1950

NEW ZEALAND

AIR DEPARTMENT

(REPORT ON THE) FOR THE YEAR 1949–50

Presented in Pursuance of Section 7 of the Air Department Act, 1937

REPORT BY THE HONOURABLE T. L. MACDONALD, MINISTER IN CHARGE OF THE AIR DEPARTMENT, FOR THE YEAR ENDED 31st MARCH, 1950

MR. SPEAKER,—

I have the honour to present to Parliament the report of the Air Department for the year ended 31st March, 1950.

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REPORT OF THE CHIEF OF THE AIR STAFF FOR THE YEAR ENDED 31st MARCH, 1950

The Hon. the MINISTER OF DEFENCE, Wellington.

I HAVE the honour to submit the following report on the Royal New Zealand Air Force for the year ended 31st March, 1950.

1. INTRODUCTION

During the past year progress has been made in the administrative organization and the operational efficiency of the R.N.Z.A.F., and both the flying and technical training programmes have been expanded. Much remains to be accomplished, however, before the operational control organization is fit for war in this theatre, and before any units of the Regular Air Force reach the minimum strength and operational efficiency necessary for service overseas.

The strength of the Air Force at 31st March, 1950, was 416 officers and 3,079 other ranks, which is 446 higher than last year. Recruiting has improved since last year, but it is still unsatisfactory, and the wastage rate of skilled personnel remains high. The cost of technical training is such that the provision of additional married quarters at stations would represent a real economy.

It has, for these reasons, been difficult to maintain the flying training programme as well as other Service and quasi-Service commitments. Nevertheless, the flying training programme has been doubled and the total flying has increased by 25 per cent. The increased flying has only been possible by relying still more on private industry.

The maintenance difficulties are increased by the obsolescence of the existing equipment. The R.N.Z.A.F. is the only Commonwealth Air Force without at least some modern aircraft, and in view of the time involved in securing such aircraft under present conditions, this matter should receive early attention.

Progress has been made in the organization and training of the Territorial Air Force and the Active Reserve. It is hoped the introduction of the Military Training Act will overcome the shortage of ground trades in the Territorial Air Force.

2. OPERATIONS—REGULAR AIR FORCE

OVERSEAS

Since September, 1949, a detached flight comprising three aircraft and four crews of No. 41 Transport Squadron has been attached to Far East Air Command, R.A.F. This flight is based at Singapore. In order to provide replacement crews, aircraft spares, and mail, one courier flight from New Zealand to Singapore and return is carried out each month. In January, 1950, a detachment of two Catalinas and four crews of No. 5 Squadron, Fiji, was exchanged with two Sunderlands of No. 88 R.A.F. Squadron, Hong Kong. Two transport crews continue to represent the R.N.Z.A.F. on No. 24 Commonwealth Transport Squadron, R.A.F.

CO-OPERATION WITH OTHER SERVICES

No. 75 Squadron has carried out a series of exercises with the Army and Navy. During the recent visit of units of the Royal Australian Navy, combined operation exercises provided valuable experience for Mosquito crews of this squadron.

SQUADRON ACTIVITIES

No. 5 Squadron, Fiji, equipped with six Catalina aircraft, has continued to be employed on the training of replacement aircrew and on search and rescue missions, and has carried out thirteen " mercy " flights at the request of the High Commissioner

for the Western Pacific. A detachment of two aircraft and crews has been maintained at Hobsonville for search and rescue duties. This flight has carried out several "mercy" missions to the Chatham Islands.

No. 41 Squadron, equipped with eleven Dakotas and two Avenger aircraft, has been employed on the following—replacement crew training, overseas schedules, search and rescue, aerial top-dressing, and flying displays.

No. 42 Squadron, equipped with two Devons, three Dominies, five Harvards, and four Austers, has been extensively occupied throughout the year with communications commitments. The Austers have carried out the usual forestry-patrol duties at Rotorua during the fire season. Meteorological flights have been regularly carried out, using Harvard aircraft.

No. 75 Squadron, which is now equipped with nine Mosquito aircraft and thirteen crews, has throughout the period under review concentrated on crew training and armament practice. The squadron has been called on many times to assist in search and rescue operations. A satisfactory standard of operating efficiency has been attained, and flights to both the Chatham Islands and the Kermadec Islands have been made as routine navigational training.

Liaison Visits

In June, 1949, the Chief of the Air Staff visited England to attend "air exercises" and to discuss with Air Ministry the re-equipment of the R.N.Z.A.F.

In December, 1949, representatives of the Royal Pakistan Air Force made a tour of Royal New Zealand Air Force stations and establishments as guests of the New Zealand Government.

During the period under review five York and three Lancastrian aircraft of No. 24 Commonwealth Transport Squadron, R.A.F., visited R.N.Z.A.F. stations on training flights.

Statistics

A summary of flying-times for all units is given in Appendix A. The total of 24,763 hours shows an increase over the hours flown in the preceding period (19,709 hours). During this period the amount of flying training has been double that carried out in the preceding year. Flying is still restricted owing to the lack of flying-hours due to maintenance difficulties within the Service.

3. MISCELLANEOUS FLYING ACTIVITIES

A communications flight, equipped with Auster aircraft, has been maintained at Rongotai for the purpose of facilitating visits to stations by Air Department officers, for flying practice, for search and rescue activities, and for training for Army A.O.P. pilots.

Search and rescue operations co-ordinated by the Air Traffic Control Division of Civil Aviation have been carried out during the year. The R.N.Z.A.F. provided aircraft on twelve occasions in searches for missing launches, dinghies, trampers, Civil aircraft, and distressed merchant shipping.

During the past year further aerial top-dressing experiments were carried out using Avenger aircraft. The programme "Top-dressed Three" was completed with these aircraft in the Masterton area. An Aerovan is being prepared for use on a magnetic survey in co-operation with the Dominion Physical Laboratory.

4. ANCILLARY SERVICES

Meteorological Services

The meteorological services required by the Air Force are provided by the Meteorological Branch of Air Department. The report of the Director of Meteorological Services appears in a separate section of this report.

Air Traffic Control

This division of the Civil Aviation Branch provides air traffic control and flight information services for the R.N.Z.A.F. in addition to discharging its Civil aviation responsibilities. All Air Traffic Control personnel at Air Force stations are members of the Territorial Air Force and work as members of the R.N.Z.A.F. This scheme represents an appreciable economy, but it will only work satisfactorily provided adequate steps are taken to include the full range of techniques required by the Air Force in the activities of the division.

5. AERONAUTICAL RESEARCH

R.N.Z.A.F. officers appointed to the New Zealand Scientific Defence Corps have continued their activities in connection with aeronautical research. Their work in the United Kingdom has been highly praised. As some of these officers will be returning next year to continue their research, it is most desirable that the facilities available at Ardmore, both in the Research and Development Flight, R.N.Z.A.F., and the Auckland Engineering School should be developed to permit a continuance of this work and the retention of these officers. A detailed report of the New Zealand Scientific Defence Corps is contained in the report of the Chiefs of Staff.

6. PERSONNEL

Statistics

Although some progress has been made in the build-up of the Service to the peace establishment, a shortage of officers and aircrew has been experienced, and in certain branches there is still a serious under-manning. The strength position at the end of March, 1950, is as follows:—

——	Officers.	Airmen.	Airwomen.	Total.
Permanent service	179	312	..	491
Short service (two to eight years)	189	2,262	331	2,782
Temporary service	48	162	12	222
	416	2,736	343	3,495

This strength summary shows a high proportion of short-service airmen serving with the R.N.Z.A.F. The majority of these personnel have been enlisted during the last three years from the United Kingdom and New Zealand sources. Permanent engagements, which will be granted to airmen who make suitable advancement during their initial service, will bring about a more even distribution of engagements during the coming year.

Manning

Insufficient response has been made to the various recruiting campaigns to secure the personnel required for the proper manning of the ground trades. Neither the numbers offering nor the general standard of applicant has been satisfactory. The variety of attractive opportunities for employment outside the Service has resulted in the R.N.Z.A.F. being merely another bidder for labour in a scarce market, where the conditions of service have tendered to favour civilian employment. For the Women's Auxiliary Air Force, however, both the reponse and the standard of applicant have been very satisfactory. The conditions of service in the R.N.Z.A.F. have been recently improved by an increase in the percentage of permanent engagements available to airmen.

