a deficit of \$65.3 million. For the same period last year, revenues were \$1,806.4 million, expenditures were \$1,790.4 million and there was a surplus of \$16 million.

Operations of the old age security fund, which are not included in budgetary transactions, resulted in a deficit of \$3.1 million for August, 1959, and an accumulated deficit of \$40.3 million for the five months to August 31, 1959. Last year for the five months to August 31, 1958, there was an accumulated deficit of \$73.3 million. These deficits were covered by temporary loans by the Minister under the terms of the Old Age Security Act.