1940.

NEW ZEALAND.

AIR DEPARTMENT

(REPORT ON THE), FOR THE YEAR 1939-40.

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, 1940.

MR. SPEAKER,—

I have the honour to present to Parliament the report of the Air Department for the year ended the 31st March, 1940.

To all concerned with civil and Service aviation I desire to express my appreciation of the energy and resource that have been displayed in what has been a particularly strenuous year.

REPORT BY THE CHIEF OF THE AIR STAFF FOR THE YEAR ENDED 31st MARCH, 1940.

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 ending 31st March, 1940.

EXPANSION PROGRAMME.

During April, 1939, a further expansion scheme was recommended by the Air Department with the object of broadening the basis on which to expand the training organization in the event of war. This scheme, which was supported by the British Air Mission and the Pacific Defence Conference, provided for—

(*a*) The conversion of the Blenheim Air Force Station to a Flying Training School with an output of 140 pilots per annum:
(*b*) An increase in the Flying Training School at Wigram from an output of 80 to 140 pilots per annum:
(*c*) The purchase of additional aircraft and equipment necessary to maintain fully the training operations at these two schools.

PROGRESS PRIOR TO OUTBREAK OF WAR.

Up to the outbreak of war considerable progress had been made with the whole expansion programme, and on the 4th September, 1939, the position was as follows:—

(*a*) Territorial Squadrons had been established at Auckland, Wellington, and Christchurch:
(*b*) An aero club organization with approximately sixty elementary training aircraft of the Tiger Moth type existed:
(*c*) The peace building programme for No. 1 Flying Training School, Wigram, was nearing completion, and this unit was already dealing with an increased intake of pupils:
(*d*) The peace building programme for No. 2 Flying Training School, Blenheim, was approximately half-completed:
(*e*) The peace building programme for the operational station at Ohakea was nearing completion:
(*f*) The landing-ground at Whenuapai had been prepared, and the peace building programme had made satisfactory progress:
(*g*) Expansion up to the scale laid down in peace for the Royal New Zealand Air Force Depot, Hobsonville, was making satisfactory progress:
(*h*) The peace building programme for the Territorial Flight at Dunedin had just commenced:
(*i*) An adequate stock of bombs for twelve months' operations at maximum scale visualized was available in the Dominion:
(*j*) The Railway Workshop scheme for training Flight Mechanics and Flight Riggers was making satisfactory progress. Buildings had been completed at the Railway Workshops at the Hutt, and the first course was running. The buildings at the Railway Workshops at Auckland, Christchurch, and Dunedin were nearing completion.

Personnel.

(a) *Regular and Territorial Personnel.*

The scheme for the release by the Air Ministry of officers of the Royal Air Force for service in regular units in the Dominion was continued during the year, and twelve specialist officers of the Royal Air Force arrived in the Dominion between the outbreak of war and 31st March, 1940. In addition, a number of officers of the Royal Air Force were released for service with the New Zealand Flights which were due to form during 1939–40 preparatory to flying Wellington aircraft to the Dominion. On the outbreak of war, however, these officers and the Wellington aircraft (which had already been delivered to the New Zealand Flight in the United Kingdom) were placed at the disposal of the Royal Air Force. In New Zealand satisfactory progress was made in the enlistment of personnel for the Regular Air Force and for the Territorial Air Force. The position on the 31st March, 1939, and on the outbreak of war was as follows:—

	31st March, 1939.	4th September, 1939.
(1) Regular Air Force—		
Officers	57	91
Airmen	622	665
(2) Territorial Air Force—		
Officers	79	79
Airmen	265	325

(b) *Air Force Reserves.*

Expansion of the Reserve of Pilots under the agreement with the Royal New Zealand Aero Club and its constituent clubs was continued up till the outbreak of war, and on the 4th September, 1939, the strength of the Civil Reserve of Pilots was 349. Of this number, 239 had been called up for training by 31st March, 1940, and 33 were discharged or transferred to the Army.

The scheme introduced with the co-operation of the Railway Department to provide the Royal New Zealand Air Force with a reserve of trained mechanics was commenced early in July, 1939, at the Hutt Workshops. Thirty apprentices in their last year of training were enrolled for a six-months' course in training on air frames and aero engines. On the outbreak of war this scheme had to be cancelled, as the Railway Workshops were required to train war entrants for maintenance duties in the Royal New Zealand Air Force. Those already enrolled under the Railway Workshops Training Scheme were offered enlistment in the Air Force.

Approximately six thousand applications for registration under the Civil Reserve of the Royal New Zealand Air Force were received early in the year, and the greater proportion of the applicants were interviewed and assessed. This register of skilled tradesmen proved of considerable assistance when selecting applicants for enlistment.

Up to the outbreak of war 81 New-Zealand-trained pilots had been sent to the United Kingdom for short-service commissions in the Royal Air Force. In addition, 267 candidates were sent to the United Kingdom direct, where they were trained in Royal Air Force schools. Between the 4th September, 1939, and the 31st March, 1940, a further 42 fully-trained pilots and 32 fully-trained air gunners left New Zealand for service in the Royal Air Force.

Transfer from Peace to War Footing.

During the precautionary period steps were taken to facilitate the transfer from a peace to a war footing. Immediately war was declared the Air Force was mobilized—Territorial and Air Force Reserves were called up, and, in addition, a number of personnel of the Civil Reserve who by virtue of their civil trade were suitable for immediate employment in the Air Force were called up and posted to Service units.

The Auckland, Wellington, and Christchurch Territorial Squadrons were mobilized and brought up to their full war strength within seven days, and these units carried out an intensive training programme to fit them for their operational role. Plans had been prepared for providing protection to shipping in the focal areas and the approaches to the more important centres. These plans are kept under review and are brought up to date in the light of changing circumstances.

Requisitioning of Civil Aircraft.

On the outbreak of war all civil aircraft from the aero clubs were taken over for use in the Elementary Flying Training Schools. In addition, three D.H. 86's, five D.H. 89's, and two D.H. 84's were taken over from commercial transport firms. These aircraft have been modified for military purposes and are being employed for training until such time as they may be required for operational duties.

War Training Organization.

As a result of consultation carried out before the war with His Majesty's Government in the United Kingdom, the New Zealand Government had agreed in the event of war to train 1,000 pilots per annum for the Royal Air Force. In May, 1939, this was modified at the request of the United Kingdom Government to 650 pilots and a total of 650 air gunners and observers per annum

On the outbreak of war immediate steps were taken to implement the organization required for this purpose. A central recruiting organization was set up at Air Headquarters, the Flying Training Organization was expanded to the maximum consistent with the aircraft available in the country, and the necessary Technical Training Schools were established at Hobsonville, Wigram, and the four Railway Workshop centres.

Empire Air Training Scheme.

On 26th September, 1939, His Majesty's Government in the United Kingdom put forward proposals for an Empire Air Training Scheme in which Canada, Australia, and New Zealand were asked to co-operate in the training of personnel for pilot and air crew duties in the Royal Air Force. A conference was held in Ottawa to discuss details, and as a result the original War Training Organization required considerable modification.

Under the Empire Air Training Scheme the New Zealand Government agreed to set up an organization which, when fully developed in January, 1941, will be capable of training the following personnel each year :—

	Per Annum.
(*a*) Fully-trained pilots	880
(*b*) Pilots trained to the elementary standard (advanced training to be carried out in Canada)	520
(*c*) Observers (initial training only ; further training to be carried out in Canada)	546
(*d*) Air gunners (initial training only ; further training to be carried out in Canada)	936

In addition to the provision of pilots and air crews the Government has agreed to train maintenance personnel for the Royal Air Force as soon as the immediate requirements of New Zealand training organization have been met. Under this scheme approximately 800 trained mechanics will be sent overseas each year commencing early in 1941.

Training Organization required under Empire Air Training Scheme.

To meet the commitments outlined above an organization comprising the following units is required :—

(*a*) One Initial Training School with a pupil strength of 250 under training :
(*b*) One Recruit Training Depot with a pupil strength of 200 under training :
(*c*) One Flying Instructors' School with a pupil strength of ten under training :
(*d*) Four Elementary Flying Training Schools with a total pupil strength of 324 under training :
(*e*) Three Service Flying Training Schools with a total pupil strength of 324 under training :
(*f*) A Technical Training Organization with an annual output of approximately 800 airmen.

Progress to Date under Expansion Scheme.

The present position regarding the Expansion Scheme is as follows :—

(*a*) *Recruiting Organization.*—A central organization has been set up to deal with recruiting of personnel for technical training and for the selection of candidates for training as pilots, air gunners, and air observers. The response has been magnificent, and up to the 31st March, 1940, a total of 4,644 applications were received for crew training and 4,436 for maintenance training.

(*b*) *Flying Training Organization :—*

(i) The Initial Training School was formed at Rongotai and later moved to Weraroa. This school provides personnel enlisted for training as pilots, observers, and air gunners, with a thorough grounding in discipline and elementary instruction in ground subjects.

(ii) A Flying Instructors' School was formed at Mangere to train pilots for employment as Flying Instructors. This school moved to Hobsonville on the 15th March, 1940.

(iii) No. 1 Elementary Flying Training School was formed at Taieri on the 16th October, 1939, and is now operating at full strength.

(iv) No. 2 Elementary Flying Training School, was formed at New Plymouth on the 14th November, 1939, and is now operating at full strength.

(v) No. 1 Flying Training School, Wigram, has been expanded considerably and will be operating at full strength by September, 1940.

(vi) No. 2 Flying Training School was formed at Blenheim on the 11th December, 1939, at approximately half war strength and will be operating at full strength by September, 1940.

(vii) An Observers' School was formed at Ohakea on the 14th November, 1939, and is now operating at full strength. Under the Empire Air Training Scheme observers and air gunners will complete their training in Canada, and therefore the Observers' School will become No. 3 Flying Training School in October, 1940. As a Flying Training School it will be operating at full strength by December, 1940.

(viii) Nos. 3 and 4 Elementary Flying Training Schools will form in August, 1940, and January, 1941, respectively.

(c) *Technical Training.*—The following Technical Training Schools were set up on the outbreak of war to provide maintenance and other specialist personnel to meet war requirements :—

(i) A Recruit Training Depot was formed at Ohakea on the 20th September, 1939, to provide all recruits enlisted for technical training with a thorough grounding in drill and discipline. This unit moved to Weraroa on the 18th November, 1939, and will move to Harewood on the 15th July, 1940.

(ii) No. 1 Technical Training School was formed at Hobsonville to train Fitters II "E" and "A." Output : Forty-eight every eight weeks.

(iii) Technical Training Centres based on the Railway Workshops have been formed at the Hutt, Otahuhu, Addington, and Hillside for the training of flight mechanics and flight riggers. Three centres have an output of twenty-four flight mechanics and flight riggers every six weeks, and the Hillside centre has an output of forty-eight flight mechanics and flight riggers every six weeks.

