1941.

NEW ZEALAND.

AIR DEPARTMENT

(REPORT ON THE), FOR THE YEAR 1940-41.

Presented in pursuance of Section 7 of the Air Department Act, 1937.

REPORT BY THE HONOURABLE F. JONES, MINISTER IN CHARGE OF THE AIR DEPARTMENT, FOR THE YEAR ENDED 31st MARCH, 1941.

MR. SPEAKER,—

I have the honour to present to Parliament the report of the Air Department for the year ended the 31st March, 1941.

For obvious reasons, certain information which ordinarily would be incorporated has been omitted.

I desire to express to all concerned my appreciation of the efficient and energetic manner in which they have met the many problems and difficulties of this period.

REPORT BY THE CHIEF OF THE AIR STAFF FOR THE YEAR ENDED 31st MARCH, 1941.

The Hon. the MINISTER OF DEFENCE.

I HAVE the honour to submit the following report on the Royal New Zealand Air Force for the year ended 31st March, 1941.

PERSONNEL.

Satisfactory progress has been maintained in the enlistment of personnel for the Royal New Zealand Air Force. Selection committees for both air crew and non-flying personnel have made periodical tours throughout the Dominion, and suitable publicity has been given to the requirements of the Service.

AWARDS.

From 4th September, 1939, to 31st March, 1941, a total of eighty-one awards has been made to New-Zealanders serving with the Royal Air Force or the Royal New Zealand Air Force. This is comprised as follows:—

Distinguished Flying Cross (with bar)	2
Distinguished Flying Cross	62
Distinguished Flying Medal	5
George Medal	3
Air Force Cross	8
Croix de Guerre	1
	81

Casualties.

(i) *Overseas.*

Casualties to New-Zealanders serving with the Royal Air Force from 4th September, 1939, to 31st March, 1941, totalled 318. These are classified as follows:—

Killed	156
Missing, believed killed	20
Missing	59
Seriously wounded, &c.	33
Prisoners of war	50
	318

(ii) *In New Zealand.*

The following analysis covers the fatal casualties in New Zealand from 1st April, 1940, to 31st March, 1941, during which period there were nineteen flying accidents involving the loss of twenty-nine lives:—

Cause.	Deaths.
Flying accidents	29
Collision on ground	1
Struck by aircraft	1
Struck by airscrew	1
Fall from aircraft	1
Electrocuted	1
Motor accidents	3
Fall over cliff	1
Natural causes	3
Drowned	1
	42

Training Organization.

The present position regarding the expansion of the Training Scheme is as follows:—

(*a*) *Recruiting Organization.*

The central organization set up to deal with the provision of personnel for training has continued to function efficiently, and the response has been most gratifying. For the year ended 31st March, 1941, a total of 7,518 applications was received for air-crew training and 8,538 for maintenance (ground staff) training. Since the outbreak of war the corresponding totals are 12,162 and 12,974.

With the introduction of compulsory service for both the Expeditionary and Territorial Forces, the co-operation of the Army and National Service Departments enabled the ballottees to be given, for a stated period, the option of applying for acceptance as trainees in the Royal New Zealand Air Force. This scheme has been fairly satisfactory, but the need for a continuation of a recruiting campaign is felt. A publicity campaign in the principal towns of the Dominion has produced satisfactory results, the co-operation of the press and radio and the band of the Royal New Zealand Air Force being a valuable feature.

(*b*) *Flying Training Organization.*

During the year 1940–41 the expansion of the Flying Training Organization has been completed. In addition, training has been speeded up and all schools are overbearing to the extent of 25 per cent.

As a result of the greatly increased programme carried out, a heavy strain has been thrown on both flying and ground instructors and the ground personnel of all Flying Training Schools. The spirit and keenness displayed by all ranks, has, however, been excellent.

The Service Flying Training Schools will be re-equipped in the near future with the latest type of single-engine trainer. These aircraft (North American Harvard) are in use in the Flying Training Schools in the United Kingdom and Canada. The Airspeed Oxford, which is used as a twin-engine trainer, continues to give excellent results.

A recent development in the training of air crew, and one which has been very successful in Great Britain, is the introduction of "synthetic training." This system has now been introduced in New Zealand and will be extended where practicable. In brief, it involves the simulation of flying conditions on the ground, and is designed to familiarize the pupil with conditions he will expect to meet in the air. A great saving in valuable time is effected. The Link Trainer is the best-known example of synthetic-training equipment. In this, a pupil is taught cross-country flying, blind flying, the correct use of flying controls, and flying procedure without leaving the ground. Instructional fuselages are used for cockpit drill. In these, pupils are instructed in the mechanism and operation of the flying controls, landing-flaps, retractable undercarriage, &c. Motion pictures are also used to a large extent. These talkie films show practically every aspect of Service flying, and the pupil hears and sees lectures and demonstrations of many branches of the operational work he will be required to perform in a Service unit.

The work and organization of the Training Schools is as follows:—

(i) *Initial Training Wing.*—This is situated at Levin and carries out the initial training of pilots, observers, and air gunners. Here a thorough grounding is given in discipline, drill, and elementary subjects directly connected with operational work.

Pilots are given instruction in navigation, mathematics, armament, Air Force law, signals, engines, theory of flight, and airmanship. After six weeks' intensive preliminary training they are passed on to one of the four Elementary Flying Training Schools.

Observers and air gunners receive similar elementary instruction, and proceed to Canada for further training under the Empire Air Training Scheme.

(ii) *Elementary Flying Training Schools.*—At these, pupil-pilots from the Initial Training Wing are taught to fly, and are brought up to a standard sufficiently high to enable them to fly the advanced training types which are in use at the Service Flying Training Schools. Each pupil is also given further instruction in the subjects already taught at the Initial Training Wing.

No. 3 Elementary Flying Training School commenced operations on the 26th October, 1940, and reached full establishment on the 23rd December, 1940.

No. 4 Elementary Flying Training School commenced operations on the 23rd December, 1940.

At the conclusion of elementary training, a number of pupils proceed to Canada to complete their training; these pupils are drawn proportionately from each E.F.T.S. The remainder pass on to our own Service Flying Training Schools to complete their training.

(iii) *Nos. 1, 2, and 3 Service Flying Training Schools.*—These schools carry out the advanced training of the pupil, and on completion he is capable of taking his place as a member of an operational squadron.

Bombing, gunner, photographic, and flying practices have been brought to a very high standard, the pupil has been awarded his "Wings," and he is in every respect a fully qualified pilot.

No. 3 Service Flying Training School commenced operations on the 28th October, 1940, having been converted from an air observers' and air gunners' school. The last output of observers was on the 23rd December, 1940, and the last output of air gunners was on the 20th September, 1940, thus allowing the changeover to be effected without loss of valuable training-time.

(iv) *Flying Instructors' School.*—Here, selected pupils from the Service Flying Training Schools are given a further course and are taught the standardized method which has been adopted as a means of imparting flying instruction. All aspects of flying instruction are constantly reviewed, while as regards the standard of flying to be attained and the means of reaching that standard, the instructors are the deciding authorities. Pupils are, in effect, taught to be flying instructors on all training types of aircraft in use in New Zealand, and they are then drafted back to the Flying Schools to fill the pressing need for qualified instructors.

