PARTS FOR THE RCAF CF-100 from hundreds of Canadian plants are assembled at the Avro Canada plant.

Procurement and

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ABOUT a hundred years ago a great Swiss military theorist, Baron Jomini, divided the science of war into three branches: strategy, tactics, and logistics. Strategy and tactics are (or should be) well recognized, but logistics has been too often ignored or misunderstood—despite the fact that its vital importance has been established without question. To quote General Eisenhower: "Logistics controls all campaigns and limits many."

To define the term in its broadest aspect, let us say that logistics is the total process by which the resources of a nation are mobilized and directed to the accomplishment of military aims. And as we shall see by our examination, procurement is an important element if not the important element in logistics.

INDICATIVE OF THE RCAF'S PRESENT OVERSEAS COMMITMENTS is this shot of its Sabres over their English base. North Luffenham is to be moved to the continent next year.

Economic Mobilization

In order effectively to direct the utilization of its resources during war, a nation must plan and organize the allotment of its logistical potential during peace. This latter process is known as economic mobilization. Let us consider some of its more important aspects.

Intelligence. Information (both military and economic) about the nation and the enemy must be accurate and up-to-date.

Total War. Plans must be for a "full-out" effort.

Government Controls. Controls on the civilian economy must compensate for war-time disruptions.

Post-War Planning. The release of these controls must be phased with the conversion from war to peace.

Procurement Planning. The mo-

CANADAIR-PRODUCED SABRE powered by Avro-Canada Orenda.

AVRO CANADA CF-100, standard RCAF all-weather gets a JATO assist.

Logistics

bilization requirements of the armed forces must be given priority. Wherever possible, equipment should be standardized between the nation's military and civilian components, and between the nation and its allies.

Strategic Planning. Military aims must be limited by the share of logistical potential allotted to the armed forces.

Conservation Program. Stockpiling and synthetic plants must be made to compensate for some inadequacies in resources. Reduction of the civilian standard of living must be balanced between the requirements of total war and postwar planning.

Research. A heavy share of the military budget must be spent on devising the best possible tactical weapons.

Allocation of Manpower. Manpower must be controlled by a single agency to ensure an equitable labor force. Since the other half of the population are economic parasites in wartime, the production of food requires about 22% of the population, and industry about 20%. This leaves only 8% for the armed forces.

Governmental Agencies. A minimum of agencies, with full authority and well defined responsibilities, is essential.

Dispersion of Industry. Industry is a primary target for strategic bombers, and should therefore be dispersed. (This is one reason for the development of an aluminum industry in British Columbia.)

Public Opinion. Without the support of public opinion, a democracy cannot even declare war. The mobilization of public opinion is mandatory: economic mobilization plans must be sold to the citizens.

We can see that logistics starts on the farms and in the forests, in the mines—and in the cradles! The nation's resources are mobilized, then processed, converted, and finally transported into the hands of its civilians, military, allies, and also into the hands of neutrals.

Military Logistics

Certain basic principles must be followed in the logistical support of all military operations. They are eight in number.

Mobility. Fighting units, when they move to a new base, should only be encumbered with their immediate requirements and an emergency reserve.

Forward Movement. Logistical units must be located in rear areas so that they may provide the bulk requirements for the bases. The flow of replenishment is forward to the bases. The flow to the rear (which includes requisitions for future requirements) is a comparatively unsteady trickle.

Simplicity. The flow of requisitions or "demands," like all logistical procedures, must be standardized in order to eliminate misunderstanding; and the system must be simplified so as to minimize paper work for the user.

Control. There is never "Enough." It is human to hoard, and the greedy user will make things difficult for the honest one. Controls, such as strength returns and stock reports, are necessary for an equitable distribution of personnel and equipment, respectively.

Economy. Economy is a principle of war and applies to logistics as much as to strategy and tactics. Almost everyone in the RCAF is dollar conscious because they are taxpayers. Military logistics must, how-

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ever, look to the end result to appreciate true economy. By spending a few dollars more for an item with a longer life or a greater capacity, the overload during the mobilization period can be met.

Flexibility. Strategic plans must be long-range and firm. They are the basis for the calculation of requirements and procurement. Tactical plans are short-range and must be changed to exploit local temporary situations. The distribution pipeline must incorporate a "cushion" (in the form of reserves and overload capacity) to compensate not only for changes in tactical plans, but also for disruptions in industry and transportation.