(iv) No. 2 Technical Training School was formed at Wigram to train wireless operators, wireless electrical mechanics, instrument makers and instrument-repairers, armourers, and fitters armourer. Output : Twenty wireless operators every eight weeks ; twenty wireless electrical mechanics every twelve weeks ; three instrument-makers every twelve weeks ; three instrument-repairers every six weeks ; twenty-four armourers every twelve weeks ; twenty-four fitters armourer every twelve weeks.

(v) An Administrative Training School was formed at Wigram on the 13th October, 1939, to train clerks store accounting, clerks pay accounting, clerks general duties, and equipment assistants. This school will close down in due course when the requirements in these trades have been fully met.

Education.

Until the outbreak of war the educational staff of the Air Force remained the same as at the end of the year 1938–39—one Education officer being attached to each of the Royal New Zealand Air Force Stations at Wigram and at Hobsonville. By the end of the year under review, however, the number of Education officers had increased to seventeen—seven at Headquarters, two at each of the Stations Wigram, Hobsonville, and Ohakea, and one at each of the Stations Levin, Dunedin, New Plymouth, and Blenheim. In addition, the full-time services of Mr. E. Caradus, Senior Inspector of Secondary Schools, who, until November, 1939, had been attached to the Air Force in an advisory capacity, were made available to the Air Force by the Education Department for the appointment of Director of Educational Services.

The Education Officers at Stations continue, as in the past, to provide personnel with all necessary educational facilities, in particular with the necessary instruction in mathematics and in elementary science. The headquarters staff form part of the machinery made necessary by a very great extension of the educational operations of the Air Force. It became obvious very early in the war that insistence on University Entrance or School Certificate standards for the air crew would not only prevent this country from fulfilling its undertaking to Great Britain and the Empire, but also deprive the Air Force of the services of hundreds of men of the very best type. At the same time, a lowering of these standards would be dangerous. The decision was made, therefore, to select those men most suitable in other respects as pilots, observers, and gunners, provided that their educational qualifications were not of too low a standard, and then to bring them up to the necessary standard in mathematics and elementary science in the interval between their selection and their entry into the Ground Training School.

A special syllabus, incorporating all the essentials, was drafted and put into operation early in 1940. Those men selected for the air crew and requiring educational training were grouped into classes in centres in which sufficient numbers were available. Men in other parts of the country were instructed by correspondence from headquarters. In both cases the special syllabus formed the basis of the instruction, and in both cases the men concerned continued with their normal occupations during the instructional period. The correspondence work was conducted by the headquarters educational staff, the classes, twenty in all, being taken in the evening in various post-primary schools throughout the country. In Auckland the Territorial Air Force Headquarters building was used for the purpose.

The ready assistance rendered by post-primary teachers in this work and the occasional assistance rendered by country teachers to men on correspondence courses has been of the greatest value and, along with the work of the Education Officers, is enabling a steady stream of men fully qualified educationally to reach the Ground and Flying Training Schools.

At the end of the year under review a total of 718 men—391 in classes and 327 on correspondence—was receiving instruction in this way. This number is apart from the large number of men receiving instruction at the various Stations through the medium of their Education Officers.

This group will complete its preliminary educational training in May and June, 1940, and will be replaced by further groups so long as such a method of training may be necessary.

In order to ensure the smooth operation of the scheme the Director of Educational Services has throughout been a member of the Air Crew Selection Committee. This Committee was, at the end of March, 1940, making its second tour of the Dominion since the outbreak of war, and already at that stage it was obvious that the number of men undergoing preliminary educational training would be much increased during the second half of the year.

Formation of New Zealand Squadron in Royal Air Force.

Early this year the Government agreed to the expansion of the New Zealand flight in the United Kingdom into a full Bomber Squadron to be equipped with Wellington aircraft. This unit is to be manned as far as possible by New-Zealanders serving with the Royal Air Force. Specialist and maintenance personnel will be provided in the meantime from Royal Air Force sources. When the requirements of the training organization in New Zealand have been met maintenance personnel will be dispatched to the United Kingdom to replace Royal Air Force personnel serving in this unit.

Works and Building Programme.

The construction of the two permanent Stations at Ohakea and Whenuapai for the Wellington medium bomber squadrons proceeded in accordance with the original plans, and by September, 1939, some twenty months after commencement of work, Ohakea was nearing completion, and the development of Whenuapai, on which building had commenced twelve months previously, was well in hand. Some delay has been experienced with the concrete hangars at this Station, which will not be completed until July and October, 1940. The expansion programme approved by the Government in April, 1939, involved a further increase in the size of the Flying Training School, Wigram, and the conversion of the Squadron Station, Blenheim, into a large Flying Training School.

On the outbreak of war the only two Stations which were occupied, and functioning as such, were the Flying Training School at Wigram and the Depot at Hobsonville. Other Stations at Ohakea, Whenuapai, Blenheim, and Taieri had reached varying stages of completion. The new building programme required to meet the war training organization was commenced early in September. This involved the following urgent works:—

(*a*) The conversion of the small Station at Taieri into an Elementary Flying Training School.
(*b*) The construction of a new Elementary Flying Training School at New Plymouth.
(*c*) The preparation of accommodation at Hobsonville, Blenheim, and Christchurch for the three Territorial Squadrons which were mobilized.

No. 1 Elementary Flying Training School at Taieri was completed and manned within six weeks after the outbreak of war, and No. 2 Elementary Flying Training School at New Plymouth within nine weeks. This work reflects the greatest credit on the Public Works organization. It was only accomplished by decentralizing control to District Offices and letting works to suitable contractors on a cost plus commission basis. Further works were commenced at all Stations to accommodate the increased numbers of personnel and additional aircraft required. The Boys' Training Farm at Weraroa, Levin, was made available by the Education Department at short notice for use as a Ground Training School, additional buildings were erected, and the Station occupied in October, 1939. A commencement was made early in December on the new Flying Training School at the Christchurch Municipal Aerodrome (Harewood).

The introduction of the Empire Air Training Scheme in December made it again necessary to recast the building programme. The increased commitments are being met by expanding existing Stations to their utmost capacity rather than by the formation of new Stations. This has resulted in a large saving in capital cost and an appreciable reduction in the numbers of trained personnel required for manning these Stations. At the same time the vast amount of detailed modification to technical buildings necessitated by these successive expansions has thrown a heavy strain on the design and works staffs. Furthermore, it has been found most difficult to expand essential services such as sewerage, water-supply, storm-water drainage, power and fire services at the same rate as the buildings for the accommodation of personnel, and some delay has been inevitable.

The types of technical buildings and the standards of accommodation provided at the Air Force Stations fall into two distinct classes. The first covers the original peace-time programme, and the second all subsequent building. The original programme was limited to a Flying Training School at Wigram, a Stores Depot at Hobsonville, and two Bomber Squadron stations at Ohakea and Whenuapai. The buildings required for these units have been under construction over the past two years in permanent materials (generally of concrete), and the standard of accommodation has been based on that provided overseas. In the case of airmen, the standard is somewhat higher than that provided in the Royal Air Force. On the other hand the officers' accommodation is not so good.

The buildings constructed both before and after the outbreak of war to meet subsequent expansions of the Air Force have all been constructed of wood to standard mobilization type designs. Hangars measuring 256 ft. by 125 ft. designed in wood and covered with locally fabricated asbestos have been adopted as a standard, and twelve of this type have now been erected. A total of forty-two standard hutments each housing eighty-four airmen in open dormitories, or eighty N.C.O.'s in cubicles (two to a cubicle), or forty officers, have been erected at the various Stations. These hutments, messes, and offices are all constructed of wood, lined internally with New Zealand plaster board.

Married quarters have been provided at permanent Air Force Stations only, and the numbers are limited to the original peace establishments. The scale is 6 per cent. of the original establishment of junior ranks and the normal expectancy of married personnel in senior non-commissioned and commissioned rank who are serving on long-term engagements. A total of 144 quarters have been provided at the permanent Stations, Hobsonville, Whenuapai, Ohakea, and Wigram. In the case of Blenheim seven quarters have been provided on the Station, and eighteen State houses are being erected in the Town of Blenheim. No married quarters have been provided at Harewood, Levin, New Plymouth, or Taieri.

The provision of the additional Flying Training Schools required on mobilization has been made possible only by the existence of suitable civil aerodromes developed as a result of Government encouragement and expenditure prior to the war. The preparation and maintenance of grass aerodrome surfaces to carry the heavy and continuous traffic of a large Flying Training School is a specialist problem of considerable magnitude, the solution of which rests, to an appreciable extent, with the seasons and vagaries of the weather.

Extensions to the flying-fields at Wigram, Taieri, and Harewood have been made during the year, but these areas, although grassed, are not yet in use. Work has continued on the levelling, drainage, and grassing of the large aerodromes at Ohakea and Whenuapai during the year, and although these are not completed sufficient area is available to meet our bare requirements at the moment.

The magnitude of the work of preparing the flying-fields at the two major Stations can be gauged by the fact that at Whenuapai 1,200,000 cubic yards of earth-work, 49·3 miles of pipe sub-soil drains varying in size from 4 in. to 30 in., 17,500 cubic yards of shingle for sub-soil, drain-back filling, and 750 miles of mole drain were involved in the work. The cost of these items of work amounted to £151,000. At Ohakea the comparative figures are—307,000 cubic yards of earth-work; 23·7 miles of pipe sub-soil drains of sizes 4 in. to 21 in.; 12,000 cubic yards of shingle back-fill, and 600 miles of mole drains at a total cost to complete of £55,500.

Details of buildings at the different Air Force Stations are so varied and the total so large that a detailed description would not convey a clear impression of the work involved.

At the large Flying Training Schools the individual buildings run into hundreds, so that the best indication of the magnitude of the programme can only be given by the cost involved. Since the commencement of the expansion programme in 1937–38 these figures are :—

	£
No. 1 Elementary Flying Training School, Taieri	115,000
No. 2 Elementary Flying Training School, New Plymouth	112,000
No. 3 Elementary Flying Training School, Harewood	53,400
Ground Training School, Weraroa, Levin	54,000
No. 1 Flying Training School, Wigram	356,300
No. 2 Flying Training School, Woodbourne (Blenheim)	305,000
No. 3 Flying Training School, Ohakea	498,000
Operational Station, Whenuapai	283,500
Aircraft Depot, Hobsonville	317,000
Communications Flight, Rongotai	9,000
Total	£2,103,200

In addition to the above, a further £1,600,000 of work has been authorized and is now in hand to complete the programme.

Aircraft and Equipment.