Recruiting for the Regular Air Force resulted in a total of 959 personnel being enlisted during the period as shown in the following table :—

(*a*) From United Kingdom—	
Ex-R.A.F. tradesmen	129
(*b*) From within New Zealand—	
(i) Airmen including aircrew Cadets	477
(ii) Airwomen	239
(iii) Cadet entrants	114
Total	959

The effective strength of the R.N.Z.A.F. in terms of trained personnel has decreased slightly during the period under review, although there has been some improvement in the gross strength position. The training periods in respect of many of the more highly skilled trades are in excess of one year inclusive of recruit training, from which it will be appreciated that a marked improvement in the effective strength position takes some time to achieve. A matter of serious concern in the manning of the Service within New Zealand is the shortage of personnel in domestic trades, which has necessitated the misemployment of more highly skilled personnel in order to maintain essential services.

The most pressing problem in maintaining the effective strength is associated with the high release rate from the Service which, in the period under review, amounted to 586 personnel, many of whom were fully trained. Chief among the causes of this high wastage rate are the inability of the Service to provide sufficient married quarters, and the necessity for Service reasons to move personnel from one location to another.

Women's Auxiliary Air Force

The strength of the W.A.A.F. at 31st March, 1950, was 18 officers and 343 airwomen.

Exchange or Service With Other Commonwealth Air Forces

The exchange of officers with the Royal Air Force has continued, and it is hoped in the coming year to arrange similar exchanges with the Royal Australian Air Force. Five officers of the R.N.Z.A.F. have been on exchange duty in the United Kingdom, This scheme continues to be most beneficial to the R.N.Z.A.F. and represents an appreciable economy from the training point of view.

Courses

During the year 1 officer attended the Joint Services Staff College, 2 officers the Royal Air Force Staff College, and 4 officers various Royal Air Force specialist courses in the United Kingdom. Two officers attended the R.A.A.F. School of Land/Air Warfare, and 1 is at present a student at the R.A.A.F. Staff College.

Honours and Awards

The following honours and awards were conferred on R.N.Z.A.F. personnel during the year :—

Honours

Knight Commander of the Order of the British Empire	1
Commander of the Order of the British Empire	2
Officer of the Order of the British Empire	2
Member of the Order of the British Empire	4
British Empire Medal	8

Awards

Air Force Cross	2
Commendations	4

Casualties

	In New Zealand.	Overseas.
Killed (Service accident)	1	1
Killed (non-Service accident)	3	..
Died of natural causes	3	1
	7	2

7. MEDICAL AND DENTAL SERVICES

Sickness in the R.N.Z.A.F. has decreased steadily since 1946 when the constant sick-rate was 4·9 per cent., till it now stands at 1·7 per cent. To obtain conformity with other Services, standardization of medical supplies and medical forms, and the use of the Pulheems system of classification have been adopted. Equipment facilities have been improved by the acquisition of x-ray apparatus, R.A.F. gramophone audiometer, decompression chambers, and a portable anæsthetic apparatus, which are at present under construction, under test, or in use on R.N.Z.A.F. stations.

The inadequacy of barrack and sick-quarter accommodation at Hobsonville and Wigram is a problem requiring urgent consideration.

The result of the mosquito survey at Whenuapai and in Fiji has provided an invaluable guide for control measures in these areas. Future commitments of the R.N.Z.A.F. medical service include tuberculin testing, immunization against tuberculosis, and annual chest x-ray of all personnel.

During the period under review there has been continued development and expansion of the services provided by the Royal New Zealand Dental Corps. All regular R.N.Z.A.F. personnel are examined once every six months and made dentally fit either in the Royal New Zealand Dental Corps section establishment on stations, or in the visiting dental caravan-trailer. As a result the dental health of R.N.Z.A.F. personnel is good.

8. TRAINING

Flying Training

During 1949, the Flying Training School, Wigram, reached full peacetime activity in pilot and navigator training. With a planned intake of 12 Cadet Pilots every four months, this school reached its maximum trainee strength of 48 pupils by May, 1949. Pilot training has progressed according to plan and a satisfactory standard of training has been achieved. A total of 24 Pilots have completed pilot training.

A total of three courses of flying instruction were completed by Central Flying School, Wigram, and 14 officers and N.C.O.s received flying instructors categories. C.F.S. is responsible for the general standard of flying instruction in the R.N.Z.A.F. and for the supervision of the Air Training Corps flying training scheme at aero clubs.

The Instrument Weather School, Wigram, completed a total of eight courses, each of six weeks' duration. This school is responsible for the standard of instrument flying throughout the R.N.Z.A.F., and organized tours by examining officers of this school were made of all flying units. In modern Service flying training, emphasis must be placed on all-weather flying, without the same range of navigation aids as are available to commercial aviation. Considerable progress has been made in the development of techniques and improvement in the knowledge necessary for flying under all weather conditions.

During the period under review the Air Navigation School, Wigram, has continued to supply navigation training as required for Navigation Instructor, Pilot Cadet, and Navigator Cadet courses. No. 3 Navigator Training Course comprising 5 experienced Navigators commenced training in January, 1950. During the year 8 Navigators and 7 Navigator-Wireless Operators graduated from the school, while a further 15 Navigators are at present under training.

No. 14 (Multi-Engine Conversion) Squadron, Ohakea, commenced the period under review with four Mosquito aircraft, but was subsequently reformed into a multi-engine conversion unit and equipped with eight Oxford aircraft. The function of this unit is to provide continuation training for all aircrew completing *ab initio* training at Wigram. The first phase of the course consisted of multi-engine conversion for Pilots, while the second phase provided crew training for both Pilots and Navigators. No. 1 Course, comprising 12 Pilots and 8 Navigators, completed the syllabus in January, 1950.

Technical Training

The technical training activities at Hobsonville and Wigram have developed with the increase in the number of trades in which instruction is available. The following table shows the increase in the numbers under training :—

——	Number Under Training at 1st April, 1949.	Number Under Training at 1st April, 1950.
Engineering	154	207
Electrical and wireless	40	68
Administrative and domestic	65	87
	259	362

Note.—The above totals include 17 civilians under training for Civil Aviation Branch at the E. and W. School, and 10 Tasman Empire Airways apprentices at T.T.S., Hobsonville.

The School of Administration which was formerly a section of T.T.S., Hobsonville, was formed as a separate unit and based at Whenuapai.

During the year, the Central Trade Test Board tested a total of 756 airmen and airwomen in all trades. The headquarters of the Board moved from temporary accommodation at Rongotai to Woodbourne in February, 1950.

General Service Training

Since the last annual report there has been an improvement in the general standard, discipline, conduct, and bearing of personnel both on and off station. This has been mainly due to the establishment of general service training schools within the R.N.Z.A.F. and in particular of the N.C.O. School of Instruction, Wigram.

Recruit training schools at Wigram received a total of 621 recruits for initial training. The Cadet Entrant School at Wigram received its first intake in April, 1949. Altogether three drafts, totalling 109 Cadets, have undertaken general service training since that

date. The syllabus is similar to that for adult recruits with more emphasis on education and allied subjects. The policy of segregating these Cadets is observed and they are quartered away from station personnel and enjoy their own recreational facilities.

To remedy the shortage of general service instructors and to prepare suitable instructors for training under the Military Training Act, 1949, at Taieri, advantage was taken of the Regular Force Instructor courses at Army School, Trentham Military Camp, to have existing drill instructors converted to G.S.I. To date 16 instructors have been converted.

9. NON-REGULAR FORCES

Some progress has been made in selecting personnel for the T.A.F. and the Air Force Reserve from among those applicants who served in the Commonwealth Air Forces during World War II. The combined strength of T.A.F. and Active Reserve is now 781, made up as follows:—

——	Officers.	Aircrew.	Airmen.	Total.
T.A.F.	135	38	123	296
Active Reserve	219	10	256	485
	354	48	379	781

Territorial Air Force

The four Territorial Air Force Squadrons completed their planned flying training programmes during the year, including an armament training camp of two weeks' duration. The role of each of these four squadrons will be that of a ground attack - fighter squadron, but the only aircraft at present available are Tiger Moths and Harvards. To improve the field of selection for aircrew training in the T.A.F., senior secondary-school Cadets of matriculation and school certificate standard have been included in the Air Training Corps flying training scheme. The response of skilled tradesmen to join the T.A.F. was originally inadequate and has remained so. The initial establishment for each squadron was for 80 Territorial tradesmen, but the four squadrons' total is now only 82.

Active Reserve

Membership of the Active Reserve has been confined to senior officers who can be placed in command or administrative appointments in the event of mobilization, to officers with approved flying instruction qualifications, and to certain skilled tradesmen.