A new site has been selected for this school, and the unit will be moving to Tauranga early in August, 1941. This new site has been selected as an ideal location for a Flying School, weather conditions being very good and the aerodrome unhampered by the flying activities of other units.

(v) *School of General Reconnaissance.*—The School of General Reconnaissance will commence operations at Nelson on 21st April, 1941. Pilots posted to this school direct from the Flying Training Schools are to be given advanced instruction in navigation and reconnaissance, including methods of patrol and search. On completion pupils will be qualified to take their places in operational squadrons in New Zealand.

(*c*) *Technical Training.*

Considerable changes have been made in the original programme for technical training instituted at the outset of war and also in the disposition of the schools dealing with the various trades.

The most notable advance between April, 1940, and March, 1941, was the taking-over of the Centennial Exhibition building at Rongotai as a Technical Training School for fitting and rigging trades. This school now provides the training previously carried out at the four railway workshop training centres and at Hobsonville.

No. 2 Technical Training School, Wigram, has been reorganized and now consists of the Electrical and Wireless School and the Armament School, which are separate establishments.

The Recruit Training Centre was transferred from Levin to Harewood on the 15th July, 1940.

A general speeding up of technical training has been maintained throughout the year in meeting both our own requirements and the Dominion's overseas commitments—*i.e.*, wireless operators, radio mechanics, and fitter-armourers for the Royal Air Force.

The following Technical Training Schools are now operating:—

(1) *Recruit Training School, Harewood.*—All airmen other than air-crew personnel do their initial six weeks' recruit training here.

(2) *Technical Training School, Rongotai.*—Those under training consist of flight mechanics, flight riggers, and personnel undergoing conversion courses from the trade of flight mechanic or flight rigger to that of fitter IIE (engines) or fitter IIA (airframes) respectively. The numbers of each trade are arranged to fit the requirements of the Service.

(3) *Electrical and Wireless School, Wigram.*—This school undertakes the training of wireless operators and radio mechanics for overseas.

(4) *Armament School, Wigram.*—This school is engaged in the training of fitter-armourers for overseas and armourers to meet New Zealand needs.

(5) *Administrative School, Wigram.*—The training of airmen in administrative trades is undertaken at this school. The numbers are now being reduced as women come into the Service.

(6) *Instrument Makers' and Repairers' School, Hobsonville.*—This school trains instrument-repairers and converts instrument-repairers to instrument-makers.

(7) In addition to the above schools, small courses for fire crew, cooks, Link Trainer maintenance personnel, &c., have been held as required.

Educational Services.

(i) *Staff.*

The following tables set out the strength and distribution of the staff of educational services during the year:—

	31st March, 1940.	31st March, 1941.
Educational officers	18	40
Clerical staff	3	8
	21	48

The distribution of the staff as at 31st March, 1941, was: Headquarters (Wellington), 19; Levin, 4; Rongotai, 3; Wigram and Harewood, 2 each; Hobsonville, Whenuapai, New Plymouth, Ohakea, Blenheim, and Taieri, 1 each; and four on vessels carrying trainees to Canada. Mr. E. Caradus continued to act as Director of Educational Services throughout the year, but has now been appointed Chief Inspector of Secondary Schools and will require to devote a considerable amount of his time to this work. He has, however, consented to act as Director of Educational Services while his services are needed.

(ii) *Educational Training.*

(*a*) *Air-crew Personnel.*—Reference was made in the last annual report to the special syllabus which was introduced to form the basis of both class and correspondence instruction of men selected for air crew and requiring educational training. No man of the right type who has completed a primary-school course is rejected by the Air Crew Selection Committee, and even men nominally up to the educational entry standard are now required to complete satisfactorily this preliminary course. The latter group, however, is given a short course lasting fourteen weeks.

It was estimated that a course of twenty-one weeks would be sufficient in the case of men with eighteen months or two years of post-primary education, and the syllabus was accordingly divided into twenty-one sections or assignments. It was found necessary to prepare a book as a correspondence course for men in country districts and for those who, owing to the nature of their occupations, were unable to attend the usual classes. This book, which was completed early in 1940, has been the text-book for the classes as well as the correspondence course. The book at present in use was printed in June, 1940, and reprinted in December, 1940. It is of interest to note that the Australian system of preliminary educational training, commenced some six months after that in New Zealand, is modelled on that of the R.N.Z.A.F., and that the New Zealand text-book has been reprinted in Australia. The Royal Air Force system of pre-entry training, commenced recently, is on similar lines to that of New Zealand.

The cost of the preliminary educational training of air-crew recruits is less than £3 for each man.

The willingness shown by post-primary teachers in all types of schools to co-operate with the Air Force has very much simplified the establishment of Air Force educational classes in all large centres in the Dominion.

(*b*) *Ground Personnel.*—At all Air Force stations, education officers are available for the educational training of the ground personnel, as well as of members of the air crew in training. Many of the ground staff are taking advantage of these facilities, some in order to qualify for higher positions and others in order to reach air-crew standard.

Special arrangements have been made in order that trainees for technical trades may receive educational training both during their recruit course at Harewood and afterwards during their technical training at Rongotai. As there is a very short interval between the time of enlistment and actual posting for recruit training, no outside classes have been established to provide preliminary educational training for these men.

(iii) *Morse Signalling.*

Morse signalling is now an integral part of the preliminary educational course. Two groups of trainees are being handled: (*a*) Those situated in centres where there are sufficient men for the formation of classes; and (*b*) those in country districts. The problem of instruction for the men in the country was solved with the co-operation of the National Broadcasting Service, and the necessary lessons are given over the air.

In almost every case the instructors are officers of the Post and Telegraph Department, and a tribute must be paid to those who have so willingly co-operated, including private concerns and individuals.

The success of the signalling instruction is demonstrated by the fact that about 60 per cent. of the trainees are able to transmit and receive at least eight words a minute before the completion of their signalling course.

(iv) *Educational Tests.*

Tests are given to cover the whole syllabus at the end of the educational courses. Some indication of the willing manner in which the men are working may be gathered from the fact that in the tests held in December, 1940, only 7 per cent. of the pilots and observers and 15 per cent. of the air gunners failed. Most of the failures were given a slightly extended course and then reached the necessary standard.

The content of the educational course is such that all men benefit from it, while obviously it is an advantage to the Training Schools that every man selected for the air crew should have satisfactorily completed the preliminary course before being posted to the recruit courses.

Women's Auxiliary Air Force.

In order to conserve all available man-power resources, it was decided to inaugurate a Women's Auxiliary Air Force. Members of this unit are to be enlisted for the duration of the war, and will be used at all stations to release man-power for combatant duties.

It is intended to use the Women's Auxiliary Air Force primarily in kitchen and dining-room, clerical, and stores work, but, in addition, it is hoped to utilize the services of this unit for parachute repairing and packing and other selected aircraft-repair work.

Air Training Corps.

As a measure to ensure a steady flow of young men as recruits for technical and air-crew training, it was decided to establish an Air Training Corps to cover the age group from 16½ to 18 years.

Medical Branch.

In August, 1940, arrangements were completed for the X-ray examination of all candidates for enlistment in the R.N.Z.A.F. in the Wellington and Auckland centres. In November, this was extended to all the examination centres throughout New Zealand, and now all recruits are X-rayed at the time of their medical examination.