(*a*) *Equipment.*

The first six months of the period under review was occupied in a physical stock-taking of equipment held in the Air Force, and the recording of this stock by machine accounting records. Orders were placed overseas for the technical equipment required under the expansion programme, and local orders were placed for the barrack equipment required under this programme. Under the National Supply Organization set up prior to the war the requirements of the three Services in the way of local supplies were co-ordinated, dormant orders for clothing were placed, and some valuable exploratory work into the industrial capacity of the Dominion was carried out. The outbreak of war and the introduction of the Empire Air Training Scheme necessitated large increases in equipment staffs and involved heavy orders for technical equipment overseas. The advent of war has naturally increased the difficulties of supply in a technical service which is so far removed from the sources of production. Some progress has been made with local manufacture. The staff and equipment of the Aeronautical Inspection Division is being built up to make further use of local capacity.

(*b*) *Aircraft.*

In May and August, 1939, orders were placed for a further 36 Airspeed Oxford twin-engine and advanced trainer aircraft required at the two Flying Training Schools during 1940. Orders for airframe and engine spares, navigational and night-flying equipment, including initial equipment for the mobilization programme, and additional reserves of bombs and aviation spirit were placed prior to September. The total approximate cost of these orders was £751,000. During the year deliveries of 40 Gordons and 32 Vincents were made.

On the recommendation of the United Kingdom Air Mission which visited the Dominion in April, 1939, steps were taken to encourage the establishment of an aircraft industry in New Zealand by the placing of an order with the De Havilland Aircraft Co. for 100 Tiger Moth aircraft. The contract with the company provided for the local manufacture by progressive stages of this type of airframe at the rate of six per month, commencing in May, 1940. All raw materials, engines, and proprietary articles, and instruments are imported

The outbreak of war necessarily involved a considerable readjustment of the existing orders. Six Wellington aircraft which had been delivered to the New Zealand Flight at Marham, in the United Kingdom, were handed over to the Royal Air Force, and the outstanding orders for these aircraft were cancelled. Orders were placed for the additional training types of aircraft required under the Empire Air Training Scheme. These orders include an additional 90 Tiger Moths for elementary training, and a total of 140 Airspeed Oxfords and 105 Harvards for advanced training.

(*c*) *Local Manufacture.*

Steps are being taken to utilize the industrial resources of the Dominion in the production of supplies and equipment for the Air Force as far as it is possible to do so. With regard to general equipment not embodied in the aircraft which is not subject to the same standard of rigid inspection, local manufacture has been resorted to for the following: All aerodrome equipment; engine test benches and erecting stands; all barrack stores and equipment; Air Force uniforms; flying-clothing; electric batteries; tools.

Progress in the manufacture of aeronautical equipment, however, is limited to the supplies of aeronautical materials which can be obtained, and, moreover, it is dependent very largely upon the capacity of the aeronautical inspection organization in the Dominion.

Efforts are being made to expand the Aeronautical Inspection Division as quickly as trained staffs and technical test equipment can be secured. A test-house will shortly be erected at the depot which will meet the needs of both Service and civil aviation.

In spite of the difficulties due to lack of an adequate staff of Inspectors and sufficient test equipment, progress has been made in various directions. The local manufacture of aircraft dopes and finishes from imported ingredients is being developed. The number of firms approved for aeronautical work is being steadily increased, and certain small orders for engine spares have been placed, such as piston-rings, tappets, &c. Local manufacture of dual-conversion sets for Gordon and Vildebeeste aircraft, blind-flying hoods for these aircraft, and wireless sets has also been carried out.

During the year additional reserves of bombs were delivered. The existing stocks are considered satisfactory. Further reserve stocks of aviation fuel have been ordered.

(*d*) *Machine Accounting.*

The Powers Samas machine accounting equipment was introduced into the Air Force in March, 1939. This system of centralized accounting as applied to the technical equipment in the Air Force has resulted in a considerable economy in accounting staffs at Stations, and in a more effective use of available stocks. As an illustration of the amount of work carried out by this equipment the following figures may be quoted: An average of 14,000 vouchers per month are dealt with. These vouchers comprise about 76,000 items, and involve the punching of 152,000 cards. The approximate number of cards passing through the tabulator per month is 400,000.

In addition to the above, a total of 320 airframe inventories are maintained by this method, each inventory involving about 400 entries.

(*e*) *Mechanical Transport.*

The requirements of motor transport at Air Force Stations did not become a serious problem until the outbreak of war. Under the Motor-vehicles Impressment Emergency Regulations, which were gazetted on the outbreak of war, the vehicles required during the early stages of the mobilization programme for the existing Stations were obtained without delay through the Impressment Officer. A total of 136 cars, lorries, trailers, and tractors are now in use.

(*f*) *Rations.*

A ration consisting of three very good meals a day is supplied to all personnel quartered in barracks. Special light meals are supplied to personnel engaged on night-flying duties. Suppers to airmen are provided on payment at the Station Institutes by the Y.M.C.A. Any extras above the airmen's scale of rations consumed in officers' and sergeants' messes are charged to the mess concerned. No extra allowances are provided in the case of officers and N.C.O.'s. Experience of messing indicates that a lighter diet than the standard military ration is more suited to the type of work in the Air Force. Considerable economy has been effected at the large stations by the provision of butchers' shops equipped for the manufacture of small-goods. The daily cost of rations per man, exclusive of fuel, at the various Stations between January and March, 1940, was as follows:—

	January.	February.	March.
	s. d.	s. d.	s. d.
Wigram	1 6	1 4	1 2
Hobsonville	1 9	1 8·5	1 7·7
Ohakea	1 7	1 6	1 6
Blenheim	1 9	1 5	1 6
Taieri	1 5	1 5	1 6
New Plymouth	1 8	1 8	1 8
Levin	1 9	1 7	1 7
Whenuapai	1 5	1 5	1 7

The standard of messing in the Royal New Zealand Air Force is good and reflects great credit on the catering organization at all Stations.

(*g*) *Fire Services.*

Fire-protection at Flying Training Schools presents two problems of some complexity. The first is the protection of aircraft which have crashed, and the second is the protection of the technical buildings, such as workshops and hangars, where the fire risk is far greater than in normal buildings. At the large Stations a fire-tender and a crash-tender are provided, both of which are fitted with carbon-dioxide and foamite equipment. Both types of tender were designed and constructed locally. The high-pressure-water reticulation and storage tanks are being extended, and additional fire-appliances of local manufacture are being provided to meet the expansion.

Firemasters and fire personnel are being selected as far as possible by enlistment of experienced personnel from local brigades.

A Headquarters Fire Committee has been appointed to advise on fire-prevention and fire-fighting in the Service.

Maintenance Organization.

The pre-war organization provided for a single repair depot at Hobsonville, Auckland, designed primarily for the maintenance of two medium bomber squadrons equipped with Wellington aircraft. The aircraft and engine repair shops and general engineering shops were by March, 1940, nearing completion. Specialist equipment for the repair of modern instruments, automatic pilots, and variable-pitch airscrews, in addition to the latest machine tools for the reconditioning of radial engines, had been on order for eighteen months, and by March, 1940, partial deliveries had been effected.

On the outbreak of war the only shops that were capable of meeting the rapidly increasing maintenance programme were the Station workshops at Wigram. It therefore became necessary, owing to the limitations of the Depot, Hobsonville, to decentralize major repairs among the Advanced Flying Training Schools, and suitable shops conforming to mobilization designs are being provided at Blenheim and Ohakea.

The shortage of tools has been partially overcome by limiting the number normally issued individually and keeping tools on flight charge for use as required. Delays in delivery of aircraft and engine spares have been met to a limited extent by the use of commercial materials and local manufacture subject to special inspections while in use. The lack of sufficient experienced technical personnel has necessitated long hours, and at some Stations double shift-work in order to maintain the requisite number of aircraft in a serviceable condition.

The shortage of trained personnel and the comparative inexperience of a large proportion of the ground maintenance staff have made it necessary to modify the normal inspectional system and the organization for maintenance at Stations. Aeroplane-inspection cards have now been introduced which require the ground staff to initial every item of inspection as it is carried out. This also ensures that the more important work is done by experienced or specialist personnel detailed for the purpose. Furthermore, a centralized maintenance scheme has been introduced under which the Station Engineer Officer becomes directly responsible for the condition of all aircraft in units, and also for the disposal and supervision of all technical personnel on the stations.

During the year three serious flying accidents have occurred, two of which involved loss of life and the third serious injury through burns to the pilot. In addition, there were fourteen forced landings and a number of minor mishaps, most of which can be attributed to inexperience. This was not abnormal considering the large number of pilots under training. In one case only can the cause be attributed to faulty maintenance.

The fact that the Air Force has maintained this expansion during the last six months without any serious breakdown in equipment and engineering maintenance is due very largely to the energy, initiative, and practical experience of the Senior Equipment and Engineer Officers who are on loan from the Royal Air Force.

Conclusion.

The transfer from a peace to a war footing and the large expansion which has taken place since the outbreak of war has thrown a very heavy volume of work on headquarters staff, both Service and civilian, and on unit commanders and their staffs. All have accepted responsibility cheerfully, and I should like to express my appreciation of the spirit of co-operation and the energy that have been displayed by all concerned.

The design and construction of the new Air Force Stations has involved many problems of engineering, and the technical knowledge and experience and energy of the staffs of the Public Works Department have again been of the utmost value.

Credit also is due to all units for their important part in the year's operation.

I have, &c.,
H. W. L. Saunders, Group Captain,
Chief of the Air Staff.

REPORT OF THE ACTING CONTROLLER OF CIVIL AVIATION FOR THE YEAR ENDED 31st MARCH, 1940.

The Hon. the MINISTER OF DEFENCE.

IN the past twelve months it can be said that the facilities offered by the companies operating scheduled air services were, on the whole, much better patronized by the general public than in previous years and, had the war not intervened, there is no doubt that all previous traffic records would have been surpassed. Much the same state of affairs applies to the aero clubs, whose training facilities were being used to the utmost. As a result of the taking-over of civil aircraft under the Aviation Emergency Regulations 1939, ten aero clubs and one company operating regular services were obliged to cease operations.

During the year the installation of the facilities necessary for the overseas services was proceeded with, and preliminary tests were conducted during initial survey flights. With the outbreak of war it appeared likely that the inauguration of the Auckland–Sydney service would be delayed, but the operation of the service was commenced on 29th April.

SECTION 1.—ADMINISTRATION.

1. CIVIL AVIATION VOTE.

The civil aviation votes for previous years, commencing with the first allocation (1929–30), are shown hereunder:—

Year.	Voted.	Expended.
	£	£
1929–30	7,300	7,532
1930–31	7,600	7,057
1931–32	2,200	2,093
1932–33	4,750	4,243
1933–34	7,250	1,813
1934–35	14,850	11,316
1935–36	20,014	13,171
1936–37	21,914	21,802
1937–38	42,234	35,490
1938–39	50,871	46,057
1939–40	42,015	

2. PERSONNEL.

In December, 1939, the Chief Inspector of Aircraft, Mr. R. C. Kean, returned from a period of attachment to various branches of the Air Ministry. Earlier in the year three technical officers were appointed to the staff, two as operations officers and one as an engines inspector with the Aircraft Inspection Branch. A full-time control officer was also appointed at the marine aircraft base established at Mechanic's Bay, Auckland, for the trans-Tasman service and the southern terminal of the Pan-American Airways' San Francisco – New Zealand service.