General Reserve

Selections for the General Reserve are not yet completed, priority having been given during the year to selections for the T.A.F. and the Active Reserve.

Air Training Corps

The Air Training Corps is the only statutory Cadet Corps in New Zealand. It is a valuable auxiliary to the R.N.Z.A.F., and it is in the interests of the Service as a whole that its activities should be fully supported. In March, 1950, there were 50 school units with 84 officers and 3,133 cadets, and 46 town units with 73 officers and 1,437 cadets.

Summer camps were provided at Weedons, Ohakea, Whenuapai, and Reikorangi for 600 N.C.O.s and Cadets. The training programme consisted of instruction in aeronautical subjects, practical demonstrations, physical and recreational welfare, and first-hand contacts with normal Air Force activities.

The Military Training Act, 1949

Although the Military Training Act, 1949, was primarily designed to establish a Territorial Army, it will provide a means of obtaining the numbers required to build up the Territorial Air Force. At the same time Air Force training, particularly Pilot training, cannot be completed within the training periods laid down in the Act. Consequently, persons liable for training under the Act who wish to serve in the Territorial Air Force must volunteer to carry out the additional training required. Otherwise the resources of the Regular Air Force, which are already heavily strained, would be dissipated by training of no value to the Service.

The R.N.Z.A.F. Station Taieri (Dunedin) has been reopened as a training station for this purpose. Certain additional works are, however, required before the desired numbers can be accepted, and economical use made of the station staff and facilities.

10. EQUIPMENT

The aircraft strength at 31st March, 1950, stood at 425, but the effective strength is very much less since a considerable number of the reserve aircraft are only fit for reduction to spares.

The continued use of obsolete aircraft and associated equipment and supplies necessitates the holding of abnormal quantities of spares, and the retention of a disproportionately large reserve of replacement aircraft. Spares for the aircraft operated by the R.N.Z.A.F. are daily becoming more difficult to procure. The maintenance and storage of reserve aircraft is also a serious burden. All of these factors emphasise the need for early approval of the proposed aircraft rearming programme. No new operational or training aircraft have been purchased since the war. The R.N.Z.A.F. is the only Commonwealth Air Force without some modern types of aircraft.

The R.N.Z.A.F. motor transport fleet should be re-equipped with new vehicles to reduce the present excessive maintenance expenditure. Maintenance of motor transport in the R.N.Z.A.F. during the year has been a major problem. During the year, an expenditure of approximately £30,000 was necessary to maintain these vehicles which indicates their poor condition due to long years of wartime service.

The reduction to spares of surplus Dakota, Catalina, and Consul aircraft has been completed, and the stock position behind these types is considered satisfactory for several years. The general stock position of airborne and ground radio spares is unsatisfactory. Difficulty arises through the unavailability in the United States of spares for the obsolete types of American radio sets used by the R.N.Z.A.F. The majority of surplus tools have been disposed of by public auction. The contract for aviation fuel and oils and the maintenance of refuelling equipment in the R.N.Z.A.F. has been transferred to British Petroleum Co., but the reserve position is as yet unsatisfactory.

Improvements in the availability of clothing and barrack equipment have been evident during the year and it is hoped that supplies will satisfy demand in the near future. The standard of messing provided on stations has been maintained. Civilian caterers, whose service has been satisfactory and economical, will continue to be employed at Shelly Bay, Weedons, and Taieri.

During the year, No. 2 Stores Depot, Mangaroa, was closed and stocks were transferred to Nos. 1 and 3 depots. The depot was transferred to the Army Department.

Movements Section

The R.N.Z.A.F. remains responsible for arranging all overseas passages for the three Services, in addition to shipping of equipment into the Port of Auckland.

The formation of No. 3 Movements Section, Christchurch, has provided improved facilities for the movement of personnel and freight. A summary showing traffic for the year is as under :—

	Passengers.	Freight. lb.
(*a*) *Air Traffic*—		
Internal	2,704	644,542
Overseas	341	77,670
(*b*) *Sea*—		
Coastal—		
(i) Disembarked	2,055	..
(ii) Embarked	2,538	..
Overseas—		
(i) Disembarked	138	787
(ii) Embarked	90	2,586
(*c*) *Rail*	10,352	1,068

11. TECHNICAL SERVICES

During the year 1949–50, technical activities generally have been of a higher order than those of the previous year, while the pattern of the organization has shown better definition. Technical statistics and centralized control of technical wing functions on stations have been placed on a sounder basis by the formation of technical control-rooms. The engine-repair section of No. 1 Repair Depot, which has been transferred to Woodbourne, is ready to operate, but without the remaining complementary sections of the depot yet to be shifted, the repair work is limited.

The increasing demand for flying has placed a heavy burden on the technical support. As the staffing position has failed to keep pace with technical commitments, an out-of-balance condition has arisen as a result of which major servicing has fallen badly into arrears. This has been accentuated by the added commitments of major servicing for Dakota aircraft from the Singapore detachment, and the servicing of aircraft for the Territorial Air Force squadrons. It was again necessary to place contracts for servicing with Civil contractors. The storage of reserve aircraft, which total some two hundred and forty, constitutes a heavy drain on resources. The increasing age of this equipment brings problems of servicing and replacement of parts.

Armaments

No major changes in armament practices in the R.N.Z.A.F. have been made, but all equipment required for the use of forward firing rockets by Mosquito aircraft has been received and installed preparatory to use. The Armament Repair Depot has not yet been transferred to Woodbourne, and major repairs continue to be undertaken by Ohakea. Two armament officers are attending courses in the United Kingdom and 1 senior N.C.O. completed a Senior Instructor's course with the Royal Australian Air Force. The present air firing and bombing ranges at Ohakea and Seagrove are inconveniently situated in respect to Civil aviation radio ranges.

Signals

The activities of the R.N.Z.A.F. signals organization during the year under review have been confined almost wholly to the maintenance of the R.N.Z.A.F. communications system and to the airborne equipment associated therewith. A close study of radio aids to air navigation for modern high-speed aircraft has been made. The provision of

more modern equipment for this purpose is of vital importance to the R.N.Z.A.F. In pursuance of this, an interchange of technical signals officers with the R.A.F. or the R.A.A.F. would be of considerable value. The first installation in New Zealand of the Air Force world-wide radio tape relay circuit has been completed between R.N.Z.A.F. Headquarters and Ohakea.

The increase in the use, both internationally and within New Zealand, of very high frequencies for communications to and from aircraft has raised the problem of an adequate system at R.N.Z.A.F. airfields.

There is satisfactory liaison between the three Services on communication radar matters, with the Post and Telegraph Department on general communications, and with the Department of Scientific and Industrial Research on matters of an electronic research nature.

Photography

Work carried out by photographic sections of the R.N.Z.A.F. included aerial photography for the Army and Navy, an aerial survey for the Department of Scientific and Industrial Research of hopfields at Motueka, publicity photography for recruiting purposes, photographs for the illustration of technical reports, &c., as well as training in aerial photography carried out by Pilot and Navigator trainees at Flying Training School, Wigram.

12. WORKS SERVICES

Great difficulty has been experienced during the past year in making any satisfactory progress with the construction of buildings and married quarters urgently required by the Air Force. The major works involved included the provision of extra accommodation at Hobsonville and Whenuapai, the replacement of temporary wartime hutted accommodation at Lauthala Bay (Fiji), Te Rapa, and Weedons, the transfer of the aircraft depot from Ohakea to Woodbourne, and the provision of additional storage facilities at Te Rapa and Weedons. Although financial approval had been obtained to the expenditure of £235,000 for buildings and £80,000 for married quarters, it was not found possible to commence any of these works until the end of the year, with the result that only one-third of the amount approved for the building programme was expended.

With regard to the provision of married quarters, the building of some fifty houses has just commenced. These delays have been due mainly to the administrative difficulties involved in securing approvals, to the pressure of work in the Ministry of Works, and to the difficulties experienced in letting contracts.

The standard of maintenance of the major air-stations by the Ministry of Works has been good, and the well-kept appearance of these stations has an important bearing on morale and efficiency.

13. ORGANIZATION AND ADMINISTRATION

Consequent upon the examination and review of orders and regulations referred to in last year's report, R.N.Z.A.F. regulations have been rewritten and will be submitted for approval shortly. The compilation of Air Board Orders which will supplement the new regulations is in progress.

In conjunction with the Navy and Army, details of an Armed Forces Bill have been submitted to the Law Draftsman. This Bill will provide for needs common to the three Services and will revise a number of other enactments which are either out of date, or which, while at present applying to certain of the Services only, could with advantage be used by them all.