All air-crew candidates, prior to their posting to Levin, are now inoculated and vaccinated. The arrangements are made by the Medical Branch, necessitating notices both to the candidates and the hospitals concerned.

Operations.

During the year, No. 1 General Reconnaissance Squadron has played an important part in the protection of shipping in the approaches to the main ports and in other focal areas, and has carried out numerous patrols and searches. It has also provided escorts for specially important shipping. Routine operational training has been maintained and has reached a high standard of efficiency. A flight of this unit is now operating from an advanced landing-field which has recently been equipped as an advanced operational base.

No. 2 General Reconnaissance Squadron, formed on the 1st January, 1941, and a Detached Flight of this Squadron formed on the 1st March, 1941. To date the unit has been employed mainly on operational training, but has on a number of occasions carried out reconnaissance duties in the Cook Strait area.

No. 3 General Reconnaissance Squadron is to form on the 1st April, 1941, with a Detached Flight which will operate from an advanced landing-ground. The formation of this Squadron and the Detached Flight should be complete by the end of June, 1941.

In addition to the work carried out by Nos. 1 and 2 General Reconnaissance Squadrons, the Service Flying Training Schools at Wigram, Woodbourne, and Ohakea have been called upon from time to time to provide aircraft for reconnaissance duties, which have always been carried out satisfactorily. The organization of these Flying Training Schools is designed to ensure the availability of aircraft for reconnaissance duties (when required) in an emergency.

Bomber Squadron.

Throughout the war the New Zealand Bomber Squadron in the United Kingdom has continued to operate. This Squadron was responsible for some of the longest reconnaissance flights of the war and at all times has commanded respect. A high percentage of its personnel has won awards.

Works and Buildings.

During the past twelve months the original programme of works in hand during the preceding year was completed, but owing to the expansion required by the Empire Air Training Scheme and the establishment of General Reconnaissance Squadrons within New Zealand, a greatly increased programme of works and buildings was undertaken. Development of these additional works was carried well forward.

The increase in establishment of personnel of the Royal New Zealand Air Force also necessitated small additions to the building and works programmes at the three Elementary Flying Training Schools already functioning, but the formation of a fourth Elementary Flying Training School at Whenuapai required an extensive additional building programme. All new buildings were of the standard mobilization temporary wooden type. All four Elementary Flying Training Schools (at Taieri, New Plymouth, Harewood, and Whenuapai) were in full operation by January, 1941.

The increased output of air-crew trainees found the existing accommodation at the Initial Training Wing, Levin, totally inadequate, and after careful consideration of the advisability of establishing a second ground-training school elsewhere, it was decided to enlarge the existing station. Tent accommodation of the Public Works type was provided for all trainees, while additional buildings for messes, lecture-rooms, stores, recreation, &c., and extensions to existing buildings were completed within two months of the decision to expand.

The increase in the number of air-crew trainees passing through the Flying Training Schools at Wigram, Woodbourne (Blenheim), and Ohakea also necessitated larger establishments of ground staff, instructors, and aircraft. This required considerable extension to the building programme to provide

additional hangarage and buildings for technical purposes and storage, as well as for barrack, mess, and recreation purposes. The extended building programme was nearing completion at the close of the year, and each station was operating to full capacity in February, 1941.

The expansion of the Royal New Zealand Air Force far beyond the limits contemplated at the outbreak of war soon disclosed that additional facilities would have to be provided for the technical training of ground staff, while existing stores accommodation at the Main Stores Depot, Hobsonville, proved inadequate. The Government therefore agreed to the taking-over for the period of the war the grounds and buildings of the Centennial Exhibition at Rongotai. A considerable amount of alteration and reconstruction was necessary to convert the existing buildings to their new purposes, but the Technical Training School and No. 2 Stores Depot, Rongotai, commenced operations in August, 1940.

Until the latter part of the year there was only one General Reconnaissance Squadron operating from the R.N.Z.A.F. Station, Whenuapai. With the decision to create three General Reconnaissance Squadrons within New Zealand, a further building programme had to be undertaken, and was nearing completion at the end of March, 1941. The No. 1 G.R. Squadron continued to operate from Whenuapai, but accommodation and facilities of a temporary nature for a Detached Flight were provided elsewhere. Two entirely new stations were constructed to accommodate No. 2 G.R. Squadron and its Detached Flight. Air Force personnel were in occupation of both stations early in 1941. No. 3 G.R. Squadron is to operate from existing aerodromes. The additional buildings and facilities are practically complete, and this Squadron will be in full operation by June, 1941.

Work on the extension and improvement of the flying-fields was continued during the year at most of the New Zealand Air Force stations. In most cases the turf surfaces have stood up satisfactorily to the extensive use occasioned by flying training, although in some instances they have caused considerable anxiety. Research has been undertaken on scientific under-drainage, soil stabilization, and the establishment of special aerodrome turf particularly resistant to the wear-and-tear of traffic. So far, in spite of the fact that the aerodromes so treated have been carrying traffic far beyond that contemplated at the time they were designed, the methods adopted have every prospect of success. The cost of dealing with aerodrome surfaces under the methods adopted is approximately one-eighth to one-tenth of the cost of laying paved runways of the type used extensively in Australia and the Far East, and, moreover, has the distinct advantage of providing a flying-field far less vulnerable to damage and resultant unserviceability from air bombing.

The construction of the large flying-field at Whenuapai was completed during the year, while additional areas have been brought into use at Taieri, Wigram, Harewood, Woodbourne, and Ohakea. Surface stabilization by the use of a thin layer of stone chips, gravel, or scoria rolled into the surface crust has had to be resorted to at Wigram, and, although not yet tested out by winter conditions, appears to be successful in producing a more resistant surface. It has been necessary to provide a much greater area of paved aprons for hangar surrounds than formerly contemplated, as it has been found that the concentrated traffic of taxying aircraft and refuelling-wagons, together with the action of petrol and oil, has severely damaged the turf surface in their vicinity. Increased congestion, both in the air and on the flying-fields, has necessitated the provision of auxiliary flying-fields at all Flying Training Schools. Where possible, nearby civil aerodromes have been used for this purpose, but six additional fields have been selected and their natural surfaces improved.

The maintenance of all R.N.Z.A.F. stations has been undertaken by the Public Works Department with civilian staff, in accordance with a comprehensive agreement between the two Departments. Maintenance covers not only attention to the flying-fields, but also all repair and maintenance work for buildings, structures, gardens, lawns, essential services, sanitation, &c., and resulted in an expenditure of £85,686 during the year.

As an indication of the magnitude of the works and buildings programme carried out during the year, the following is a return of the capital expenditure for each station :—

	£
Initial Training Wing, Levin	52,800
No. 1 Elementary Flying Training School, Taieri	50,100
No. 2 Elementary Flying Training School, New Plymouth	26,000
No. 3 Elementary Flying Training School, Harewood	117,500
No. 4 E.F.T.S. and Operational Station, Whenuapai	340,600
No. 1 Flying Training School, Wigram	126,000
No. 2 Flying Training School, Woodbourne	190,000
No. 3 Flying Training School, Ohakea	248,100
School of Technical Training and No. 2 Stores Depot, Rongotai	81,300
Aircraft and No. 1 Stores Depot, Hobsonville	86,000
No. 2 General Reconnaissance Squadron Station	72,100
No. 2 General Reconnaissance Squadron Detached Flight	30,000
No. 1 General Reconnaissance Squadron Detached Flight	4,100
No. 3 General Reconnaissance Squadron Station	32,000
	£1,456,600

Since the commencement of the expansion programme of 1937–38, the sum of £3,559,900 has been expended on works and buildings.