In February of this year the Controller of Civil Aviation (Group Captain T. M. Wilkes, C.B.E., M.C., A.D.C.) was appointed New Zealand Liaison Officer in Melbourne to the Royal Australian Air Force and the Australian Defence Forces, and Flight Lieutenant J. M. Buckeridge was appointed Acting Controller of Civil Aviation during his absence.

INTERNATIONAL AGREEMENTS.

Importation of Aircraft of American Manufacture.

The visit of the Chief Inspector of Aircraft to the United States last year afforded the opportunity of direct discussion with representatives of the Civil Aeronautics authority in Washington, on outstanding questions of interpretation and technical requirements of an arrangement between the United States of America and this Dominion relating to the importation into New Zealand of aircraft and aircraft components manufactured in the United States, to which reference was made in my last report.

From these discussions it was possible to formulate a set of mutually acceptable conditions, and the arrangement became effective on 1st March, 1940.

Licences and Certificates.

1. *For Personnel.*

The following licences provided in the Air Navigation Regulations 1933, are issued by the Controller of Civil Aviation :—

(1) Pilots—
Class " A " (private) Licences.
Class " B " (commercial) Licences.
(2) Navigators' Licences, first and second class.
(3) Ground Engineers' Licences, in seven categories—A, A3, B, C, Ce, D, and X.
(4) Instructors' Authorities.

During the year the original Instructor's Licence was withdrawn, and the regulations were amended to provide for the issue of an Instructor's Authority and an Assistant Instructor's Authority. Pilots holding the old-type licence and complying with the conditions of the new regulations were granted the new authority automatically on request.

2. *For Equipment.*

The following licences and certificates are issued in respect of equipment, &c. :—

(1) Aircraft : Certificates of Registration and Certificates of Airworthiness.
(2) Aerodromes : Public Licences and Temporary Licences.

Since 1921 licences and certificates have been issued in accordance with the provisions of the International Convention, but issues were very limited until the aero-club movement got under way in 1929.

The table given hereunder sets out the number of licences and certificates issued since 1921 :—

Licence or Certificate.	1921–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34.	1934–35.	1935–36.	1936–37.	1937–38.	1938–39.	1939–40.
Personnel—												
Pilot's " A " Licence ..	8	72	102	146	100	130	135	146	181	216	205	86
Pilot's " B " Licence ..	23	10	7	14	11	9	14	16	25	15	26	20
Navigator's Licence ..	..	..	..	..	..	..	..	..	1	1	2	9*
Ground Engineer's Licence	29	15	14	18	4	7	21	30	16	12	16	11
Equipment, &c.—												
Certificates of Airworthiness	1	20	28	14	10	1	5	18	13	15	9	5
Certificates of Registration	1	21	31	11	10	1	9	18	17	33	22	5
Aerodrome Licences—												
Public	..	..	..	..	..	..	24	22	10	11	5	1
Temporary	..	..	..	..	..	..	14	42	34	16	12	4

* Two first class and seven second class.

Flying Personnel.

Seventy club trainees and five other pupils presented themselves for the " A " Licence tests and were successful in obtaining licences, compared with a total of 212 for the year 1938–39. The period covered in the present report is, however, confined almost wholly to the six months from April to September, for after the cessation of club activities practically no applications for testing were received. Three clubs continue to provide training facilities on a reduced scale, and arrangements have been made with the Royal New Zealand Air Force for the testing of any pupils completing their *ab initio* training.

In August, 1939, the second of the annual technical examinations for " B " Licence candidates was held. Seven candidates submitted themselves for the four written papers, and three were successful. The intervention of the war prevented the holding of the practical portion of the examination, which was thus deferred until convenient arrangements could be made. This examination was the first held under the new syllabus introduced in 1938 with the purpose of raising the standard to that obtaining in other countries.

The annual examinations for second-class Navigation Licences were held on 21st and 22nd June, 1939. Six candidates presented themselves, and two were successful. During October a supplementary examination was to have been held, but was deferred indefinitely.

Nine Instructors' Authorities were issued to trainees completing the courses of tuition referred to later in this report, five pilots being graded as Instructors and four as Assistant Instructors.

Ground Engineers.

The number of Ground Engineers' Licences issued during the year totalled twelve, compared with seventeen for the preceding twelve months, and in the same period fifteen extensions to existing licences were granted.

On the 31st March, 1940, sixty-four ground engineers held current licences valid in one or more categories. The practice of holding frequent examinations to enable applicants to qualify for licences, or to obtain extensions to existing licences, was followed until shortly after the commencement of war, when all examinations were completely suspended. During the period 1st April to 30th September, 1939, nine series of examinations were held, in which seventeen candidates were dealt with and fourteen were successful.

Aircraft.

On the 31st March, 1940, there were only 39 aircraft on the Civil Register, compared with 107 at the end of the previous year. This small total was due to the fact that 72 aircraft belonging to clubs and companies were requisitioned by the Government shortly after the outbreak of war, and these were accordingly removed from the register. The machines remaining in use may be analysed as follows :—

D.H. 60	3	Monospar S.T. 25	1
D.H. 80A	2	Rearwin	2
D.H. 83	3	Spartan	1
D.H. 90	2	Waco	1
Avro Avian	2	Whitney Straight	1
Cub	5	Pou-de-ciel	3
Desoutter	1	Miscellaneous	7
Fleet	1		—
Lockheed 10A	4		39

Of these, 32 are single-engined machines and the remainder twin-engined. Only 12 are not of British manufacture. On the 31st March, 1940, twenty-five of the aircraft on the register were certified as airworthy, the remaining 14 comprising 11 machines which were under overhaul or temporarily out of action, and three Pou-de-ciels (" Flying Fleas ") which, being experimental aircraft, were not granted certificates of airworthiness.

During the year, 8 new aircraft were added to the Civil Register, 6 United Kingdom certificates of airworthiness were validated for use in the Dominion, 13 New Zealand certificates were issued, and 53 renewed.

SECTION II.—COMMERCIAL FLYING.

The steady increase in route miles flown on commercial services, and their greater use for the carriage of passengers, mail, and freight, was continued until shortly after the outbreak of war. By the 9th November, 1939, ten of the aircraft operated by commercial companies had been requisitioned by the Royal New Zealand Air Force, and, in addition, a number of their personnel, who were members of the R.N.Z.A.F. Reserve, had been called up for war service. It was therefore necessary to rearrange certain of the existing services and to cancel others wholly. As a result of this, the route mileage, which stood at 2,015 at the declaration of war, fell to 1,720 at the end of September, and 1,348 during November. Despite these factors, the services available were well patronized, and in most cases are carrying almost capacity loads. Had war not intervened, there is every possibility that active steps would shortly have been taken to inaugurate the Dunedin–Invercargill, Auckland–Rotorua, and Nelson–Takaka services, with the added possibility of the resumption of a feeder service to cater for traffic in the Wanganui and Taranaki districts.

On account of defence requirements it must be expected that services of a civil nature will be severely restricted through lack of suitable material. Valuable knowledge has, however, been gained in operating the commercial routes, and it can be anticipated that this practical experience will serve as a valuable basis for future operations.

The three companies operating were Union Airways of New Zealand, Ltd., Cook Strait Airways, Ltd., and Air Travel (N.Z.), Ltd. The services maintained during the year were as follows :—

(1) Auckland–Wellington.
(2) Wellington–Dunedin.
(3) Palmerston North – Gisborne (suspended, 25th October, 1939).
(4) Gisborne–Auckland (suspended, 12th October, 1939).
(5) Palmerston North – Christchurch (suspended, 16th September, 1939).
(6) Wellington–Blenheim–Nelson.
(7) Nelson–Greymouth (extended to Hokitika, 10th November, 1939).
(8) Hokitika – Jackson's Bay.
(9) Inchbonnie–Weheka.

The total route mileage covered at 31st March, 1940, was 1,348, and the number of aircraft in use nine, comprising four Lockheed Electras on routes (1) to (6), and three De Havilland Fox Moth and two De Havilland Dragonfly aircraft on routes (7) to (9).

Internal Services.

1. *Union Airways of New Zealand, Ltd.*

At the commencement of the year this company operated services (1) to (5), having a total route mileage of 1,440 miles and using four Lockheed Electra aircraft, three De Havilland Air Expresses, and two De Havilland Dragons. Between 17th September and 25th October, 1939, the five aircraft of the two last-mentioned types were taken over by the Royal New Zealand Air Force, and as a result the services were reduced by the cancellation of those operating between Palmerston–Christchurch, Palmerston–Gisborne, and Gisborne–Auckland, and the reduction of the trips on the Auckland–Wellington and Wellington–Dunedin routes from once daily to thrice weekly in each direction. In addition to its own services, this company also operated the services over route (6) under charter to Cook Strait Airways, Ltd. Details of the company's operations in statistical form are shown in the appendices to this report.

2. *Cook Strait Airways.*

Prior to 9th November, 1939, Cook Strait Airways operated services over routes (6) and (7) with five De Havilland Rapide twin-engined aircraft. On the latter service an intermediate call was made at Westport, and daily schedules were maintained. On the cross-Strait services, a total of seventeen trips daily was scheduled. With the taking-over of the company's aircraft by the Royal New Zealand Air Force, arrangements were made with Union Airways of New Zealand, Ltd., and Air Travel (N.Z.), Ltd., to continue the services under charter. The original schedule of the Nelson – West Coast service is maintained by the latter organization with two De Havilland Dragonfly aircraft, while Union Airways operate the cross-Strait service on a basis of seven trips daily with Lockheed Electra aircraft.

3. *Air Travel (N.Z.), Ltd.*

Air Travel (N.Z.), Ltd., continued to operate the services on routes (8) and (9), using two twin-engined De Havilland Dragonfly aircraft and three De Havilland Fox Moths. This company's services have proved very useful to settlers in the southern portion of Westland, where there are as yet no formed roads.

As stated in (2), the company commenced operations on Cook Strait Airways' Nelson–Greymouth service on the 10th November, 1939, and extended this to Hokitika so as to connect with their own normal services. Where the traffic so requires, Air Travel also operates in conjunction with Union Airways in the cross-Strait service.

Operational figures are quoted in the appendix.

International Services.

1. *Tasman Empire Airways.*

This company is expected to be registered at an early date, and regular services on a twice-weekly basis will commence almost immediately thereafter.* It was originally intended to utilize three flying-boats of the Short Empire S. 30 class on the service, but owing to an accident to one of these while employed by Imperial Airways on the European route only two—the "Aotearoa" and the "Awarua"—will be available for the Tasman service. With the restricted service to be operated during the war period it is anticipated that these will be sufficient. A number of survey flights have been made during the past few months by the "Aotearoa" and a large amount of information has been collected which will be used in the regular operation of the service.