The Air Force Act, 1937, the Air Force Amendment Act, 1947, and the Air Force Act (Imperial) have been revised and drafted into a Bill entitled the R.N.Z.A.F. Bill, 1950, which it is hoped to bring down in the forthcoming session of Parliament. Under this Bill the Air Force Act (Imperial) will no longer apply to the R.N.Z.A.F.

14. EDUCATION

The resources of the Education Branch have been concentrated almost entirely on the various aspects of training—preparation for aircrew and technical training, educational preparation for promotion examinations, and general service indoctrination of recruits. Suitable progress has been made in all these aspects, but the most difficult task is preparing for aircrew and technical training. The educational standard of recruits is still causing concern, so that preparation for the specialist aeronautical and aircrew training must be preceded by a revision of the general education of the recruits.

The staff of education officers was increased by the appointment of further qualified teachers with Service experience to short-service commissions in the R.N.Z.A.F. The activities of these officers are augmented by the occasional employment of part-time teachers.

A satisfactory standard of library service has been maintained on all stations. This has been greatly assisted by the addition of W.A.A.F. librarians, under training, to the staffs of station libraries. Further recreational facilities have been maintained in hobby, entertainment, and sports clubs.

The co-operation of the Education Department, Technical Correspondence Schools, Civil Technical Colleges, and Rehabilitation Department has been received in catering for the resettlement needs of personnel. The service rendered by these organizations is much appreciated. As the Air Force has a large resettlement problem, the development of satisfactory schemes for rehabilitation into industry has an important effec on the welfare and efficiency of the Service.

15. ACCIDENTS PREVENTION

During the period under review there occurred twenty-one reportable accidents. The majority of these occurred during training and were typical of this class of flying. Five aircraft were destroyed as a result of these accidents, but no injury was caused to personnel.

An examination of all R.N.Z.A.F. aircraft accidents appears in the report of the Inspector of Accidents.

16. PUBLIC RELATIONS

Reports on the work performed by the R.A.F. Research and Inquiry Service were received regularly throughout the year, and 373 next-of-kin were notified of the results of investigations on individual cases.

In addition to routine and special press releases, a contract was entered into with the magazine *New Zealand Flying* for the publication of Service news. Liaison has been established with the National Film Unit, and a film covering the activities of the R.N.Z.A.F. Forest Patrol has been taken. Other coverage of similar nature is under consideration.

Arrangements were made for the acceptance into private homes over the Christmas period of a number of ex-R.A.F. personnel now serving with the R.N.Z.A.F.

17. HISTORICAL RECORDS

The first draft of the R.N.Z.A.F. history is nearing completion with two and a half chapters still to be written. As sections of the draft are completed they are distributed for use within the Service as an interim history. The historical sections at Air Department and in London have written popular histories of the work of New Zealanders in Bomber, Coastal, Fighter, and Middle East and South-east Asia Commands, which will be published this year.

18. CONCLUSION

The maintenance of a modern Air Force in a country with a light industrial backing such as New Zealand creates special problems. Intimate relations should be built up with our nearest neighbour, Australia, in the matter of aircraft supply and maintenance. Overseas training in many specialist fields is essential. In the long run, the efficiency of the Air Force depends upon the support of an enlightened public. This is fostered by the employment of the Air Force in peacetime on projects of national importance, or economic value. This policy is being followed subject to the limitations imposed by the primary task of the Air Force and the nature of its training.

I wish to acknowledge the co-operation given to the Air Force during the past year by other Departments of State. Our relations with the other two services are steadily growing closer which is a good augury for the more intimate co-ordination of Service activities in the future.

I have, &c.,

A. DE T. NEVILL,
Air Vice-Marshal,
Chief of the Air Staff.

APPENDIX A

FLYING STATISTICS FOR YEAR 1ST APRIL, 1949, TO 31ST MARCH, 1950

	Flying-hours.
Operational units—	
No. 5 (B.R.) Squadron	1,237
No. 75 (F.B.) Squadron	1,474
Total	2,711
Transport units—	
No. 41 Squadron	3,836
No. 42 Squadron	2,614
Total	6,450
Training—	
No. 14 Squadron (Conversion)	1,782
No. 1 Flying Training School	11,744
Air Navigation School	
Instrument Flying School	
Central Flying School	
Total	13,526
Miscellaneous—	
Communications flight, Rongotai	646
Search and rescue	176
Meteorological flights	323
Forestry fire patrol	200
Station flying for communications	519
Research and development flight	212
Total	2,076
Grand total	24,763

REPORT OF THE DIRECTOR OF CIVIL AVIATION FOR THE YEAR ENDED 31st MARCH, 1950

The Hon. the MINISTER IN CHARGE OF CIVIL AVIATION.

I HAVE the honour to submit the following report on civil aviation for the year ended 31st March, 1950.

PART I—INTRODUCTION

Twelve months ago mention was made of the increasing responsibilities vested in the Civil Aviation Branch resulting partly from New Zealand's membership in the International Civil Aviation Organization (ICAO). Many of the problems associated with these responsibilities, and additional problems related to the introduction of new procedures designed to ensure the safety of air navigation, have been dealt with in the past twelve months, and although not all the difficulties facing the Branch have been solved, encouraging progress has been made. Some of the staffing difficulties encountered in the past have been overcome, and recruitments, particularly in the technical categories, have helped to establish an organization which can keep abreast of current problems and, perhaps, engage in essential operational research, which is so necessary in the practical application to local conditions of international standards and procedures.

As a member of ICAO, New Zealand has, of course, adopted many of the standards and procedures issued by the Organization. Such a step is very necessary in the interests of uniformity. The standards and procedures referred to are mandatory only in respect of international air navigation, but for want of a suitable yardstick they are, as far as practicable, being introduced also for domestic application.

Notwithstanding the foregoing comments, it should be emphasized that New Zealand is still operating largely with equipment adapted from military use, and that if operators are to offer efficient low-cost services to the public there will be continuing demands for improvements for many years to come. The demands for new or extended aerodromes, for night flying and other facilities, still far exceed economic and technical resources or the amount of money that can be devoted to civil aviation development without prejudicing other equally important national requirements.

The report of the United Kingdom Civil Aviation Mission which visited New Zealand at the end of 1948 (Tymms' report) dealt with many aspects of what might be termed internal administration, and as far as possible within the Branch the recommendations made have been adopted. As pointed out in the last annual report, other recommendations embracing wider issues naturally involve prior determination of Government policy.

PART II—FINANCE AND ECONOMICS

In all activities which involve the expenditure of public funds it is necessary to keep constantly under review the relationship which State expenditure bears to the benefits the community derives directly and indirectly from such expenditure. This principle is as true of expenditure on civil aviation as it is of expenditure on, say, our highways system or our port and marine facilities.

Due to the fact that so many of the assets and liabilities for which the Civil Aviation Administration is responsible for maintaining and operating having been constructed during the recent war for war purposes, little purpose would be achieved in attempting

to ascertain the actual cost of their establishment or their present value. Instead, an estimate of their present capital value for civil aviation purposes has been made as they exist at the present time. This estimate is as follows :—

	£
Aerodromes, works, and buildings used for civil aviation purposes	3,500,000
Telecommunications equipment (nominal amount)* ..	30,000
	£3,530,000

While it may be claimed that as the entire capital cost of the foregoing items has in the past been provided from revenue sources and, as such, can be regarded as written off *in toto*, nevertheless in any examination of civil aviation costs the assessed amortization charges of the above sum do represent the extent to which the taxpayer could expect relief if all civil aviation activities could be placed on a financially self-supporting basis.

Assuming a yearly amortization rate of 6 per cent., the charge for the year 1949–50 can be calculated as follows :—

	£
Total estimated capital value as at 31st March, 1950 ..	3,530,000
Less capital expenditure for aerodromes, buildings, and telecommunications equipment in the year 1949–50	224,739
	£3,305,261

Total charge for aerodrome and telecommunications capital investment :—

	£	
6 per cent. on £3,305,261..	198,316	
3 per cent. on £224,739	6,742	
		£205,058

No amortization charge has been made for capital investment in other items but aerodromes, buildings, and telecommunications equipment. During the year 1949–50 a total of £10,661 was paid for other capital items—viz., £500 for aircraft purchase, £1,574 for motor-vehicles, and £8,587 for fire-fighting equipment.