It is desired to place on record the part played in the Air Force expansion programme by the staff of the Public Works Department, whose co-operation and attention to the innumerable and urgent demands of the Service, under difficult conditions, has been exemplary. Every officer of the Public Works Department associated with this programme is entitled to a justifiable pride in these stations.

Aircraft and Equipment.

(*a*) *Equipment.*

The period under review has been one of continuous expansion, culminating in the establishment of all the units visualized under the Empire Air Training Scheme. In addition, three General Reconnaissance Squadrons have been established.

The equipment of twelve new units, including Flying Training Schools and Operational Squadrons, during a period when the supply position has become increasingly difficult, has thrown a heavy burden on the Equipment Branch of the Air Force. The supply position, however, is reasonably satisfactory. It must be pointed out that, without the direct representation of the Liaison Officers in the United Kingdom, Canada, and Australia, it would not have been possible under the existing conditions to have obtained much of the equipment received. There is no doubt that the execution of overseas orders can be satisfactorily effected only through the medium of adequate and efficient staff in these Liaison Offices.

During the past year the need for more complete co-ordination of supply throughout the Empire became imperative, with the result that an Eastern Supply Group was set up. Air Force equipment previously obtained from the United Kingdom is now being drawn to an increasing extent from other sources, primarily from Australia and North America. Nevertheless, the bulk of the aircraft and associated equipment used under the Empire Air Training Scheme is of British origin and has been provided largely at the expense of the United Kingdom.

(*b*) *Aircraft.*

During the year a large number of Airspeed Oxford twin-engined advanced trainer aircraft required for the equipment of the Flying Training Schools has been received. These aircraft are supplied at the expense of the United Kingdom Government.

Advice has been received that Harvard aircraft on order from America to replace the Vincents and Hinds now in use at Flying Training Schools will be received during April and May, 1941.

In spite of the difficulties with regard to the supply of raw materials and the training of personnel, the de Havilland Aircraft Co. of New Zealand, Ltd., has made satisfactory progress on the contract for 100 elementary training aircraft.

Orders have been placed for a large number of Hudson twin-engined bomber reconnaissance aircraft and some flying-boats required for the equipment of General Reconnaissance Squadrons.

(*c*) *Local Manufacture.*

The activities of the Department with regard to the local manufacture of aeronautical equipment are set out in the report of the Controller of Aeronautical Inspection. The importance of this work, combined with increasing difficulties and delays in the supply of technical equipment, make it necessary to utilize the existing engineering resources of the Dominion to the maximum degree, and with this object the establishment of an Aeronautical Production Branch was approved in January. The staffing of this branch has proved very difficult, owing to a lack of personnel in the Dominion with adequate technical qualifications and the impossibility of obtaining such personnel from overseas. The branch will be primarily concerned with the urgent production of aeronautical spares in small quantities to meet temporary shortages. Close touch is being maintained with the Munitions Controller.

(*d*) *Machine Accounting.*

The value of the Powers-Samas machine accounting equipment introduced prior to the war for stock control and provisioning is becoming still more evident. Certain increases in equipment have been made, and the work handled by the Central Accounting Section has been trebled. Over two million Powers cards dealing with stock records are now in circulation.

(*e*) *Mechanical Transport.*

An increase in the number of stations has necessitated a parallel increase in the amount of mechanical transport in use. A total of 248 vehicles is now in constant operation. These include 16 fire or crash tenders, 18 ambulances, 11 floodlights, and 44 tanker trailers.

(*f*) *Rations.*

During the year, classes of instruction for cooks and butchers were held, and a publication for the general guidance of ration staff and cooks was issued, with the result that menus have become more standardized and certain economies effected.

Satisfactory contracts have been let for the disposal of by-products, such as swill, fat, and bones.

The cost of rationing compares favourably with the previous year. This is illustrated by the following comparison between the average cost of rations last year and the average cost of rations for the month of March, 1941 :—

	Average Cost during 1940.		Cost during March, 1941.	
	s.	d.	s.	d.
Hobsonville	1	7·5	1	5·5
Ohakea	1	8	1	6
Blenheim	1	8	1	7
Wigram	1	6·5	1	11·5
Taieri	1	7	1	6
New Plymouth	1	9	1	8·5
Levin	1	8	1	6
Whenuapai	1	6	1	7
Rongotai	1	8	1	7·5
Harewood	1	6·5	1	8

(*g*) *Fire Services.*

The efficiency of the fire-fighting organization throughout the Air Force stations has progressively improved as a result of the establishment of a fire-fighting school at Ohakea and technical improvements to equipment.

Fire-fighting personnel are now put through a four weeks' course, which has considerably increased their technical efficiency and has ensured the adoption of standard methods throughout the Service. In addition, an R.N.Z.A.F. Fire Manual, dealing with all phases of fire-fighting and fire precautionary measures, and specially adapted to local conditions and equipment, has been issued.

As a result of experience gained both in the Dominion and overseas, the Marmon-Herrington six-wheeled, all-wheel-drive chassis has been imported from Canada and fitted in accordance with the latest practice in crash-tender construction. Certain A.R.P. equipment has been ordered, and instruction in the methods of dealing with incendiary bombs has been undertaken at stations.

(*h*) *Clothing.*

During the year the following main items of clothing have been delivered by New Zealand manufacturers to the R.N.Z.A.F. :—

Jackets	32,000 (approximately).
Trousers	32,000
Greatcoats	17,000
Caps, F.S.	33,000
Socks	48,000
Shirts	21,000
Boots	27,000
Flying-boots	8,000
Flying-gauntlets	8,000
Flying-helmets	8,000

As the productive capacity of mills and clothing-manufacturers has been strained under existing conditions, these deliveries have been maintained only by close and continuous liaison with the Factory Controller and the Defence Purchase Division.

(*i*) *General.*

The work of the Equipment Branch has been maintained at high pressure throughout the year, and, having regard to the difficulties experienced under war conditions, the equipment of the new units and the maintenance of the training programme without any serious breakdown reflects most creditably on the organization of the branch.

Maintenance.

The repair and maintenance organization has kept pace with the accelerated Empire Air Training programme, and by the end of January, 1941, the workshops at the Service Flying Training Schools and the Aircraft Depot had been expanded and equipped to deal with all major overhauls and repairs of airframes, engines, and technical equipment. At these stations more than 10 acres of hangar and workshop space is now devoted to inspections and overhauls of Service equipment.

During the past year the Air Force has flown nearly 200,000 hours, or a distance of more than 800 times round the world, and the maintenance of aircraft has involved about a million man-hours in the fitter and rigger trades alone.

While the capacity of the existing organization has proved sufficient for the time being, the increased aggregate number of flying hours involved in the Empire Air Training Scheme during the coming year, coupled with the greater number of overhauls arising as the aircraft and engines become older, as well as the expansion of the General Reconnaissance Squadrons, will all throw a heavy strain on this organization, and may necessitate both further expansion in the Service and the delegation of work to civil industry.