2. *Pan-American Airways.*

This company will provide a service from San Francisco to Auckland, passengers travelling to Honolulu by the Eastbound aircraft, and transferring at that point to the machines to be used on the New Zealand service. Only one return flight has been made during the year for purely survey purposes, using the new Boeing type flying-boat with which it is intended to operate the service. The date of commencement has not yet been decided.

Non-scheduled Commercial Flying.

In addition to the three companies operating scheduled services, the following organizations catered for commercial work of a general nature, the aircraft used being indicated in parentheses :—

Waikato Aviation Co., Ltd., Rotorua (one Desoutter).
New Zealand Aerial Mapping, Ltd., Hastings (one Monospar S.T. 25).
Southland Airways, Ltd., Invercargill (two D.H. Puss Moths).
Queenstown – Mount Cook Airways, Ltd., Timaru (one Waco Q.D.C.).

During the year ended 31st March, 1940, a total of 2,530 hours was flown on these services, the distance covered being 268,793 miles and the passengers carried 8,133. The corresponding figures for the previous year were 2,456, 252,187, and 10,342 respectively. Further figures relating to these services appear in the Appendix.

Air Photography.

New Zealand Aerial Mapping, Ltd., using one Monospar S.T. 25 aircraft, continued its operations in aerial survey and photographic work, most of which continues to be for local bodies. The total area photographed was 937 square miles, and the flying-time involved 97 hours.

* The service commenced on 30th April 1940.

SECTION III.—AERO CLUBS AND TRAINING OPERATIONS.

As in the case of the scheduled services referred to in the preceding section, the war has been responsible for a drastic curtailment of the training operations of the aero clubs, and the majority were obliged to cease flying, although retaining their identity and social functions. At the beginning of the year, and up to shortly after the outbreak of war, there were sixteen clubs in operation, employing between them sixty-three aircraft.

Between 12th September and 11th October, 1939, the majority of the aircraft owned by the clubs were requisitioned by the Royal New Zealand Air Force for elementary training purposes, with the result that at the 31st March, 1940, the following were the only clubs still operating aircraft:—

Rotorua and Bay of Plenty Aero Club, using one Avro Avian:
New Plymouth Aero Club, using one Taylor Cub and one Rearwin:
Nelson Aero Club, using one Taylor Cub:
Canterbury Aero Club, using one Taylor Cub:
Te Kuiti Aero Club, using one Rearwin:

On the declaration of war the membership of the clubs was estimated at 3,189, comprising 2,519 associate and 670 flying members, compared with 3,690, 2,742, and 948 respectively on 31st March, 1939. In the same period the number of pilots trained to "A" Licence standard by the clubs numbered 75, and the number of "A" Licences issued 86, compared with 205 for the full year 1938–39.

During the whole year the combined clubs flew a total of 11,740 hours in training, of which 4,201 were dual instruction, and, in addition, completed 486 hours in commercial operations, during which 2,441 passengers were carried. Comparative figures for previous years are shown in the Appendix.

Training of Instructors.

As was stated in last year's report, the commencement of Civil Reserve and Air Force training by the aero clubs created a shortage of civil instructors. As a remedial measure, in November, 1938, a scheme was adopted whereby twenty-six pilots were to be trained as flying instructors by the Auckland Aero Club. The first term of eight pupils undertook the course between January and March, 1939, and a further three terms of six pupils each were scheduled to commence during April June, and September of the year under review. The first two of these courses were completed to schedule, but on the intervention of the war the final term was cancelled and the training of all subsequent instructors was continued by the R.N.Z.A.F. Flying Instructors' School.

Purchase of Aircraft for Aero Clubs.

In August, 1937, the Government introduced a scheme whereby financial assistance was granted to the "approved" aero clubs to enable them to purchase new and up-to-date aircraft for use mainly in connection with the further training resulting from the introduction of the Civil Reserve and Air Force schemes. In the current year £15,000 was included in the estimates for similar purchases, and eight clubs placed orders through the Department for a total of ten aircraft, comprising six Tiger Moths and four Moth Minors. Prior to September, 1939, only two of the aircraft had been delivered to the clubs, and on the declaration of war the remainder of the machines were diverted to the Royal New Zealand Air Force.

Miscellaneous Flying Operations.

1. *Associated Air Pilots.*

On the cessation of aero-club activities in the Manawatu district a number of the local club members resident in or around Palmerston North formed a limited-liability company called "Associated Air Pilots, Ltd.," for the purpose of purchasing an aircraft and continuing their flying. The company was registered early in December, 1939, and purchased a Piper Cub aircraft, in which their members have so far flown a total of 290 hours. No dual instruction is provided.

2. *Private Flying.*

At 31st March, 1940, there were thirteen privately owned aircraft on the register, compared with seventeen for the previous year. The machines were all of the light type suitable for operation from small aerodromes and fields, and comparatively easy to maintain. The total hours flown under this heading was approximately 500, compared with 49 for the period 1938–39.

3. *Government-operated Aircraft.*

Three aircraft were in use by the Government during the year, these comprising a locally manufactured D.H. Moth and a Miles Whitney Straight owned by the Public Works Department, and a Percival Gull operated by the Air Department. The Public Works machines were in use mainly by the Aerodromes Branch of that Department in connection with the inspection of the aerodromes and landing-grounds throughout the Dominion. In addition, the Whitney Straight was used for photographic work and for the calibration of aeradio direction-finding stations. The total hours flown during the year by the two machines was approximately 429.

The Air Department's Percival Gull was stationed at Rongotai aerodrome and used mainly for communication purposes. Hours flown for the twelve months amounted to approximately 80. This aircraft and the Moth owned by the Public Works Department were both taken over by the Air Force shortly after the outbreak of war.

National Organization.

The two organizations representing respectively the commercial pilots and the aero clubs are the Air Pilots' Guild of New Zealand and the Royal New Zealand Aero Club. The functions of these bodies were covered in last year's report.

SECTION IV.—GROUND ORGANIZATION.

1. Aerodromes and Landing-grounds.

The work involved in the construction and maintenance of civil aerodromes was continued until war was declared, when much of the effort had necessarily to be diverted to essential war projects. Notwithstanding this, the year saw the completion of aerodromes at Onerahi (Whangarei), Keri Keri, and Harewood (Christchurch), and extensions were effected to existing aerodromes at Rangiora, New Plymouth, Taieri, and Tauranga. The preparation of an emergency-landing ground for Wellington. has now been completed at Paraparaumu.

At the 31st March, 1940, the number of aerodromes and landing-grounds in New Zealand was as follows :—

Licensed fields for commercial and general use—		
(i) Constructed and licensed	51	
(ii) Licensed, but extension and development proceeding	6	
(iii) Construction in hand (portion available), not licensed	5	
(iv) Construction in hand (not licensed)	4	
		— 66
Emergency-landing grounds—		
(i) Constructed and in use	10	
(ii) Construction in hand	2	
		— 12

Work is proceeding on the surveys and designs of the proposed regrading at Rukuhia, and in connection with the construction of an emergency-landing ground at Karamea and of the proposed aerodrome at Wairoa. Preliminary designs are also being considered for an aerodrome at Dargaville and an emergency-landing ground at Motuhora.

Financial provision was made for £250,000 from the Consolidated Fund to cover expenditure on civil aerodromes and ancillary facilities during the year. The amount was allocated as follows :—

	£
Civil aerodromes and landing-grounds (investigations, surveys, design development, and construction)	125,000
Maintenance of emergency-landing grounds and landing-grounds in remote localities	20,000
Radio facilities for aerodromes and air routes	25,000
Other aerodromes and air-route services (including meteorological equipment, windsocks, lighting, traffic-control, photography maps, and "Air Pilot")	20,000
Landing-grounds, aeradio and meteorological facilities in New Zealand, Pacific Islands Dependencies	60,000
	£250,000

During the period one initial aerodrome licence was issued, forty-one existing licences renewed for a further period of twelve months, and four temporary licences were granted in respect of landing-grounds required for short periods only.

2. Meteorological Services.

The general organization of the meteorological services for civil aviation, as outlined in last year's report, has been continued. The most important development has been the provision of a series of synoptic observations at 6 p.m. and midnight, and the introduction of a twenty-four-hour service at the Meteorological Offices at Auckland and Wellington. With certain minor amendments the detailed scheme for co-operation between the Meteorological Offices at Auckland and Sydney in connection with the trans-Tasman service has been fully developed and proved satisfactory during survey flights of the "Aotearoa." Further details of the meteorological organization will be found in the report of the Director of the Meteorological Office.

3. Radio Services.

During the year considerable progress has been made towards the completion of the aeradio station and construction programme which was outlined in the report for last year. Full facilities have now been provided for radio communication on all regular air routes. The construction of eight radio direction-finding stations has been completed, and they will be ready for operation as soon as the necessary testing and calibration work has been carried out.

The amount of traffic handled by the aeradio stations in respect of the operating company's booking messages, arrival and departure reports, weather reports, and direction-finding messages for the nine months ended 31st March, 1940, is given below:—

Station.	Number of Messages.		Station.	Number of Messages.	
	Sent.	Received.		Sent.	Received.
Mangere	3,237	2,869	Westport	2,589	2,794
New Plymouth	4,004	2,469	Greymouth	1,891	2,455
Palmerston North	6,172	8,104	Hokitika	2,577	4,801
Tauranga	746	661	Jackson's Bay	1,182	357
Gisborne	1,160	1,127	Christchurch	4,176	3,332
Napier	1,607	1,225	Taieri	3,628	2,686
Wellington	14,328	15,264			
Blenheim	6,620	9,030	Totals	61,579	71,566
Nelson	7,662	14,392		133,145	

Short-wave direction-finding for overseas air routes is conducted at Musick Point and at Awarua, and bearings at these two stations can be rapidly communicated to aircraft. To facilitate collaboration between the two New Zealand stations a special radio communication channel is provided. Medium-wave direction-finding will also be conducted at Musick Point when the new buildings are completed. In the meantime Mangere Aeradio is serving this purpose. The direction-finder at New Plymouth Aeradio, which is now under construction, will also be a useful adjunct to other radio facilities for the trans-Tasman route, as with bearings taken at Mangere and New Plymouth it will generally be possible to "fix" the position of aircraft approaching the New Zealand coast. Consideration is also being given to the establishment of a similar station at a northern aerodrome to collaborate in giving "fixes" and thereby assist in navigation on the route from Australia to New Zealand.

SECTION V.—CENTENNIAL EXHIBITION.

A comprehensive display, demonstrating the theory of flight, internal-combustion aero-engines, and the progress of civil and Service aviation, was arranged at the Centennial Exhibition. In the various fixed and working models illustrating aerodynamic principles and the development of aircraft engines a good deal of public interest was evinced. The display was rendered possible by the very valuable co-operation of the British Air Ministry and aircraft manufacturers.