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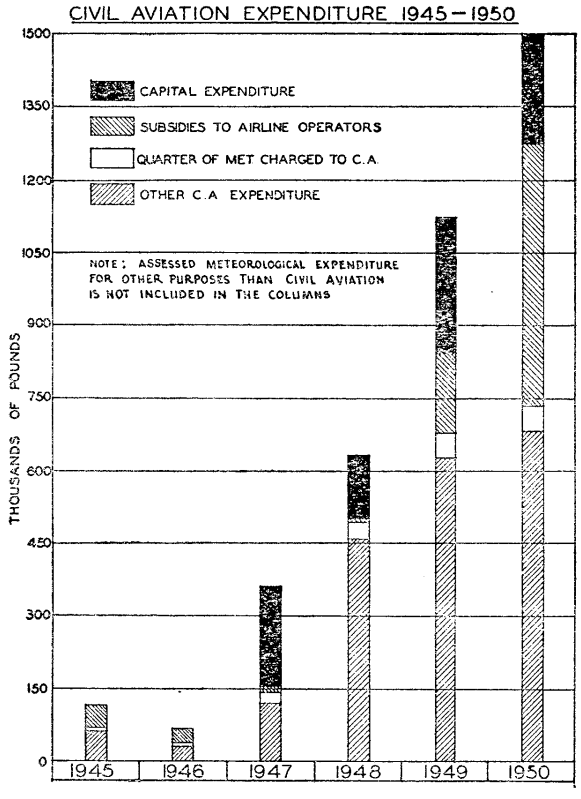
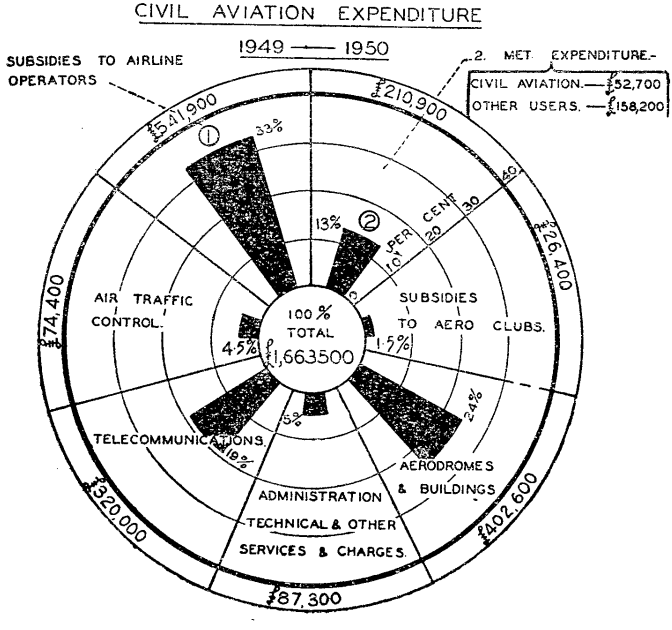
* The insertion of a nominal amount only as the basis for calculation of the amortization charge on telecommunications equipment, which cost many times the amount quoted when purchased, is due to the fact that all the equipment, although the best procurable at the time, was obsolescent when purchased. There was no alternative at the time but to equip New Zealand airways with such equipment as was then available, but advances in design have made it possible for such great savings in man-power and base installations to be made that to continue with existing equipment would prove far more expensive than virtually writing off existing installations, even when such cost of write off is charged against new modern equipment. All aviation administrations have been faced with a similar situation during the last few years, but New Zealand, because it is not heavily committed to the older equipment, is probably less affected than other countries such as the United Kingdom, the United States of America, Australia, and Canada.





NOTE.—The sector chart (bottom) includes the whole of the Meteorological expenditure for 1949–50 while the bar chart (top) includes expenditure for Civil Aviation purposes only.

In addition to the charge to be made for capital expenditure (£205,058), the following recurrent expenditure was charged to the vote "Civil Aviation" (disregarding charges for the South Pacific trunk air route):—

	£
Total expenditure charged to vote "Civil Aviation"	1,067,440
Plus unauthorized expenditure	389,127
Plus subsidies to aero clubs, charged to vote "Air" (other payments made from vote "Air," a proportion of which may justify recharging to vote "Civil Aviation," have been disregarded)	26,366
	1,482,933
Less capital expenditure, 1949–50	235,400
	1,247,533
Plus capital amortization charge	205,058
Total recurrent expenditure	£1,452,591

This recurrent expenditure can be summarized under the following headings:—

	£	£
Capital amortization charge		205,058
Subsidies to aero clubs		26,366
Subsidies to airline operators—		
N.Z.N.A.C.—	£	
Year 1948–49	243,318	
Year 1949–50	100,000	
Regional service, year 1948–49	45,809	
	389,127	
T.E.A.	30,000	
B.C.P.A.	122,787	
		541,914
Maintenance telecommunications (excluding salaries)		146,790
Maintenance aerodromes and buildings		198,946
Staff: Salaries, allowances, fares, expenses—		
Telecommunications staff (estimated proportion, 60 per cent.)	171,798	
Air Traffic Control staff (estimated proportion, 26 per cent.)	74,446	
Administration, technical, and other services (estimated proportion, 14 per cent.)	40,086	
		286,330
Sundry expenses		47,187
		£1,452,591

Apart from subsidies paid to airline operators, the largest items of expenditure are :—

	£	£	£
Telecommunications—			
Maintenance			146,790
Salaries (estimated)			171,798
Amortization of capital—			
6 per cent. on	15,693	= 942	
3 per cent. on	14,307	= 429	
			1,371
	£30,000		£319,959
Aerodromes and buildings—			
Maintenance			198,946
Amortization of capital—	£	£	
6 per cent. on	3,289,568	= 197,374	
3 per cent. on	210,432	= 6,313	
			203,687
	£3,500,000		£402,633

The total expenditure, 1949–50, from the vote " Meteorological Services " amounted to £210,907. It is considered that one-quarter of this amount—viz., £52,727—would represent a reasonable charge against Civil Aviation, resulting in total recurrent Civil Aviation cost for the past year of £1,505,318.

It should be noted that the major portion of these items is incidental to the operation of scheduled commercial services. Outside of aviation circles it is seldom realized how extensive is the system of ground organization required for the safe and regular operation of scheduled services. If an air service is to be of any use to the travelling public it has to be regular, reliable, and safe. If it is to fulfil these requirements, then a minimum basic administrative organization consisting of inspection, communications, airfields, air traffic control, aids to navigation, and meteorology is unavoidable. Once this basic organization is provided, then, whether five aeroplanes or fifty use these facilities, little if any variation in ground organization or expenditure is necessary or practicable. In view of the expenditure involved, the question inevitably arises as to whether scheduled services should be established on routes that do not possess a reasonably high potential traffic density.

Again, even on those routes where a high potential traffic density exists, the ground organization for scheduled services to be justified must be used to the fullest extent practicable. This aim can only be realized if the cost to the user of air services, including some reasonable payment for ground organization, is sufficiently low to attract an acceptable percentage of the traffic available. On the other hand, the extent to which low-cost air services can be offered to the travelling public is, to some considerable extent, conditioned by the location and suitability of airfields and airfield equipment. If it is accepted that there is a limited percentage of the national income which can be diverted to the development of civil aviation without prejudicing other equally important demands on public funds, then it is obvious that, if over-expansion of scheduled services in advance of adequate ground organization or in advance of the ability of operators to use aircraft and methods resulting in reasonably attractive fares occurs, an undue percentage of available funds is diverted from improving ground organization to supporting uneconomic air services. It is questionable if New Zealand Civil Aviation has not already reached such a situation.

In this respect the following tables and graphs illustrate the points:—

TABLE SHOWING RELATIONSHIP BETWEEN THE NATIONAL INCOME AND THE BUDGETED ALLOCATIONS FOR CIVIL AVIATION DEVELOPMENT AND THE USE MADE OF DOMESTIC AIR SERVICES BY THE PUBLIC

(Information Supplied by Treasury)

Country.	Fiscal Year Ended	National Income.	Annual Budgeting Cost of C.A.	Percentage of Annual Cost to National Income.	Percentage of Public Taking Air Journeys in 1948.
Canada*† ..	December, 1948..	$12,588,000,000	$23,996,408	0·19	5·34
Australia*† ..	June, 1949 ..	£1,955,000,000	£7,718,616	0·39	18·03
New Zealand* ..	March, 1949 ..	£419,000,000	£1,660,928‡	0·40	8·93
South Africa ..	1947	£767,400,000	£1,638,261	0·21	..
United Kingdom*†	December, 1948..	£9,675,000,000	£26,613,871	0·27	0·87

* Includes in all cases aerodrome maintenance, C.A. technical, regulation, and administrative costs, deficiencies or surpluses on Government airlines.