Time and Space. Every planner must be time-conscious. The strategic planner should appreciate the total "lead-time" (which includes the calculation of requirements, procurement of authorities and bids, and finally production) before equipment may be distributed to user units. This lead-time is 12 months for an average item! Similarly, the time-lag in supplying personnel and facilities will affect the date of a planned operation. The tactical planner must therefore know the aggregate of the time-lag from date of requisition to delivery at base.

Co-ordination. Logistical activities must be co-ordinated with operational activities. This is a lesson the RCAF has learned the hard way. To neglect logistics in planning—at any level—is an invitation to disaster.

Logistics in the RCAF

Fundamentally, of course, RCAF logistics is the administration of its resources. Logistics spends all of the RCAF budget. The planners or strategists can only think, talk and write; and by the time the users or tacticians go to work, the logisticians have spent all the money. In the table that accompanies this article the resources of men (personnel), space (facilities) and material are shown in the following time phases:

Requirements—planning the right things.

Procurement — getting the right things in proper quantity and quality.

Distribution — putting the right things in the right place for the right people at the right time.

Maintenance—sustaining the right things.

Evacuation — removing the right things.

Facilities

Facilities are meant to include land as well as buildings and utilities. Utilities include the systems for communications, electricity, gas, water and sewage, in addition to air strips, roads, and all other works (or "plant")—all empty and unmanned.

The requirements of facilities should be programed for several years so that they may be sited and developed for war-time expansion. Designing is done by the construction engineering staff at AFHQ, supplemented by consultant engineering and architectural firms. The contract demand with the plans and specifications is submitted to Defense Construction Limited, a crown company for new construction projects, under the Department of Defense Production. During the Second World War and after, some jobs have been done by Construction and Maintenance Units of the RCAF to save time or money. Plant repair

STATISTICS OF THE AIRCRAFT AND PARTS INDUSTRY IN CANADA

Year	Number of Plants	Average Number of Employees	Salaries and Wages	Cost of Fuel and Electricity	Cost of Materials at Works	Gross Selling Value of Products
1945	38	37,812	84,230,503	1,813,007	115,093,267	278,652,880
1946	16	11,405	24,459,085	787,180	6,708,468	36,210,906
1947	12	9,374	21,422,060	749,639	16,190,747	44,303,576
1948	11	8,049	19,829,987	833,111	18,287,931	45,600,172
1949	14	10,695	27,443,498	1,070,016	24,315,084	61,099,075
1950	15	10,549	30,174,821	1,209,143	18,149,951	55,267,621
1951	23	19,198	59,558,317	1,492,895	36,291,613	117,188,078
1952	38	33,356	108,667,004	2,024,357	115,286,096	244,607,320
*1953	43	38,071	142,332,596	2,438,588	166,738,304	398,797,000

*Preliminary, subject to revision

Source: Dominion Bureau of Statistics, Mining, Metallurgical and Chemical Section

STATISTICAL DATA ON COMMERCIAL CARRIERS IN CANADA
Domestic Services

	1950		1951		1952		1953	
	Scheduled	Non-Scheduled	Scheduled	Non-Scheduled	Scheduled	Non-Scheduled	Scheduled	Non-Scheduled
Operating Revenues	$43,600,117	5,463,486	55,381,454	6,703,065	58,099,584	15,403,661	84,197,975	20,057,525
Operating Expenses	$42,445,956	5,527,719	48,893,874	6,501,608	55,034,005	14,993,662	83,292,744	19,667,156
Net Operating Income	$1,154,161	Dr. 64,233	6,487,580	201,457	3,065,579	409,999	905,231	390,369
Hours Flown	166,399	133,530	194,649	151,676	201,382	227,133	208,987	250,501
Miles Flown	27,196,010	12,803,628	31,456,005	14,657,536	31,302,256	14,982,855	33,352,054	17,325,628
Passengers Carried	1,120,657	156,763	1,362,871	183,668	1,317,878	271,000	1,493,620	354,308
Goods Carried (lbs.)	24,507,955	18,062,822	30,846,807	22,796,054	33,911,879	87,630,917	38,752,770	121,827,281
Mail Carried (lbs.)	12,751,448	361,827	13,446,028	494,380	13,772,085	547,610	15,216,497	754,433
Passenger Load Factor	67.2	—	72.5	—	68.9	—	66.6	—
Average Number of Employees	5,652	685	6,187	755	7,288	1,318	8,254	1,583
Total Salaries	$17,481,260	1,771,515	21,225,011	2,153,386	27,677,209	4,345,409	32,478,037	5,944,631
Average Number of Aircraft					130	511	134	556