The centralized maintenance scheme mentioned in last year's report has been in full operation at Flying Training Schools during the past year, and has resulted in a considerable economy in the use of technical personnel, with greater efficiency. An average aircraft serviceability of 80 per cent. has been maintained throughout units, in spite of difficulties in obtaining spares from overseas. The policy adopted for the complete overhaul of Service type airframes is similar to that now in force in the Royal Air Force. This enables the utmost use to be made of technical equipment and facilities now available. Elementary training aircraft are overhauled for the Service by the de Havilland Aircraft Co., whose plant is now adequate to deal with the present rate of repairs and overhauls.

The equipment of the Service Flying Training Schools as completely self-contained units, as far as maintenance and overhaul of airframes and engines is concerned, has proved successful. During the last six months, for instance, forty-five Cheetah X engines, seventy Pegasus IIm3, and thirty-three Panther IIa engines have been overhauled in the engine-repair sections of the three schools. This has greatly relieved the depot at Hobsonville and has enabled this unit to concentrate on the erection of aircraft received from overseas.

General engineering sections have, to a great extent, helped to meet the problem of obtaining supplies of spares. The workshops at No. 1 F.T.S., Wigram, in particular, have been called upon to manufacture spares and equipment not otherwise available, such as test equipment for gyroscopic instruments, portable calibrators for altimeters and air-speed indicators, moulds and dies of various types, and numerous other small items. In addition, Wigram carries out repairs to compasses, parachutes, and airscrews for other units in the South Island, and in many respects has been functioning as a depot. As already stated, No. 1 Aircraft Depot, Hobsonville, has been mainly concerned with the erection of aircraft.

All instructions to units regarding technical matters are incorporated in the volume, "New Zealand Technical Instructions," which has been issued with the object of ensuring that all technical regulations are readily available. The closest contact is maintained with the technical commands of the R.A.F. and the R.A.A.F., and a regular exchange of technical information takes place.

The main obstacle experienced during the year, from the maintenance point of view, has been the growing difficulty of obtaining spares from abroad for both airframes and engines. To meet this problem it has become more and more necessary to fall back on local manufacture. Station workshops have proved their ability to handle the manufacture and repair of the most complicated components, and, where necessary, engineer officers are granted authority to supervise the manufacture of parts made by local firms, thus relieving the heavily taxed facilities in station workshops. With the formation of the Production Branch, it is hoped that the possibilities in the Dominion for this type of work will be exploited to the full.

Every endeavour has been made to keep maintenance at the highest possible level, and in spite of difficulties due to lack of spares, &c., a very high standard has been achieved. This is evidenced by the fact that the flying-training programme is up to schedule.

R.N.Z.A.F. Band.

The Band of the Royal New Zealand Air Force has played an important part in the air-crew-recruiting campaigns. It has also been of material assistance to Patriotic Funds. On two tours of the Dominion the band raised approximately £30,000 for Patriotic Funds. Throughout its tours the Band has been responsible for much favourable publicity for the Air Force.

R.N.Z.A.F. Activities filmed.

During the year the R.N.Z.A.F. co-operated with the Government Film Studios at the request of the War Publicity Committee in producing a special film depicting the various activities of the R.N.Z.A.F. This film aroused great interest throughout the Dominion, and was of material assistance in recruiting and in general publicity. Facilities were also provided for newsreel and documentary film production.

Conclusion.

The additional expansion programmes which have been undertaken during the year, combined with the difficulties of supply, have thrown a heavy burden on all sections of the Service and the civilian staff. Nevertheless, all undertakings have been carried out according to schedule, and an extremely high standard of efficiency has been maintained throughout. Great credit for the manner in which these responsibilities have been met is due to the ability, initiative, and energy of all concerned.

The success of the air training programme in New Zealand is demonstrated by the manner in which New Zealand airmen have acquitted themselves in operations overseas. It is apparent that New-Zealanders have a natural aptitude for flying, and their training here has enabled them to meet the high standards of the Royal Air Force.

I have, &c.

H. W. L. Saunders, Air Commodore,
Chief of the Air Staff.

REPORT OF THE ACTING CONTROLLER OF CIVIL AVIATION FOR THE YEAR ENDED 31st MARCH, 1941.

The Hon. the Minister of Defence.

Although activities in civil aviation have been further reduced since the presentation of my last report, the fullest use is being made of the equipment still available for civil purposes. The scheduled aircraft services, although reduced to the main trunk route (Auckland Wellington), the Cook Strait Service, and the Nelson West Coast and South Westland services, are operating to the maximum degree with the material and personnel available. Three clubs and two companies are providing flying facilities for private pilots who were formerly members of the larger aero club federations, but unfortunately only two clubs are now able to provide training facilities.

Notwithstanding the war, the plans for the linking of the United States of America and Australia with the Dominion were brought to fruition, with the result that Tasman Empire Airways, Ltd., commenced a regular scheduled service on 30th April, 1940, whilst the first commercial flight of Pan-American Airways carrying passengers terminated at Auckland on 11th September, 1940. The public evinced a rapid appreciation of the saving of time effected by the use of air services, and the result has been a steady increase on both these services in passengers, freight, and mail traffic.

The inauguration of overseas services has necessitated the institution of special meteorological services and radio aids essential for the safe navigation of aircraft operating on such long routes. The provision of these facilities has presented many problems which, however, have been overcome by the willing co-operation of the Departments concerned and of the Australian authorities. At the same time, the Aeradio and Direction-finding Organizations for the internal air services have been improved, and during the forthcoming year it is hoped, with the co-operation of the Royal New Zealand Air Force, to complete the calibration of all D/F stations.

Licenses and Certificates.

The following licenses and certificates provided for in the Air Navigation Regulations 1933 are issued by the Controller of Civil Aviation:

1. *For Personnel.*

Pilots' Class "A" (private) Licenses.
Pilots' Class "B" (commercial) Licenses.
Navigators' Licenses, first and second class.
Ground Engineers' Licenses, in categories A, Ae, B, C, Ce, D, and X.
Instructors' Authorities.

2. *For Equipment.*

Aircraft: Certificates of Registration and Certificates of Airworthiness.
Aerodrome: Public Licenses and Temporary Licenses.

As anticipated, the numbers of licenses and certificates issued during the year are generally considerably below the corresponding totals for the pre-war years. The following table indicates the figures for the current year and quotes, for comparative purposes, the figures for the years 1938–39 and 1939–40. The total licenses and certificates current at the end of each year are also given:—

	Issued, 1940–41.	Current on 31st March, 1941.	Issued, 1939–40.	Current on 31st March, 1940.	Issued, 1938–39.	Current on 31st March, 1939.
Pilots' "A" Licenses ..	30	115	86	447	205	588
Pilots' "B" Licenses ..	4	24	20	26	26	86
Navigators' Licenses ..	6	11	9	9	2	4
Ground Engineers' Licenses ..	8	46	11	64	16	76
Certificates of Airworthiness ..	4	27	5	25	9	78
Certificates of Registration ..	4	39	5	39	22	107
Aerodrome licenses						
Temporary	5	3	1	3	5	4
Public	..	26	4	39	12	55

Towards the end of 1939 it was decided to defer the holding of examinations for "B" Pilots', Navigators', and Ground Engineers' Licenses during the war period, but as certain civil aviation activities continued to operate it was necessary to reconsider this decision, with the result that examinations for Ground Engineers' were resumed as from 1st January, 1941.