† Allowances made for revenue from landing fees and concessions where charged in the case of Australia, Canada, and United Kingdom.

‡ Being vote "Civil Aviation" and South Pacific trunk air route for 1948–49, plus one-quarter of estimated expenditure for meteorological services, less estimated receipts.

TABLE SHOWING THE INCREASE IN NEW ZEALAND CIVIL AVIATION EXPENDITURE* DURING THE YEARS 1945 TO 1950

——	1944–45†	1945–46†	1946–47.	1947–48.	1948–49.	1949–50.
	£	£	£	£	£	£
Capital expenditure for aerodromes, buildings, and telecommunications	..	..	207,203	132,332‡	276,820	224,739
Subsidies to airline operators	47,801	26,872	12,863	3,681	184,844	541,914§
Other expenditure	62,202	28,504	117,333	459,492	630,104	685,938
Civil Aviation expenditure	110,003	55,376	337,399‖	595,505¶	1,071,768**	1,452,591
Plus one-quarter of expenditure for meteorological services	5,989	6,158	23,940††	37,329	51,948	52,727
Total expenditure for civil aviation ..	115,992	61,534	361,339	632,834	1,123,716	1,505,318

* Excluding expenditure for the South Pacific trunk air route. † All expenditure charged to War Expenses Account. ‡ Including £6,897 charged to War Expenses Account. § Including £389,127 unauthorized expenditure. ¶ Including £54,478 charged to War Expenses Account. ‖ Including £43,310 charged to War Expenses Account, but excluding an amount of £180,000 paid for the purchase of shares in Union Airways. ** Including £108,348 unauthorized expenditure. †† Of the total expenditure for meteorological services for the year—viz., £95,759—£1,191 was charged to War Expenses Account.

PART III—ADMINISTRATION AND PERSONNEL

1. STAFF ESTABLISHMENT

The number of staff employed in the Civil Aviation Branch as at 31st March, 1950, was 564, approximately one-fifth of whom were located in those islands of the Pacific where New Zealand is responsible for the maintenance of aerodromes and associated ground facilities—namely, in Fiji, the Cook Islands, Tonga, and in Western Samoa.

Coupled with the increase in the number of air services has been considerable progress in the provision of aids to navigation. The maintenance and operation of these various units, many of which are located some distance from populated areas, has resulted in the Civil Aviation Branch having to provide staff at a number of isolated places throughout New Zealand.

A continuous review of staffing requirements is necessary in order to ensure that the disposition of personnel is balanced with the variations in traffic handled, but the fact remains that where services are spread over six days per week, with sometimes early and late flying, the five-day forty-hour week cannot meet the position without either large overtime payments or, on the other hand, the provision of a greater number of individuals.

The question of staffing of outstations is rendered more difficult by the lack of housing accommodation for personnel. In many localities staff require to be transported some distance to and from their place of work, with the result that transportation costs are considerable. A long-term scheme of housing, bearing in mind the permanence of each particular unit and the family responsibilities of the staff concerned, has been embarked upon with the assistance of the Housing Division of the Works Department and of the State Advances Corporation. A committee at Head Office of Air Department co-ordinates the various requirements of the Civil Aviation Branch and of the Meteorological Office.

2. Organization

Considerable progress has been made in the reorganization of the Branch during the year under review, and at the date of submitting this report the Branch comprised—

The Directorate, which includes—
- The Director of Civil Aviation.
- The Deputy Director of Civil Aviation.
- The Overseas Liaison and Information Section.
- The Economic Research and Planning Section.

The Airways Division, which includes—
- The Telecommunications Section.
- The Airports Section.
- The Air Traffic Control Section.

The Operations and Air Navigation Division, which includes—
- The Operations Section.
- The Air Navigation Section.

The Airworthiness Division.

The Administration Section.

The functions of the three Divisions are dealt with in later parts of this report. A degree of delegation in administrative and technical matters has been accorded to the Divisions and all normal routine work is dealt with at this level without direct oversight or supervision by the Directorate.

The Overseas Liaison and Information Section is responsible for all liaison with overseas administrations and Commonwealth and international organizations, for the provision of information for civil aviation and other publications, for general civil air intelligence services, and for certain policy planning matters. The section is also concerned with studying ICAO requirements and acting in an advisory capacity to all sections on the interpretation of ICAO standards and procedures.

The Economic Research and Planning Section was established to advise the Directorate and other sections on the economic and financial aspects of civil aviation generally and air transport operations in particular. The section is responsible also for the consideration of air transport agreements between New Zealand and other countries and of questions relating to private and public air law.

The Administration Section, in addition to performing all clerical functions for the Civil Aviation Branch, works in close conjunction with other branches of the Air Department, as, for example, the Accounts Branch, Central Registry, Staff Branch, Library and Stationery Branch.

One of the important responsibilities of the Administration Section is the circulation of the considerable volume of vital and useful information constantly being made available

for pilots, operators, aircraft owners, and engineers, and all those actively associated with aviation. This information is included in certain basic publications, the more important of which are :—

The New Zealand Air Pilot and Flight Information Manual.
Civil Airworthiness Requirements.
Notices to Airmen (NOTAMS).
Civil Aviation Information Circulars.
Air Navigation Directions.
Notices to Aircraft Owners and Engineers.

3. Regulations and Agreements

Two amendments, Nos. 14 and 15, were issued to the existing Air Navigation Regulations 1933 during the year. Amendment No. 14 came into force on 25th August, 1949, and gives effect to ICAO requirements relating to the inspection and certification of aircraft prior to flight, the licensing of aircraft maintenance engineers, flight engineers, and the issue of Certificates of Competency for specialized duties. Amendment No. 15, which became effective on 23rd March, 1950, makes provision for the reporting, investigation, and rectification of defects in aircraft or aircraft components, introduces the aircraft nationality and registration marking standards contained in Annex 7 to the Chicago Convention, and amends the regulations covering modifications of aircraft and aircraft components.

The Cook Islands Customs (Aircraft) Regulations 1949, issued pursuant to the Cook Islands Act, 1915, came into force on 1st October, 1949. These regulations originated by the Customs Department, provide for the appointment of Customs aerodromes in the Cook Islands and lay down the procedures to be followed by overseas aircraft arriving at and departing from such aerodromes. The new regulations, which comply with the ICAO Standards and Recommended Practices for the facilitation of international air transport, also detail the Customs requirements for documentation and importation of goods by air.

Issued pursuant to the Samoa Act, 1921, the Western Samoa Customs (Aircraft) Regulations 1949 also came into force on 1st October, 1949. These regulations contain provisions similar in effect to those which apply to the Cook Islands.

During the year the following Air Navigation Directions were issued in amplification of the Air Navigation Regulations 1933 and its amendments :—

(i) *A.N.D. 8, 8A, and 8B.*—These directions provide details of flying control areas and designated reporting points, and supplement in more detail the provisions of Air Navigation Directions 1947 (A.N.D. 5) in respect of these matters.

(ii) *A.N.D. 9.*—This direction provides that Certificates of Safety for Flight in respect of transport aircraft registered in New Zealand may be signed by an appropriately licensed aircraft maintenance engineer holding valid United Kingdom licences.

(iii) *A.N.D. 10 and 10A.*—Rules for the examination of aircraft maintenance engineers are contained in these directions. These rules lay down the minimum requirements governing the issue of aircraft maintenance engineer's licences and are based on the Standards and Recommended Practices of ICAO.

(iv) *A.N.D. 11.*—This direction authorizes the issue of New Zealand Civil Airworthiness Requirements, which prescribe the conditions and requirements regulating the airworthiness of civil aircraft registered in New Zealand.

On 15th November, 1949, an exchange of notes was effected between New Zealand and France for reciprocal air traffic rights in respect of the regional air services operated by airlines designated by the signatory Governments.

At present the French company TRAPAS is the only foreign operator providing air services through New Zealand Island territories. The company maintains a monthly return service on the route Tontouta (New Caledonia)–Nadi (Fiji)–Faleolo (Western Samoa)–Aitutaki (Cook Islands)–Papeete (Tahiti) and Bora Bora (Society Islands), using Catalina aircraft.

An agreement between the Governments of New Zealand, the United Kingdom, and Australia for the continued operation of Tasman Empire Airways, Ltd., was signed at Wellington on 15th September, 1949.