SECTION VI.—OPERATIONAL STATISTICS.

The tables presented in the following pages have been set out in a form which will provide an easy means of comparison between the different years.

In the case of the scheduled services, a general summary of operations has been given, together with similar tables for each of the companies concerned. For comparative purposes tables are also given illustrating the activities of scheduled services to the 31st March, 1940. Non-scheduled services and the aero clubs are dealt with by means of annual summaries.

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

APPENDICES.

APPENDIX A.

FLYING OPERATIONS OF AERO CLUBS: TRAINING.

(a) Year ended 31st March, 1940.

Clubs.	Membership.		Aircraft in use.	Under Instruction.		Hours flown.		Licences current, at 31st March, 1940.		——
	Associate.	Flying.		Dual.	Solo.	Dual.	Solo.	Private.	Commercial.	
Auckland	325	69	8	25	..	544	1,269	44	..	Ceased operations 30/9/39.
Waikato	200	61	4	28	6	275	529	27	..	Ceased operations 11/10/39.
Rotorua	58	38	1	24	7	348	240	7	..	
Te Kuiti	50	1	1	..	..	..	173	1	..	
Western Federated ..	540	53	10*	..	..	430	1,168	53	..	Ceased operations 9/10/39.
Middle Districts ..	215	84	4	25	11	337	635	48	..	Ceased operations 5/10/39.
Wellington ..	321	97	8	16	41	494	988	40	..	Ceased operations 12/9/39.
Wairarapa and Ruahine	211	25	2	..	2	105	227	23	..	Ceased operations 8/10/39.
Hawke's Bay and East Coast	180	27	3	1	2	164	362	24	..	Ceased operations 8/10/39.
Marlborough ..	148	25	5	10	7	122	138	8	..	Ceased operations 4/10/39.
Nelson	49	17	1	..	5	88	124	12	1	
Canterbury ..	94	50	8†	2	1	492	821	47	1	
Otago	100	60	5	25	4	377	512	31	..	Ceased operations 25/9/39.
Southland	110	46	4	6	16	197	302	24	..	Ceased operations 26/9/39.
West Coast (S.I.) United	190	17	2	4	1	129	150	12	1	Ceased operations 3/10/39.
Totals	2,791	670	66	166	103	4,102	7,638	401	3	

NOTES.—The figures quoted in columns 2 to 8 represent the totals at the date the clubs ceased operations, or in the case of operatin clubs at 31st March, 1940.

* NOTE.—This club ceased functioning as a federation on 9th October, 1939, the New Plymouth club continuing operations with two light aircraft. † As from 13th October, 1939, this club maintained only one aircraft.

(b) Years 1928-40.

Period.	Clubs operating.	Membership.		Aircraft in Use.	Under Instruction.		Hours flown.		Licences current.	
		Associate.	Flying.		Dual.	Solo.	Dual.	Solo.	Private.	Commercial.
1928 to 31st March, 1933	10	*	*	32	*	*	6,051	16,185	275	18
Year ending—										
31st March, 1934 ..	10	*	*	35	*	*	2,298	6,745	315	21
31st March, 1935 ..	11	1,869	483	39	123	43	2,660	7,823	315	22
31st March, 1936 ..	11	2,562	613	43	171	58	3,206	8,842	389	19
31st March, 1937 ..	11	2,457	840	39	251	76	3,952	9,330	483	30
31st March, 1938 ..	12	2,675	915	58	243	118	5,748	11,978	532	22
31st March, 1939 ..	13	2,742	948	65	275	89	6,213	13,443	535	19
31st March, 1940 ..	15	2,791	670	66	166	103	4,102	7,638	401	3
Totals ..	..	..	..	..	..	..	34,230	81,984	..	..

* Figures not available.

APPENDIX A—*continued.*

FLYING OPERATIONS OF AERO CLUBS: COMMERCIAL FLYING.

(*a*) *Year ended 31st March, 1940.*

Club.	Aircraft.	Trips.	Passengers.	Hours flown.	Miles flown.
Auckland	8	620	1,066	131	12,015
Waikato	4	4	8	3	350
Rotorua	1	..	..	..	..
Te Kuiti	1	..	..	..	..
Western Federated	10	..	..	..	..
Middle Districts	4	1	1	7	580
Wellington	8	279	451	159	17,395
Wairarapa and Ruahine	2	40	40	10	770
Hawke's Bay and East Coast	3	14	8	10	800
Marlborough	5	33	33	6	520
Nelson	1	29	29	8	450
Canterbury	8	364	592	111	11,729
Otago	5	188	189	25	1,893
Southland	4	18	24	16	1,315
West Coast (S.I.) United	2	..	..	..	..
Totals	66	1,590	2,441	486	47,817

NOTE.—See notes appended to table above.

(*b*) *Years 1928–40.*

Period.	Aircraft in Use.	Trips.	Passengers.	Hours flown.	Miles flown.
1928 to 31st March, 1933	17	8,090	10,127	2,246	164,458
Year ending—					
31st March, 1934	19	3,539	6,146	1,542	122,313
31st March, 1935	39	4,432	7,742	1,814	149,395
31st March, 1936	34	4,487	7,225	1,542	129,308
31st March, 1937	32	5,449	9,073	1,523	130,102
31st March, 1938	48	4,312	8,303	1,569	148,953
31st March, 1939	62	3,962	7,263	1,152	110,917
31st March, 1940	66	1,590	2,441	486	47,817
Totals	..	35,861	58,320	11,874	1,003,263

APPENDIX B.

SCHEDULED AIRCRAFT SERVICES.

(*a*) *Statistics for the Year ended 31st March, 1940.*

Company.	Hours flown.	Miles flown.	Passengers.	Freight.	Mail	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.	Trips scheduled.	Trips commenced.	Trips completed.
				lb.	lb.						
Union Airways of New Zealand, Ltd.	5,821	766,740	22,113	48,508	141,136	4,515,616	5,990	16,797	2,540	2,539	2,531
Cook Strait Airways, Ltd.	4,087	493,399	29,072	137,615	41,756	1,899,652	4,411	1,472	6,595	6,506	6,458
Air Travel (N.Z.), Ltd.	633	66,095	617	36,895	52,097	63,272	1,846	3,460	1,273	1,273	1,269
Total	10,541	1,326,234	51,802	223,018	234,989	6,478,540	12,247	21,729	10,408	10,318	10,258

(*b*) *Statistics of Operations, 1935–40.**

Period.	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.
				lb.	lb.			
Year ending—								
31st March, 1935	315	31,500	595	2,637	1,841	10,000	120	75
31st March, 1936	3,220	346,171	9,106	26,123	19,431	860,295	1,758	957
31st March, 1936	6,588	776,938	24,251	44,074	111,377	2,673,860	2,047	9,288
31st March, 1937	11,327	1,331,100	43,782	81,853	216,238	5,518,363	4,301	18,205
31st March, 1938	12,821	1,574,395	53,039	166,278	316,380	6,787,026	9,054	29,248
31st March, 1939	10,541	1,326,234	51,802	223,018	234,989	6,478,540	12,247	21,729
31st March, 1940								
Total	44,812	5,386,338	182,575	543,983	900,256	22,328,084	29,527	79,502

* These figures include totals for East Coast Airways for years 1936 to 1938.

APPENDIX B—*continued.*

UNION AIRWAYS OF NEW ZEALAND, LTD.

(a) Operations for Year ended 31st March, 1940.

Quarter ending	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.	Trips scheduled.	Trips commenced.	Trips completed.
				lb.	lb.						
30th June, 1939	2,218	290,295	8,539	20,235	52,324	1,579,971	2,716	5,996	1,014	1,013	1,008
30th September, 1939	2,103	270,760	7,264	17,821	53,497	1,404,730	2,102	6,274	933	933	931
31st December, 1939	976	133,180	4,007	6,631	23,919	934,000	721	2,997	394	394	394
31st March, 1940	524	72,505	2,303	3,821	11,396	596,915	451	1,530	199	199	198
Total	5,821	766,740	22,113	48,508	141,136	4,515,616	5,990	16,797	2,540	2,539	2,531

(b) Years 1936–40.

Period.	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.
				lb.	lb.			
Year ending—								
31st March, 1936	562	71,575	1,212	861	1,055	278,970	119	108
31st March, 1937	3,000	360,140	7,192	7,160	44,184	1,623,545	772	6,394
31st March, 1938	5,219	648,628	15,909	19,189	108,148	3,603,747	2,156	14,222
31st March, 1939	7,364	922,475	25,119	40,366	190,397	4,907,471	4,505	23,316
31st March, 1940	5,821	766,740	22,113	48,508	141,136	4,515,616	5,990	16,797
Total	21,966	2,769,558	71,545	116,084	484,920	14,929,349	13,542	60,837

NOTES.—(i) Operations commenced on 16th January, 1936; (ii) East Coast Airways absorbed on 1st July, 1938.

COOK STRAIT AIRWAYS, LTD.

(a) Operations for Year ended 31st March, 1940.

Quarter ending.	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.	Trips scheduled.	Trips commenced.	Trips completed.
				lb.	lb.						
30th June, 1939	1,200	150,000	6,892	31,496	12,251	447,455	933	420	1,821	1,805	1,795
30th September, 1939	1,192	149,044	6,889	36,528	14,136	449,107	1,156	485	1,814	1,807	1,807
31st December, 1939	733	83,166	6,432	35,821	8,735	428,219	1,207	316	1,361	1,338	1,315
31st March, 1940	962	111,189	8,859	33,770	6,634	574,871	1,115	251	1,599	1,556	1,541
Total	4,087	493,399	29,072	137,615	41,756	1,899,652	4,411	1,472	6,595	6,506	6,458

(b) Years 1936–40.

Period.	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.
				lb.	lb.			
Period ending 31st March, 1936	464	58,000	3,056	3,981	710	178,487	113	36
Year ending—								
31st March, 1937	2,120	271,726	14,353	22,706	20,355	831,377	613	488
31st March, 1938	3,270	409,000	20,954	40,603	38,245	1,251,379	1,238	1,043
31st March, 1939	4,191	520,326	24,318	85,633	43,562	1,495,206	2,539	1,278
31st March, 1940	4,087	493,399	29,072	137,615	41,756	1,899,652	4,411	1,472
Total	14,132	1,752,451	91,753	290,538	144,628	5,656,101	8,914	4,317

NOTE.—Operations commenced 30th December, 1935.

AIR TRAVEL (N.Z.), LTD.

(a) Operations for Year ended 31st March, 1940.