Flying Training.

During the year the following civil organization were providing flying-training facilities:—

Rotorua and Bay of Plenty Aero Club, using one D.H. 60, one Avro Avian, and one Piper Cub;
New Plymouth Aero Club, using one Piper Cub, one Porterfield, and one Rearwin;
Associated Air Pilots, Ltd., using one Piper Cub; and
Air Work (N.Z.), Ltd., using one Moth Minor.

On 31st March, 1941, these organizations had sixty pupils under training for Pilots' "A" Licenses, while thirty-three trainees presented themselves for the license practical and oral tests.

The Te Kuiti Aero Club operated one Rearwin aircraft, but did not provide training facilities.

During the year the three clubs and two companies referred to flew a total of 2,419 hours, of which 510 hours represented dual instruction to trainees.

SECTION II.—COMMERCIAL AIRCRAFT SERVICES.

Of the nine scheduled services which were in operation in September, 1939, only six continued to operate, and these on a reduced scale. As a result, the total route mileage flown decreased from 2,015 to 1,273. Notwithstanding war conditions, the maximum frequency possible with the material available has been maintained. The following services are now in operation :—

Union Airways of New Zealand, Ltd.—

(*a*) Auckland–Wellington (via New Plymouth and Palmerston North).

(*b*) Wellington–Dunedin (via Christchurch).

(*c*) Wellington–Blenheim–Nelson.

Air Travel (N.Z.), Ltd.—

(*d*) Nelson–Greymouth.

(*e*) Inchbonnie–Weheka (via Hokitika and Franz Josef).

(*f*) Hokitika–Jackson's Bay (via Haast, Okuru, and Bruce Bay).

Of these services, (*c*) and (*d*) were operated by the companies indicated on behalf of Cook Strait Airways, Ltd., who ceased operations for the duration of the war in November, 1939, owing to its equipment being requisitioned by the Air Force.

The total mileage flown was 645,702, as compared with 1,344,558 for the year ended 31st March, 1940. The passengers carried were 37,023, compared with 51,802 for the corresponding period last year. The total number of aircraft in use on scheduled services was nine, comprising four Lockheed Electras used by Union Airways of New Zealand, Ltd., and three Fox Moths (D.H. 83) and two Dragonflies (D.H 90A) used by Air Travel (N.Z.), Ltd.

International Services.

1. *Tasman Empire Airways, Ltd.*

The final stage of the Empire air route was completed on 30th April, 1940, when Tasman Empire Airways commenced regular services between Auckland and Sydney. Since the inception of the company's operations, commendable regularity has been maintained. At the commencement of the services, one return trip weekly was flown between Auckland and Sydney, but on the inauguration of Pan-American Airways Service an additional return trip was introduced on alternate weeks to link up with the American service. The company at present employs two Short S.30 flying-boats on the 1,340 mile route.

2. *Pan-American Airways, Ltd.*

Pan-American Airways, Ltd., a company registered in the United States of America, commenced scheduled services in September, 1940, on the basis of one trip fortnightly in each direction between San Francisco and Auckland, the first south-bound trip terminating at Auckland on the 11th of the month. The service is maintained at present with three Boeing flying-boats, and intermediate calls are made at Honolulu, Canton Island, and Noumea. The length of the route is 7,928 miles.

Non-scheduled Commercial Flying.

In addition to the three companies operating scheduled services, the following organizations catered for commercial work of a general nature :—

Waikato Aviation Co., Ltd., Rotorua, using one Desoutter and one Avro Avian.

N.Z. Aerial Mapping, Ltd., Hastings, using one Monospar S.T. 25.

Southland Airways, Ltd., Invercargill, using one Puss Moth (D.H. 80A).

Queenstown–Mount Cook Airways, Ltd., Timaru, using one Waco Q.D.C.

The last-mentioned company ceased active operations on 16th April, 1940, whilst Southland Airways, Ltd., disposed of its equipment on 28th June, 1940. During the year ended 31st March, 1941, 2,132 hours were flown on these services and the passengers carried totalled 5,150. The corresponding figures for the previous year were 2,571 hours and 8,170 passengers respectively.

Air Photography.

N.Z. Aerial Mapping, Ltd., using a Monospar S.T. 25 aircraft, continued its aerial survey and photographic work, most of which is for municipal bodies and Government Departments. The total area photographed amounted to 2,209 square miles, the flying-time involved being approximately 123 hours.

Aircraft.

The total number of aircraft on the civil register remains the same as last year—viz., thirty-nine. On 31st March, 1941, twenty-seven of the aircraft registered had current Certificates of Airworthiness, the remaining twelve machines comprising nine stored or undergoing overhaul, and three Pou-de-Ciels ("Flying Fleas") which, being experimental aircraft, are not granted Certificates of Air-worthiness.

SECTION III.—GROUND ORGANIZATION.

1. Meteorological Services.

Details of the organization provided for aviation by the Meteorological Office appear in the report of the Director of Meteorological Services.

2. Aerodromes and Landing-grounds.

During the past year the construction and maintenance of civil aerodromes was largely confined to the extension and improvement of those civil aerodromes and landing-grounds which might be used by the Air Force for training operations. Although much of the work done was primarily of defence importance, the benefit of all these improvements will be available to civil aviation after the war. An extensive programme of turf improvement was commenced and is in progress on all important aerodromes. The effect of the manuring and seeding work is already noticeable, and will enable flying-fields to stand up to a much greater intensity of traffic than would otherwise have been the case. It will also appreciably reduce maintenance costs.

The extension of the existing aerodrome at Harewood, and the levelling and regrassing of the existing flying-fields at Waitaki and Ashburton, were completed. New emergency-landing grounds at Tophouse and Clarence River were completed, and road-deviation work preparatory to the construction of a new ground at Karamea was put in hand. Extensions to the aerodromes at Taieri, Rotorua, Waipapakauri, Haast, and Westport (Carter's Beach) were also commenced during the year. Construction work on the new municipal aerodromes at Invercargill was continued, and a large area of the field is available for use.

The design of an emergency-landing ground at Raglan, and the regrading and extension of the aerodrome at Rukuhia (Waikato), are in hand. Construction work should commence at an early date. Work on the proposed aerodrome at Dargaville and Wairoa has been deferred for the duration of the war.

At the 31st March, 1941, the number of aerodromes and landing-grounds in New Zealand was as follows:—

Aerodromes and landing-grounds—	
(1) Constructed and usable	58
(2) Usable, extensions proceeding	6
(3) Portion usable, construction proceeding	2
(4) Under construction (not usable)	..
	66
Emergency-landing Grounds—	
(1) Constructed and in use	11
(2) Under construction (not usable)	1
	12

Financial provision was made from the War Expenses Account for £316,658 to cover expenditure on civil aerodromes and ancillary facilities during the year. The amount was allocated as follows:—

	£
Civil aerodromes (survey, construction, and maintenance)	178,727
Aeradio facilities serving civil aerodromes and internal and overseas air routes	51,739
Overseas flying-boat service facilities	17,139
Aviation facilities overseas	69,053
	£316,658

3. Radio Services.

The installation of additional navigational aids at aeradio stations has proceeded steadily, and during the year direction-finders have been provided at the New Plymouth, Blenheim, Hokitika, Harewood, and Taieri aeradio stations. Action has also been taken to allow for the remote control of transmission from separately-situated receiving-stations at these places. The New Plymouth direction-finding station is now in operation, and, in addition to its use for the internal services, it is utilized for taking bearings on trans-Tasman flying-boats when approaching the New Zealand coast.