4. Overseas Meetings and Visits

During the year New Zealand was represented at five meetings overseas, concerned with matters of particular interest to civil aviation.

(*a*) In June, 1949, the Third Assembly of the International Civil Aviation Organization met at Montreal. New Zealand was represented by Air Commodore Findlay, Head, New Zealand Joint Staff Mission, Washington (delegate), Mr. J. A. Malcolm, New Zealand Trade Commissioner, Montreal (adviser), and Mr. J. F. Northey (adviser), of the Prime Minister's Department. The Assembly, which was attended by delegations from thirty-six countries, examined important administrative and financial problems concerning the Organization.

(*b*) The second session of the International Administrative Aeronautical Radio Conference was convened at Geneva, 1st August, 1949. The Branch was represented by Mr. F. R. W. Andrews, Senior Communications Officer, who accompanied Mr. G. Searle, of the Post and Telegraph Department. There were representatives of fifty-two States and their colonial territories. The main work of the Conference was the allocation of radio frequencies on an equitable basis among the countries of the world.

(*c*) A special Aeronautical Telecommunications Fixed Services Meeting, under the auspices of the International Civil Aviation Organization, Far East and Pacific Office, was convened in Melbourne, Victoria, from 4th to 7th July, 1949. New Zealand was represented by Mr. D. F. Jenkins, Principal Communications Officer, Civil Aviation Branch. Recommendations by previous ICAO Regional Air Navigation Meetings on aeronautical fixed circuits were reviewed to meet the request by the International Telecommunications Union that demands for frequencies be re-examined and reduced and consolidated to the utmost possible extent. The meeting was able to effect a reduction of approximately 50 per cent. in demands for aeronautical fixed service frequencies for the area covered by its terms of reference.

(*d*) In continuation of discussions in February, 1949, meetings were held in Melbourne in May and October, 1949, and January, 1950, with Australia and the United Kingdom and their departmental and airline representatives concerning resolutions of the traffic conferences of the International Air Transport Association (IATA). Messrs. T. A. Barrow, Air Secretary, and P. P. Heller, Planning and Economic Research Officer of the Civil Aviation Branch, were New Zealand's delegates.

(*e*) A joint meeting was held in Paris of the Meteorological Division of ICAO (third session) and the International Meteorological Organization during February, 1950. Dr. R. G. Simmers, Assistant Director of Meteorological Services, attended on behalf of New Zealand. Among the items of outstanding importance dealt with were the consolidation of the Specifications for Meteorological Services for International Air Navigation and the preparation of material for inclusion in a further Annex to the ICAO Convention. Some study was also made of the physical conditions of those higher layers of the atmosphere, soon to be used for commercial aviation in view of the advent of jet-propelled aircraft. Other aspects of the joint meeting are fully treated in the report of the Director of Meteorological Services.

Officers of the Air Traffic Control Section visited Australia on two occasions during the year. The first visit was to attend a conference in Melbourne to discuss and correlate the ICAO South Pacific Supplementary Procedures with those for the North Pacific region and subsequently to redraft the Manual of Operations for International Air Routes within the Brisbane, Sydney, Auckland, and Fiji Flight Information Regions. The second visit was to examine the experimental American-type Flight Progress Display System then on trial at Essendon Airport, with a view to ascertaining its suitability for adoption in New Zealand.

The Chief Aeronautical Engineer, the Chief Surveyor, and the Controller of Operations visited Australia on the official survey flight of Tasman Empire Airways Solent flying-boat, and subsequently a member of the Operations Section travelled to Sydney for discussions with the Australian Department of Civil Aviation on the inauguration of scheduled night departures from Sydney by flying-boats on the trans-Tasman service.

5. International Civil Aviation Organization (ICAO)

In the report for the year ended 31st March, 1949, the history, constitution, and development of the International Civil Aviation Organization were outlined. The Australian representative on the Council of ICAO, Dr. K. N. E. Bradfield, by courtesy of his Government, watches New Zealand interests and reports on the work of the Organization to this country.

Since the last annual report five Annexes to the Convention on International Civil Aviation have been issued by ICAO. These Annexes contain Standards and Recommended Practices for technical and administrative procedures which have received the general agreement of contracting States. Thus—

Annex 6 (OPS) contains the Standards and Recommended Practices for the Operation of Aircraft on Scheduled International Air Services.

Annex 7 (REG) contains the Standards and Recommended Practices for Aircraft Nationality and Registration Marks.

Annex 8 (AIR) contains certain Standards and Recommended Practices for the Airworthiness of Aircraft.

Annex 9 (FAL) contains the Standards and Recommended Practices for the Facilitation of International Air Transport.

Annex 10 (COM) contains the Standards and Recommended Practices for Aeronautical Telecommunications.

Authority for the establishment of the standards in the Annexes comes from the Convention on International Civil Aviation drawn up at Chicago in 1944. ICAO standards are designed to foster air safety in two ways: by producing world-wide uniformity of air navigation services and procedures and by ensuring that each nation's aviation practices are maintained at a high standard of quality. At the same time it should be realized that, while some Annexes are substantially complete, others are little more than skeletons upon which ICAO must and will eventually build a complete structure.

In the legal field ICAO has undertaken responsibility for the revision and conclusion of a number of conventions dealing with air law which were formerly the concern of pre-war international drafting bodies. These include the Rome Convention (damage to third parties), the Warsaw Convention (liability of air carriers), and the Convention on the International Recognition of Rights in Aircraft. The Legal Committee of the Organization is also studying problems relating to remuneration for search, rescue, and assistance, a matter which is of particular significance in view of the great increase in international air navigation.

PART IV—AIRWAYS DIVISION

The Airways Division comprises three related sections :—

(1) The Telecommunications Section.
(2) The Airports Section.
(3) The Air Traffic Control Section.

A Division Controller has not yet been appointed, but it is expected that a recommendation for this position will be submitted in the coming year.

1. Telecommunications Section

This Section is now the largest numerically in the Branch, and to illustrate the extensive coverage for which the Section is responsible, Appendix A sets out the numbers of aeradio stations and radio navigational aids in operation in New Zealand and in the Pacific islands, together with the equipment in service.

In view of the scope of the Section's work, the report on the year's activities is set forth in somewhat greater detail than usual.

(*a*) *Communications*

To expedite the handling of traffic and permit the most economical use of operating personnel and facilities, a reorganization of the internal point-to-point network for dealing with aeronautical communications was carried out during the year. Area control stations at Auckland, Wellington, and Christchurch act as distribution centres for messages originating at or destined for satellite stations in their respective areas. Land-line teletype circuits between the area centres permit rapid handling of inter-area traffic. Teletype circuits were also established between Wellington and New Plymouth, Wellington and Napier, and Christchurch and Dunedin during the year. These measures have resulted in considerable relief to the congested radio channels handling point-to-point traffic, and have permitted reductions in staff at many stations due to the reduction in the number of radio channels handled at each station.

To meet requirements of air traffic control and provide necessary air-to-ground communications on the trunk air route, aeradio stations at Taumarunui and Waitaki were opened on 18th July, 1949, and 20th February, 1950, respectively.

A scheme for a flexible but effective communications organization for search and rescue has been worked out, whole-hearted co-operation and offers of voluntary services having been received from all organizations in the country who have facilities available for use in such emergencies.

(*b*) *Engineering : General*

The major effort during the last year has been the consolidation of the temporary installations effected partly during the war years and partly during the change over to high-frequency working made in December, 1948.

A certain expansion of facilities to meet the more urgent operational requirements has taken place, but the extreme shortage of suitable qualified staff has seriously retarded the proper design and engineering of permanent installations.

Active liaison has been maintained with the operating companies and the R.N.Z.A.F. in the planning of new radio navigational and communications facilities both as regards specific local requirements and the broad planning of a long-term programme.

In view of the extreme shortage of dollar funds, a major effort has been put into investigation and, where applicable, modification of the large amount of American equipment used in telecommunications with a view to the utilization of consumable spares from the sterling area. The effort has been successful, and a saving of at least 80 per cent. of our previous dollar expenditure in this connection has been effected.

The reconditioning of equipment obtained as war surplus has continued. With the growth of the organization it has been found necessary to acquire dispersed stores buildings, but this has not provided adequate space for the efficient functioning of the central maintenance and repair depot, and an urgent requirement exists for still more space.

Considerable difficulty has been experienced in obtaining, issuing, and bringing up to date the necessary technical publications to support the wide distribution of the varied war surplus equipment, but generally speaking the field organization is now effectively supported by the necessary technical instructions and literature.