Quarter ending	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.	Trips scheduled.	Trips commenced.	Trips completed.
				lb.	lb.						
30th June, 1939	246	25,855	185	6,239	20,924	17,760	307	1,253	399	399	399
30th September, 1939	169	17,630	197	6,411	12,684	20,637	286	840	370	370	370
31st December, 1939	109	11,320	117	18,010	10,289	11,550	929	684	261	261	261
31st March, 1940	109	11,290	118	6,235	8,200	13,325	324	683	243	243	239
Total	633	66,095	617	36,895	52,097	63,272	1,846	3,460	1,273	1,273	1,269

APPENDIX B—*continued.*

AIR TRAVEL (N.Z.), LTD.—*continued.*

(*b*) *Years 1935–40.*

——	Hours flown.	Miles flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight-ton-miles.	Mail-ton-miles.
				lb.	lb.			
Period ending 31st March, 1935	315	31,500	595	2,637	1,841	10,000	120	75
Year ending—								
31st March, 1936	872	87,233	1,030	10,774	17,568	37,270	638	809
31st March, 1937	1,018	101,800	948	13,621	45,417	54,010	638	2,348
31st March, 1938	1,010	102,262	978	20,331	60,524	53,055	800	2,415
31st March, 1939	672	71,177	662	28,346	75,014	67,084	1,476	4,201
31st March, 1940	633	66,095	617	36,895	52,097	63,272	1,846	3,460
Total	4,520	460,067	4,830	112,604	252,461	284,691	5,518	13,308

* NOTE.—(i) Commenced operations on 18th December, 1934; (ii) Passenger and ton mileages for years ending 31st March, 1937 and 1938 are estimated.

COMMERCIAL FLYING: NON-SCHEDULED (TAXI) SERVICES.

(*a*) *Year ended 31st March 1940.*

Company.	Aircraft.		Number of Trips.	Passengers.	Hours flown.	Miles flown.	Freight.
	No.	Types.					
							lb.
Union Airways of New Zealand, Ltd...	4	Lockheed 10A ..	29	209	42	5,035	..
Cook Strait Airways, Ltd.	4	*D.H. 89	10	66	23	2,746	..
Air Travel (N.Z.), Ltd.	5	3 D.H. 83 2 D.H. 90	2,601	3,298	1,352	143,753	..
Waikato Aviation Co., Ltd.	1	Desoutter 1 ..	968	1,715	262	23,805	..
Southland Airways	†2	D.H. 80A ..	1,297	2,115	681	76,674	23,881
New Zealand Aerial Mapping ..	1	Monospar S.T. 25 ..	34	81	35	3,394	..
Queenstown – Mount Cook Airways, Ltd.	1	Waco	251	649	135	13,386	..
Total as at 31st March, 1940	13	..	5,190	8,133	2,530	268,793	23,881

* Aircraft removed from service during November, 1939. † One aircraft removed from service during January, 1940.

(*b*) *Years 1928–40.*

Period.	Aircraft in use.	Trips.	Passengers.	Hours flown.	Miles flown.	Freight.
						lb.
1928 to 31st March, 1933	7	13,217	13,508	4,052	314,031	..
Year ending—						
31st March, 1934	7	1,545	2,280	872	67,888	..
31st March, 1935	7	2,381	3,804	827	66,755	..
31st March, 1936	11	903	2,420	676	65,580	..
31st March, 1937	12	3,002	6,708	1,154	112,648	..
31st March, 1938	18	2,802	7,774	1,870	187,545	..
31st March, 1939	24	5,845	10,342	2,546	252,187	29,946
31st March, 1940	13	5,190	8,133	2,530	268,793	23,881
Total*	..	34,885	54,969	14,527	1,335,427	53,827

* These figures include totals for East Coast Airways, 1936 to 1938.

REPORT OF THE CONTROLLER OF AERONAUTICAL INSPECTION FOR THE YEAR ENDED 31st MARCH, 1940.

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, 1940.

AERONAUTICAL INSPECTION AND AIRCRAFT ACCIDENTS.

STAFF.

In November, 1939, the Chief Inspector of Aircraft, Mr. R. C. Kean, on completion of his tour of duty abroad, resumed his duties with the Department.

Mr. E. F. Carpenter, of the Aeronautical Inspection Directorate of the British Air Ministry, who had been on exchange with Mr. Kean, returned to England in August, 1939.

The Chief Inspector's work while away included investigation into such matters relating to Dominion aviation as the expansion of both Service and commercial aviation; the establishment of facilities for the manufacture of aircraft and aircraft parts; the development of the use of local materials for aeronautical purposes, and the consequential necessity that the Department should organize its Inspection Branch to care for its increased responsibility and its obligations as a signatory to the Air Convention.

REORGANIZATION.

The Aeronautical Inspection Branch, previously a section of the Civil Aviation Branch, has been reorganized as a separate branch of the Department and is now known as the Aeronautical Inspection Division (A.I.D.). The head of this Division has been designated Controller of Aeronautical Inspection. The responsibilities of this Division in relation to civil aviation remain the same. The additional duties to be carried out by the A.I.D. include the inspection of aeronautical supplies prior to acceptance for the Royal New Zealand Air Force, the development of the "approved firm" system for production and supply of aeronautical equipment within the Dominion, and the translation of the requirements of the Royal New Zealand Air Force for locally manufactured aeronautical equipment into technical specifications for issue to local manufacturers.

LOCAL MANUFACTURE.

The outbreak of the war hastened the Department's policy to utilize as fully as possible the facilities of commercial firms within the Dominion for the manufacture of aeronautical materials and parts for the Royal New Zealand Air Force. The complexity of requirement in respect of the manufacture and fabrication of material for embodiment in aircraft limits the number of firms capable of engaging in this work, but it is gratifying to report that there are a number of Dominion manufacturers with the plant and the willingness to meet the very exact requirements imposed upon all aeronautical material.

So as to provide that the basic requirements for safety will be satisfied, the "approved firm" system has been introduced. This, in effect, means that to ensure the use of correct materials and to establish that all aeronautical work complies with the required standards of quality and accuracy firms engaged in such work must employ an approved system of storage, recording, and inspection. The conditions laid down by the A.I.D. in this respect have been reduced to a level sufficient to provide "minimum danger" rather than the normal requirement of "maximum safety," but, owing to local firms' lack of experience in the field of aeronautical manufacture, it will still be necessary for the A.I.D. to exercise considerable supervision until the manufacturers become more conversant with the basic principles of aeronautical requirement.

During the period under review the de Havilland Aircraft Co., of England, established a factory at Rongotai for the manufacture of the training type of aircraft and for the repair and maintenance of all types of aircraft. The conditions in the United Kingdom since September last delayed the arrival of certain essential material and plant, but the progress that has been made with both equipment and personnel is such as to justify the expectation that production will commence in June of this year. An A.I.D. station has been established at this factory.

The local manufacture of dope and other necessary aircraft finishes is being investigated, and it is expected that at an early date sufficient of these materials will be produced to meet all Service and civil aviation needs.

The manufacture of batteries for the Royal New Zealand Air Force is now being carried out locally. Small quantities of both aircraft and engine replacement parts have been produced satisfactorily in the Dominion.

In an endeavour to utilize local timbers for aircraft purposes the co-operation of the Forestry Department was obtained, and specimens of tawa, white pine, and silver beech are being forwarded to the United Kingdom, where the Air Ministry have arranged for complete investigation into their suitability as substitutes for the present accepted timbers.

Arising out of this development of a local aeronautical industry, and the endeavour to utilize as much local material as possible, further specialized testing equipment is being obtained for the Department's test-house to enable accurate determination of the physical properties of local and commercial grade material to be made to ensure that their use for aircraft purposes will not adversely affect established safety factors.

FIELD INSPECTION.

In the period under review a total of six hundred and twenty-three field inspections covering aircraft was carried out by the Inspection staff of the Division. Supervision of the work of licensed ground engineers and the activities of approved firms was maintained during the year.

A.I.D. Test-house.

The work of the test-house for the year is summarized below :—

Aircraft instruments tested	282
Magnaflux examination of steel parts	212
Material tests	28
Welded specimens	50
New drawings prepared	22
Tracings prepared	25
Sets of drawings checked	18
Prints issued to operators	179

Approved Firms.

The number of firms operating under the "approval" system as sources of supply for certified aircraft material and parts increased during the year from thirty-nine to sixty-six. An analysis of these approved firms is as follows :—

Aircraft materials and/or parts (Category A (1))	41 firms.
Accredited agents (Category A (11))	10 firms.
Repairs and overhauls (Category B)	15 firms.

Accidents to Civil Aircraft.

Between the period 1st April, 1939, to 31st March, 1940, there were twenty-one notifiable accidents or forced landings of civil aircraft. One only resulted in serious injury to an occupant. No fatal accident occurred during this period.

An analysis of the accidents under various headings is as follows :—

	Injury to Persons.				Damage to Aircraft.				Cause.			
Class.	Number of Accidents.	Fatal.	Serious.	Minor.	Destroyed.	Serious but repairable.	Minor.	Nil.	Weather.	Engine-failure.	Error of Judgment.	Miscellaneous.
1. Regular air service	5	..	..	..	..	2	2	1	3	..	2	..
2. Other flying for hire	1	..	..	..	..	..	..	1	..	1	..	..
3. Subsidized club flying	8	..	1	1	1	1	2	4	3	2	3	..
4. Other club flying	5	..	..	1	..	4	1	..	..	2	1	2
5. Private	2	..	..	..	1	..	..	1	1	1	..	..
Total	21	..	1	2	2	7	5	7	7	6	6	2

Causes of Accidents.

Six accidents were caused by errors of judgment or faulty technique on the part of the pilot, one of which resulted in serious injury to the passenger, minor injury to the pilot, and the total destruction of the aircraft.

Six forced landings were caused by failure of the power-plant, two only resulting in damage to the aircraft.

Adverse weather conditions brought about four forced landings, in one of which the aircraft was destroyed, but without injury to the pilot. No damage to the aircraft was caused by the other three landings.

Three aircraft were damaged on the ground owing to heavy wind.

An aircraft was seriously damaged while on the ground, as the result of the engine being started without a pilot at the controls and the aircraft colliding with a building. Another received serious damage while on the ground as a result of it being struck by the trailing wireless aerial of an aircraft passing overhead.

The details of the major or more serious accidents are as follow :—

Regular Air Service.—While landing a twin-engined aircraft carrying passengers during squally weather conditions the pilot overshot the aerodrome and collided with a fence. No injury was caused to passengers or personnel, but the aircraft was seriously damaged. Another twin-engined aircraft carrying passengers, while taxying on the aerodrome after landing, sustained serious wing damage due to heavy wind causing contact with the ground.

Subsidized Club Flying.—(1) Misunderstanding between an instructor and his pupil resulted in an aircraft being uncontrolled during landing practice and it crashed on landing. The pupil's injuries resulted in the loss of an eye and the pilot suffered minor head injuries. The aircraft was totally destroyed.

(2) A club pilot engaged in cross-country flying misused the petrol-system controls and brought about an engine stoppage. While attempting to effect a forced landing in a field the aircraft was seriously damaged. The pilot suffered minor injuries.