The aeradio stations, where required, are co-operating in the operations of the Royal New Zealand Air Force.

Consequent upon the curtailment of commercial air services as a result of the war, the aeradio stations at Gisborne, Greymouth, Tauranga, and Napier have been closed.

The aeradio station at Musick Point is now in full operation. This station maintains regular point-to-point services with the air terminal at Rose Bay, Sydney, and with flying-boats crossing the Tasman. In addition, point-to-point services are conducted on behalf of Pan-American Airways with Noumea and Canton Island, and with aircraft on the South Pacific section of the company's route between Honolulu and Auckland.

The amount of traffic handled by the aeradio stations in respect of the operating companies' booking messages, arrival and departure reports, weather reports, and direction-finding messages for the twelve months ended 31st March, 1941, is given hereunder:—

Station.	Number of Messages.		Station.	Number of Messages.	
	Sent.	Received.		Sent.	Received.
Mangere	4,623	3,976	Hokitika	3,126	6,601
New Plymouth	7,363	8,397	Jackson's Bay	2,618	1,257
Palmerston North	3,675	8,912	Christchurch	5,647	6,049
Wellington	19,401	18,668	Taieri	6,144	5,168
Blenheim	6,072	8,996			
Nelson	7,855	12,987	Totals	69,949	84,139
Westport	3,157	2,740			
Greymouth	268	388	Grand total ..	154,088	

I have, &c.,
J. M. Buckeridge,
Acting Controller of Civil Aviation.

REPORT OF THE CONTROLLER OF AERONAUTICAL INSPECTION FOR THE YEAR ENDED 31st MARCH, 1941.

The Hon. the Minister of Defence.

I have the honour to submit the following report on the work of the Aeronautical Inspection Division for the year ended 31st March, 1941.

AERONAUTICAL INSPECTION AND AIRCRAFT ACCIDENTS.

(i) Staff and Organization.

During the year under review the appointment of an Assistant Chief Inspector of Aircraft was made. Arrangements have been concluded for the appointment of an Air-worthiness Officer, and he is expected to take up his duties with the Department within the next few weeks.

Two Inspection Officers, for test-house duties, have been made available on loan by the British Air Ministry. They are expected to arrive in the Dominion in June this year.

The operation of Tasman Empire Airways, and the increase in the manufacture of Aeronautical material in the Auckland District, have made it necessary to establish an A.I.D. station in Auckland.

(ii) Local Manufacture.

The deterioration of the position as regards the supply of aeronautical equipment for the R.N.Z.A.F. has widened the range of parts which have had to be produced locally. Some difficulty has been experienced in obtaining certain classes of raw material, and it is unlikely that the position will improve to such an extent as to obviate the use of substitute materials and the resultant modification of design.

The de Havilland Aircraft Co. of New Zealand, Ltd., commenced production of training-type aircraft early in the year, and by 31st March, 1941, has produced, with varying stages of complete manufacture, 50 per cent. of the aircraft called for under their current contract with the Government. In addition, the company has carried out the assembly of a large number of training-type aircraft received from overseas, together with conversion work on other types of aircraft, and is concurrently engaged upon the complete overhaul and major repair work on both airframes and engines for the R.N.Z.A.F. This company has also experienced difficulty in obtaining supplies of both finished parts and raw material from overseas, and it has become necessary for the Department to undertake provisioning action to ensure continuity of output.

The manufacture of wooden airscrews for three types of aircraft was commenced during the year, and two local firms are now engaged in the production of this particular component.

The local manufacture of aircraft finishes, referred to in this Division's previous report, has now been established, and all requirements for the R.N.Z.A.F. and the local aircraft factory are being met from local sources.

During the year, local firms have successfully carried out the manufacture of a considerable number of targets used by the Service in aerial gunnery training, and also the aircraft winches required for handling these targets.

The manufacture of certain classes of aircraft accumulators is now being carried out within the Dominion.

A variety of items of aeronautical equipment, such as blind-flying hoods, electrical fittings, rubber parts, piston-rings, and other engine and airframe details, has been manufactured in the Dominion during the past year.

(iii) Field Inspection.

The reduction in civil aviation activities as a result of the war has brought about a reduction in the number of field inspections of civil aircraft. During the year ending 31st March, 292 field inspections covering aircraft, firms operating under the Department's "approval," local production, and the supervision of licensed ground engineers were carried out by the inspection staff of the Division.

(iv) A.I.D. Test-house.

Tests carried out by the Division are summarized below:—

Aircraft instruments tested	242
Material tests	123
Tests on welded specimens	51

The major portion of the test equipment referred to in this Division's previous report has now come to hand, and it is anticipated that within three months this equipment will be in operation in the new test-house at Hobsonville. The equipment of the original test-house at Headquarters will be transferred to the new test-house, and all testing will be carried out at Hobsonville in the future.

(v) Airworthiness and Drawing Office.

The work of this section of the Division in respect of civil aviation is summarized below:—

New drawings prepared	42
Prints prepared	46
Sets of drawings checked	5
Prints issued to operators	199

In connection with local production, the section prepared drawings, and engaged in original design of items of ground equipment for the Service.

(vi) Accidents to Civil Aircraft.

There were four notifiable accidents or forced landings of civil aircraft in the year ended 31st March, 1941. No injury to an occupant of an aircraft occurred during this period.

An analysis of accidents is as follows:—

Class.	Injury to Persons.				Damage to Aircraft.				Cause.			
	Number of Accidents.	Fatal.	Serious.	Minor.	Destroyed.	Serious but repairable.	Minor.	Nil.	Weather.	Engine-failure.	Error of Judgment.	Miscellaneous.
1. Regular air services	2	..	..	..	..	..	1	1	..	1	..	1
2. Other flying for hire	1	..	..	..	..	..	..	1	..	1	1	..
3. Private	1	..	..	..	..	..	1	..	..	..	1	..
Total	4	..	..	..	..	..	2	2	..	2	2	1

(vii) Causes of Accidents.

An aircraft operating on a regular air service was charged during take-off by a cattle beast. Minor damage only was caused to the wing structure of the machine.

A twin-engined aircraft operating on a regular air service was forced to land on a registered aerodrome owing to the failure in flight of one engine. No damage to the aircraft resulted from this landing.

The pilot of a private machine misjudged the direction of the wind while landing on a secondary aerodrome, which caused him to run into a haystack on the edge of the landing area. Minor damage only resulted from this error of judgment.

Due to engine-failure while in flight, a private machine was forced to land on a registered aerodrome. No damage was caused to the aircraft as a result of this landing.

I have, &c.,

R. C. Kean,

Controller of Aeronautical Inspection.

REPORT OF THE DIRECTOR OF THE METEOROLOGICAL OFFICE FOR THE YEAR ENDED 31st MARCH, 1941.

The Hon. the Minister of Defence.

I have the honour to submit the following report on the work of the Meteorological Office for the year ended 31st March, 1941.

General.