Source: Dominion Bureau of Statistics, Transportation and Public Utilities Section

is done by unit construction engineering sections, C.M.U.'s, or contractors. Rental of services, and of property for temporary activities, is a heavy cost which increases greatly in war time. Only those items of plant which are in short supply are removed from units for redistribution as material.

Materiel

The term "materiel" applies to supplies as well as to the ready-for-use "end items" of equipment. Supplies are processed raw materials—rations, stationery, coal, beer, as well as the electricity, gas, water, oil, etc., required by facilities. In fact, materiel includes everything that is used or consumed by military personnel, except fresh air.

Research constantly seeks to improve or supersede items of materiel. Development starts with the research idea or model and, after months or years, ends with a sealed sample. The calculation of requirements is based on the RCAF's annual program of activities and consumption statistics. There are various sources for materiel: rations come from the Army, stationery from the King's Printer, canteen and other non-public fund items direct from trade — but other materiel is procured by AMCHQ. AMCHQ does not deal direct with industry but submits contract demands to the Canadian Commercial Corporation, a crown company for purchasing materials and services, under the Department of Defense Production. Air Materiel Command H.Q. must specify to the C.C.C. in writing precisely what is required: reference to samples, photographs, or catalogues has proved in the past to be quite inadequate. Industry must have complete details or specifications before it can quote intelligently and honestly. Mass production does not start immediately on receipt of an acceptance of tender from the C.C.C.: the production must be planned in detail, jigs set up, production completed before the items can be made, inspected and shipped to RCAF Supply Depots.

Warehousing is a modern art. The methods of handling materials in Supply Depots were developed during and after the Second World War. Packaging is most important. It is true economy to spend several dollars on "export packing" for a critical item which may cost only a few cents, just to ensure that it is serviceable when it reaches the user. Transportation has been called the "instrument of supply." The movement of materiel is the major logistics problem in a global war, and the proper choice of the carrier will usually save precious time. It is estimated that the over-all cost of airlift is about one third that of surface transportation on account of the savings in pipeline quantity, packaging, breakage, and losses, to say nothing of time. However, the lack of transport aircraft makes it necessary to restrict airlift to expensive, fragile, and urgent items.

Servicing and periodic inspection by unit personnel forestall equip-

ment repair. When modifications or repair work cannot be done on the site by unit personnel, or by mobile parties from contractors or Repair Depots, it is evacuated. Overhaul involves dismantling the assemblies —that is, looking for repair work. Salvage involves the recovery of those serviceable or repairable components which are worth the cost of dismantling the assembly. Disposal of surplus material is the sale, by the Crown Assets Disposal Corporation, of items "in the whole state" or as scrap material.

THE AIR RACE

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three and three-quarter million dollars in 1952 to one and one-third million dollars. Furthermore, in the first six months of 1954 the non-scheduled segment of the commercial operators has shown a 29% drop in revenue compared to the same period last year with costs dropping only 26%.

"This does not mean that there is cause for panic. We undoubtedly have passed from the boom stimulated by the Korean War and are perhaps in more stable peacetime conditions, but it does mean that we will have to watch our costs more closely, perhaps dig a little harder for business and look for excess fat that may have swollen our costs in the past. It is true that increased costs are a part of the general pattern of the Canadian economy in 1954 and so are higher prices. We should perhaps remind the public that while the general consumer index of prices now stands in the neighborhood of 117 relative to 1949, the index of commercial air services has shown no rise. In fact, in some categories of service, such as transcontinental tourist, air cargo and helicopter charter, prices have been reduced.

"We may have to look to our pricing again and if the trend continues, adjustment upward may have to be made. We would like to hold the line and we think our government can assist us on two fronts. Aircraft, parts and components of types and sizes not manufactured in Canada should continue to be imported duty free and, in addition, serious consideration and early action should be taken for the removal of sales tax on aircraft, engines and their component parts, as urged for some time by this Association. These steps would take some of the pressure off rising costs and speed the introduc-