(3) Another club pilot, while attempting a forced landing as a result of engine stoppage due to water in the fuel, caused extensive damage to the aircraft, but escaped injury to himself.

Private Flying.—A private pilot, overtaken by fog while on a cross-country flight, attempted to make a forced landing in a field. Due to contact with obstructions in the field, the aircraft was totally destroyed.

I have, &c.,

R. C. Kean,
Controller of Aeronautical Inspection.

REPORT OF THE DIRECTOR OF THE METEOROLOGICAL OFFICE FOR THE YEAR ENDED 31st MARCH, 1940.

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, 1940.

WAR ORGANIZATION.

Following a recommendation of the Organization for National Security, the control of the Meteorological Service in New Zealand was transferred, on the outbreak of war, from the Department of Scientific and Industrial Research to the Air Department. Due to the close co-operation which already existed between the Meteorological Office and both the Air Force and Civil Aviation Branches of the Air Department, the transfer has involved no appreciable change in the general organization of the Service.

GENERAL.

It is with deep regret that we record the sudden death, on 12th June, 1939, of Dr. Edward Kidson, who had been Director of the Meteorological Office since 1927. When Dr. Kidson assumed control of the Office he set himself the task of building up a scientific weather service in this country. He foresaw the coming development of aviation and the important part which New Zealand would play in trans-oceanic air services, and he strove to anticipate the ever-increasing demands for meteorological information which have arisen. When he took charge he had a staff of four; at the time of his death it exceeded forty. Though he did not live to see the inauguration of regular trans-Tasman and trans-Pacific flights, to him is due the credit, from the meteorological side, for making such services possible as far as New Zealand is concerned. Again, he had always stressed the importance of an adequate meteorological service in the event of war, and this aspect he had constantly in mind in his development of the service. In the passing of Dr. Kidson the British Empire lost a meteorologist of the highest standing.

In last year's report emphasis was laid on the importance of communication services in the meteorological organization, and the assistance of the Post and Telegraph Department, the National Broadcasting Service, and the Aeradio Committee in this connection is gratefully acknowledged. Valuable co-operation has also been received from the Public Works Department Aerodromes Branch, the Marine Department, the Forestry Department, and the Department of Agriculture. A special word of thanks is also due to the large number of voluntary observers throughout the country, without whose continued help the greater part of the climatological work of the Office would cease.

We are also indebted to the Wellington Branch of the Royal Society of New Zealand for presenting to the Office a large number of meteorological books and publications which hitherto had been included in the library of the Society.

CLIMATOLOGY.

During the year the demand for climatological information has shown a marked increase. The requests received cover a wide range of subjects and vary in their nature. An example of the more comprehensive type of report was that presented to the Sheep Industry Commission. Again, many Government Departments have been supplied with extensive and detailed statistical data for special surveys. Besides these, numerous shorter inquiries have been dealt with, and the demands of educational authorities and students have been met as far as possible. An increasing number of private people and firms seek reliable information from the wealth of the records accumulated in the Meteorological Office throughout the years.

With the establishment of climatological stations at Wallaceville, Maioro, and the Kermadecs, the total number furnishing data now stands at sixty-four for the Dominion, besides eight for the Pacific Islands under New Zealand administration. All these stations record daily rainfall maximum and minimum screen temperatures and 9 a.m. temperature and humidity. Certain of them record barometric pressure, soil temperatures, duration of bright sunshine, and the run of the wind.

Another 500 stations are supplied with rain-gauges by the Meteorological Office and continue to forward monthly returns of daily rainfalls, and may add useful information concerning special phenomena.

During the year the tabulation of continuous records of humidity was begun at Auckland, Wellington, and Christchurch, and of pressure, temperature, humidity, and rainfall at Ohakea, while the previous tabulations were continued of pressure, temperature, rainfall, and wind at Auckland, Wellington, and Christchurch, of temperature at Alexandra, and of sunshine, cloud, and visibility at Wellington.

Wind data are being extracted from Dines Anemometer Charts from nine instruments in addition to those at Auckland, Wellington, and Christchurch. Most of these have been established by the Public Works Department. The Aerodromes Branch of that Department also collects detailed returns from the various aerodromes under its control, and the Meteorological Office extracts and summarizes this information which relates especially to cloudiness, height of low cloud, visibility, and winds.

Unfortunately, circumstances during the past year or two have not made it possible to arrange adequate systematic inspections of the instruments and sites of the observing-stations.

Forecasting.

The most important development during the year has been the introduction of reports from a limited network of stations at 6 p.m. and midnight, in addition to the existing reports at 6 a.m., 9 a.m., noon, and 3 p.m. Similar arrangements have been made in Australia, and we thus now have four principal synoptic charts, covering a wide area, based on observations made within one hour of the times 00, 06, 12, and 18 G.M.T. which have been agreed upon internationally as principal observing hours. Supplementary charts at 9 a.m. and 3 p.m., also, are drawn. There is a regular interchange of synoptic reports between New Zealand, Australia, Fiji, and Samoa by means of short-wave wireless telegraph broadcasts six times each day. To meet the requirements of war-time defence and of trans-ocean flying, a twenty-four-hour service is now maintained in the Meteorological Offices in Wellington and in Auckland.

Just prior to the outbreak of war and the consequent cessation of all ships' reports, arrangements had been made whereby vessels in this area would send four weather reports each day at times corresponding with the principal weather charts. Introduction of this extended scheme has had to be postponed, but the advantage to the forecaster in having additional weather charts based on observations from land stations at 6 p.m. and midnight has done much to offset the handicap imposed by the absence of ships' reports during war-time.

The great majority of synoptic stations in New Zealand are now reporting in international code, and during the year several more were equipped to enable full reports to be given, including barometric tendency and humidity. As with the climatological stations, lack of staff has, unfortunately, made it impossible to arrange for adequate inspection of reporting stations, but, notwithstanding, a considerable improvement has been made in the general standard of reports and in the accuracy of barometer readings. Regular pilot-balloon observations were started during the year at Awarua Radio Station, near Invercargill, and at the Kermadec Islands.

The organization of the weather reporting system from islands in the south-west Pacific, under New Zealand control, was improved during the year. Use of the full international tropical code, designated F. 12 was introduced, and all the islands now make observations at 1900 and 0100 G.M.T. In addition, a limited number make observations at 0600 G.M.T., and Rarotonga and Apia at 1200 G.M.T. also. All the reports are collected and rebroadcast as a collective synoptic message by Apia Radio at 0230, 0815, 1220, and 2030 G.M.T. respectively.

The steady increase in the demand for special forecasts provides ample evidence that many sections of the public are making progressively fuller use of the forecasting service. There appears to be a definite increase in interest in their local weather by members of the public, and this immediately results in a much more intelligent use of the forecasts. The handicap placed on a forecaster, in a country of such varied topography as New Zealand, in having to issue forecasts covering a wide area in a comparatively few words is not generally realized. He can do little more than indicate the general type of weather to be expected. But the man who takes an intelligent interest in the day-to-day weather changes soon learns to interpret this forecast in the light of the local peculiarities of his own district.

In addition to many inquiries by telephone every day, much more frequent use is being made of the facility whereby a forecast can be obtained by telegram, either " reply paid " or by having the answer sent " collect." Inquiries come from many sources, the most common being from farmers with reference to such operations as haymaking and shearing, from engineers in connection with building operations, road-sealing, &c., and from shipping interests and yachtsmen.

Special district forecasts are broadcast daily from Stations 1YA and 2YA at 7.30 a.m. and from the four main YA stations at 1 p.m. and 6.55 p.m. when a Dominion forecast is also included. In addition, a forecast for the Hawke's Bay area is given from 2YH at 6.45 p.m. A forecast for farmers covering the next twenty-four hours, together with a " further outlook " giving an indication of the conditions expected during the next two or three days, is broadcast from 2YA at 3.30 p.m., except Saturdays and Sundays, and from the other YA stations at 4 p.m. In addition, aviation weather reports are broadcast from 2YA and 4YA at 6.50 a.m., 10 a.m., and 1 p.m. In these latter a summary is given of the existing weather conditions over New Zealand, and weather reports from about fifteen of the main towns or aerodromes are included. The 10 a.m. broadcast contains, in addition, a Dominion forecast for the remainder of the day. Forecasts are also supplied to the National Commercial Broadcasting Service and to the press.

For a number of years a forecast and series of weather reports for the use of ships have been broadcast at 0930 G.M.T. each evening by radio telegraphy from Station ZLW, on a frequency of 385 kc/s. At the beginning of 1940 the time of this broadcast was advanced to 0530 G.M.T., and it has subsequently been transmitted simultaneously on a frequency of 385 kc/s. and 14,850 kc/s. (or 7,600 kc/s. during the winter months). At the same time a similar transmission of weather reports for shipping was introduced at 2020 G.M.T. Full details of this special service for shipping were issued as a " Notice to Mariners," in the *New Zealand Gazette* No 145, of 20th December, 1939, and amended by an erratum notice in the *Gazette*, No 146, of the following day.

Auckland Branch.

Early in the year under review the Auckland Branch was moved from the temporary accommodation in Auckland into its new quarters in the trans-Tasman terminal building at Mechanics Bay. The office is connected by teleprinter with the radio-station at Musick Point, and the detailed system of co-operation with the Meteorological Office at the Sydney terminal has been fully developed along the lines laid down at the Melbourne Conference in December, 1938. The organization has worked satisfactorily on the various survey flights of the flying-boat " Aotearoa."

Mr. L. N. Larsen, the Meteorologist in charge at Auckland, flew to Sydney on one of the survey flights of the " Aotearoa," and the Director and Mr. W. R. Dyer, of the Auckland Office, were passengers on the second survey flight to Suva and Nukualofa.

Air Force Stations.

A Meteorological Office is maintained at Wigram Aerodrome, Christchurch, with a staff of two professional officers, two junior assistants, and two airmen meteorologists. The chief function of the Christchurch Office is the provision of instruction in meteorology for Air Force trainees. In addition, it acts as a forecasting centre for all local flying activities and is one of the principal synoptic stations making regular pilot balloon observations in addition to full weather reports at 6 a.m., 9 a.m., noon, 3 p.m., 6 p.m., and midnight.

A professional meteorologist, with an airman assistant, took up duty at Ohakea and Blenheim as soon as the regular training programme started at these aerodromes. In each case the main duty of the meteorologist is that of instructing pilots and observers, but a limited amount of observational and forecasting work is also carried out.

At all three aerodromes every opportunity is taken of having aerological observations made whenever an aeroplane is available for making a flight to considerable heights.

Apia Observatory.

Following a recommendation of the Observatories Committee of the Council for Scientific and Industrial Research, the control of Apia Observatory, for administrative purposes, was transferred to the Meteorogical Office on the 1st September, 1939. In recent years meteorology has played an increasingly important part in the work of the observatory. The new system of administration has the advantage of facilitating the regular interchange of professional staff between the observatory and the Meteorological Office.

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

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