The slight reduction in the work of the Meteorological Office resulting from the curtailment in civil aviation has been more than offset by increased commitments to meet the demands of the defence Services, and the training of newly recruited staff is still a prominent activity. In addition, to provide the necessary training in the preparation of ballistic wind data, a three months' course of instruction covering the observation and computation involved in pilot balloon ascents was given to six specially selected non-commissioned officers from Territorial artillery units during 1940, and a similar course, attended by eleven Territorials, was in progress at the close of the year.

Climatology.

There was a steady demand for reliable information concerning a wide range of subjects connected with the climatology of New Zealand and its dependencies, and in nearly every case the Office was able to supply the data desired. The majority of requests for detailed statistical information originated in other Government Departments, but numerous inquiries were sent in from varied business, professional, and educational sources. Many minor questions from private individuals were received and answered.

The year closed with sixty-eight climatological stations in New Zealand, together with eight in its dependencies, furnishing monthly returns giving daily values of maximum, minimum, and 9 a.m. temperatures, humidity, and rainfall, while many in addition show values of sunshine, barometric pressure, soil temperature, and daily run of wind. The newly established stations include those at Karamu and Wairoa, originated for the facial-eczema investigation.

In addition, there is a rainfall organization, consisting of a network of approximately 500 stations, in which very few changes have been made during the year. Many of these voluntary observers supply with their monthly return a detailed weather diary from which much useful information is extracted.

Further observational material is obtained through the Aerodromes Branch of the Public Works Department, which gathers particulars of wind and weather, especially relating to cloudiness and visibility, from the various aerodrome sites under its control. This office scrutinizes the returns and provides abstracts of the weather conditions.

At Wellington, hourly values are tabulated of pressure, air temperature, relative humidity, wind force and direction, rainfall, sunshine, cloud amount, and visibility. Similar tabulations are prepared of several of the elements for Auckland, Ohakea, Wigram, and Alexandra.

Forecasting.

On 22nd December, 1940, censorship restrictions were applied to all weather reports or forecasts by radio, whether broadcasts in plain language or sent in International Code. This involved the suspension of the broadcasting of the general and district forecasts, the farmers' forecast, and the forecasts and reports for aviation and shipping. The disadvantages resulting from the elimination of the afternoon farmers' forecast from the programmes of the main national stations was partly relieved by providing for publication, in addition to the district forecast, a "further outlook" (where desired) by the newspapers concerned. The "further outlook" gives an indication of the general conditions to be expected on the day or two succeeding the period covered by the forecast. While it must of necessity be less accurate than the twenty-four-hour forecast, it is useful for the farmer, especially in planning such operations as haymaking, shearing, fruit-spraying, &c.

Apart from the broadcasts, all the other forecasts for the use of the general public and civil aviation services have been maintained, and there has been a steady increase in the number of requests for individual forecasts for specific purposes relating to aerial mapping, engineering, farming, &c. A number of new routine forecasts for defence Services have also been introduced. The Meteorological Office at Auckland has continued to provide special forecasts required for the trans-ocean flying services, and the Wellington Office has provided those used by the internal commercial air services.

Six synoptic charts are prepared each day. These are based on observations made at 6 a.m., 9 a.m., noon, 3 p.m., 6 p.m., and midnight at stations in New Zealand, and include also information from Australia and the Pacific islands. Two new weather-reporting stations in New Zealand were established during the year, and the frequency of reports from certain existing stations was increased.

Air Force Stations.

The Meteorological Officers attached to the R.N.Z.A.F. stations at Wigram, Ohakea, and Blenheim have continued to give regular courses of lectures to pilots in training. The syllabus follows closely a corresponding course given to pupil pilots in England.

In addition, forecasts are supplied for all local flying operations and cross-country flights. To reduce unnecessary duplication of work, weather charts for certain of the synoptic hours only are plotted on the Air Force stations, and developments in the situation during the remaining period, as revealed by the charts analysed in Wellington, are communicated to the stations by means of regular conference telephone calls. Full synoptic reports, including pilot balloon observations, are made at each of these stations.

To meet the requirements of the R.N.Z.A.F. stations at which there is no Meteorological Officer, regular forecasts and route reports are supplied by the Auckland Meteorological Office to Hobsonville and Whenuapai, and by the Wellington Office to New Plymouth, Nelson, and Taieri. The form in which the information is issued corresponds with that employed in Great Britain.

Apia Observatory.

The normal programme of geophysical observations in terrestrial magnetism, atmospheric electricity, and seismology has been continued. Tide records have been obtained as usual, and the time service for Apia has been maintained. The daily meteorological routine has been extended to include seven sets of surface observations and two pilot balloon ascents. The extension of aviation in the south-west Pacific area has given an added importance to the meteorological work at Apia Observatory, and improvements have been made in map analysis and forecasting. During July and August, 1940, the Acting-Director of the Observatory spent six weeks studying developments in the New Zealand Meteorological Office.

Fijian Meteorological Service.

At the request of the British Government, it was agreed that the New Zealand Meteorological Office should assume technical control of the meteorological service in Suva during the war period. Mr. W. R. Dyer, of the staff of the Auckland Meteorological Office, was seconded to the Government of Fiji as Acting-Director of the Suva Meteorological Office in January, 1941. In February, Mr. J. H. Croxton was seconded as meteorological assistant. Various improvements have been made in the island weather-reporting network based on Suva, and regular pilot balloon observations are now being made in Fiji.

Publications.

Reprints of two articles prepared in the Wellington Meteorological Office appeared in the *Journal of Science and Technology*, and were issued separately as "Meteorological Notes." They were: No. 23, "Atmospheric Pressure Variation at Wellington," by C. J. Seelye: and No. 24, "Variability of Annual Rainfall in New Zealand," by C. J. Seelye.

During 1940 the volume of "Meteorological Observations for 1939" was published, and the regular publication each month of climatological and rainfall data in the Government *Gazette* was maintained.

To economize in paper, a change was introduced at the beginning of 1941 in the method of publication of rainfall data. The detailed figures for the five hundred or more rainfall stations have now been eliminated from the *Gazette*, and instead it is proposed to issue at the end of each year a special publication giving the monthly and annual rainfall figures. This method involves a delay in making available the monthly figures, but it is estimated that the change will effect a total annual saving in paper equivalent to some 70,000 pages of the *Gazette*. Full data for approximately sixty-five climatological stations, together with notes on the weather for the month, are still being published in the *Gazette*.

Staff.

To meet additional demands during the year, the numerical strength of the staff has been increased by three professional officers, who received promotion from the Clerical Division on completion of their B.Sc. degree, and four observers or office-assistants. In the case of the majority of those who have volunteered for military service or who have been drawn in the various ballots, calling up has been postponed *sine die* on the grounds that the men are performing work essential for the country's defence organization and for which they have received specialized training. All vacancies and new appointments have been filled either by men who are ineligible for overseas service or by girls.

The rapidity with which the demands on the forecasting service have grown in recent years has made it impossible to give the newly-appointed professional officers, however enthusiastic and capable they may be, really adequate training before they have had to take their places in the aviation-forecasting roster. Some time, therefore, must still elapse before it can be considered that full efficiency has been reached. Similar difficulties are being experienced in meteorological organizations the world over, and the extensive recruitment and training of new staff during the last few years has placed a considerable strain on the older and more experienced members.

The cordial and loyal co-operation of all members of the staff is acknowledged with pleasure.

I have, &c.,
M. A. F. Barnett,
Director, Meteorological Office.

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