(*c*) *Medium-frequency Radio Beacons*

Two new medium-frequency beacons have been erected as permanent installations, one at Pahiatua, the other at Ohura. The Pahiatua beacon will improve navigational facilities for flying over the Manawatu Gorge, and Ohura for flying through the centre of the North Island. A temporary installation has also been erected at Waitaki.

Considerable difficulty was experienced with the Ohura installation. It was at first difficult to find a compromise between conflicting operational and technical requirements, but when this had been done it was found that bearings of the quality obtained were useless for flying, due, probably, to disturbances caused through reflection of signals by the mountains and to unknown variations in earth conductivity.

Unfortunately no basic information is available as to propagation characteristics over most of New Zealand, and is particularly lacking in such remote areas as the King-country. Experience has shown that the geology of New Zealand presents unusually difficult problems to the radio engineer.

The Ohura beacon is now giving satisfactory service during hours of daylight using a frequency in the " high frequency " band.

(*d*) *Radio Ranges*

The northern leg of the Wellington (Porirua) radio range was declared operational on 14th June, 1949. This leg provides track guidance on that part of the trunk air route between Wellington and Wanganui. Alignment and flight checks of the western leg, directed over the Marlborough Sounds, are to be undertaken shortly, and it is anticipated that this leg will be brought into operation at an early date. This leg will be used by the trans-Tasman flying-boats using the Wellington terminal.

Realignment of the Whenuapai (Auckland) and New Plymouth radio ranges to provide navigational assistance over the new air route Auckland–Ohura–Wellington was carried out, and a fan marker on the new alignment of the southern leg of the Whenuapai range was installed in the Titirangi area. A similar installation has been commenced at Muriwai on the western leg of that range which, when commissioned, will considerably facilitate the approaches of the Tasman flying-boats to the Auckland Harbour.

(*e*) *Direction-finding Stations*

The installation of a high-frequency direction-finding station at Nadi was completed and the facility brought into operation on the 15th July, 1949.

In conjunction with Tasman Empire Airways, Ltd., and New Zealand National Airways Corporation, tests were recently carried out on the degree of accuracy of bearings obtained from stations in the South Pacific area. The results obtained are now being analysed to ascertain the degree of reliability obtainable from the stations by aircraft flying over various sections of the South Pacific air routes.

(f) Pacific Stations

In the Pacific the major developments have been the commissioning of the new combined administration and aeradio communications stations at Rarotonga and the commissioning of the new high-frequency direction-finding station at Nadi. Much rebuilding and consolidation work is still required in the Pacific, and preliminary plans for this programme have been prepared.

(g) Meteorological Radar

The Branch has accepted the responsibility for the engineering and maintenance of the radio and radar equipment used for meteorological observations. It has installed a high-powered radar unit at Nadi, and the engineering of the Invercargill installation in conjunction with the new aeradio station there has reached a stage where construction work can start as soon as a contractor can be found to carry out the work. The fourth and last of the sets produced by the Dominion Physical Laboratory is available for installation, and four war surplus 10 cm. 200 kW. anti-aircraft gun-laying sets have been purchased from the United Kingdom.

The Meteorological Office will use the radar equipment to follow the flight of special balloons, obtaining both their plan positions and heights. They will thus obtain information on the wind velocities at various heights to enable them to provide more accurate forecasts of the conditions to be expected by aircraft.

The new jet-propelled aircraft that may be expected to operate on the international routes in the near future will fly at heights greater than 20,000 ft., and information on the air turbulence and wind speeds at these heights is urgently needed.

(h) Research and Development

In view of its interest to this Branch, close liaison has been maintained with the progress of the investigation being carried out by the Department of Scientific and Industrial Research in the procurement of the basic propagation characteristics of New Zealand's soils, particularly at medium and low frequencies. This work was sponsored by the Radio Research Board at the instigation of this Branch.

With a long-term view towards planning the technical facilities required for the solution of the difficulties of Air Traffic Control at the new Rongotai Airport, practical analysis has been made of overseas mathematical data associated with the general problem of the control of traffic at busy airports. Original work of fundamental value has also been carried out, in conjunction with the Department of Scientific and Industrial Research, in the mathematical analysis of existing traffic in the Cook Strait.

Theoretical coverage and propagation calculations and graphs have been made for the introduction of very-high-frequency techniques for all air-to-ground communication. The introduction of very-high-frequency techniques for air-to-ground communication on the airways is an urgent operational requirement which is long overdue.

Now that the preparatory theoretical work has been carried out, the newly recruited technical staff should be able to proceed with the practical development of this scheme, and it is hoped to take effective strides towards its innovation during the coming year.

(i) Staff

General comments have been made above regarding the shortage of staff. An intensive recruiting drive was made during the year which yielded a fair response for technical staff, but there is almost a complete absence of professional engineers with the proper training and experience in radio and telecommunications, and it has therefore been necessary to initiate recruitment overseas to obtain professional staff of the required calibre.

On the operational side, staffing difficulties in respect of commitments in the South Pacific and in New Zealand have been overcome, and it is not anticipated that any difficulty will be experienced in maintaining authorized staff establishments in the coming year.

Arrangements made with the Royal New Zealand Air Force enabled an additional course for twelve operator-trainees to be commenced at the R.N.Z.A.F. Electrical and Wireless School at Wigram at the beginning of September. It is expected that trainees becoming available from the school will make good the normal wastage due to resignations, &c., and provide for requirements for expansion of services.

2. Airports Section (Including Crash/Fire Services)

(*a*) *Aerodromes and Associated Facilities*

As far as possible during the year under review, construction efforts have been concentrated on the development of the main trunk air routes to the standard necessary for the regular and safe operation of air services. These efforts have, however, again been hindered in no small measure by the shortage of professional engineers and associated technical staff, as well as of man-power, construction plant, and materials.

The only new aerodrome at present under construction is at Hokitika. Work has proceeded steadily on the construction of this airfield, and it is anticipated that, exclusive of building works and runway surfacing, the formation of this airfield will be completed in April of this year. The runways will be paved next summer.

A considerable amount of planning-work has been carried out in connection with the following new projects.

Wellington (Rongotai).—General plans for the development of Rongotai Airport have been prepared, and are before the Government for consideration.

Auckland.—Extensive preliminary surveys have been carried out in the vicinity of Auckland with a view to locating the most suitable site for an international airport. The search for the preferred site is now concentrated in the Mangere area. At the present time engineers are investigating all practical means of reducing to the minimum the area of productive land that may be involved in the construction of an airport adequate for the operation of international air services.

Rotorua.—The airport which at present serves Rotorua is sub-standard in certain details. The preparation of preliminary plans for the development of a new airport in this location has therefore been commenced.

However, in view of the demands already being made on the available construction resources in the development of aerodromes on main trunk routes, the construction of a new airport in this area is not contemplated for some years.

Timaru.—During the year steps have been taken to secure an area of land near Levels that will be suitable for the ultimate development of an airport for Timaru. Again, in view of the more urgent requirements of Civil Aviation at other points, no early construction work is contemplated.

At the same time attention has been given to construction work and planning in respect of the following aerodromes used by domestic scheduled air services.

Auckland (Whenuapai).—The terminal apron at this airport is now in course of reconstruction. This work is scheduled for completion by April, 1950.

Christchurch (Harewood).—The construction of two runways to Class C dimensions and Class 4 strength is now under way, thus making this airport suitable for the operation of international air services.

Tauranga.—The preliminary planning of extensions to this airport to provide for its development in due course to Class E dimensions is in hand.

Palmerston North.—Consideration has been given to the manner in which the Palmerston North Airport (Milson) should ultimately be developed. A layout comprising a single paved runway for use by heavier types of aircraft, together with shorter turf strips for light aircraft, is proposed.

Paraparaumu.—The planning of works essential to the continued full-scale operation of Paraparaumu Airport, pending the construction of the new airport for Wellington at Rongotai, has been completed. It is proposed to give priority to certain runway and apron sealing works and to the extension of the operations building.

Invercargill.—Preliminary plans providing for the development of this airport to Class E dimensions are in hand.

Some of the aerodromes mentioned above are unlikely to be taken beyond the planning stage for many years.

Auckland (Mechanics Bay).—The construction of a hardstanding and slipway for use by the Solent flying-boats recently introduced by T.E.A.L. was carried out during the year.

The construction by T.E.A.L. of a hangar, store, and an engine-test house was undertaken.

Wellington (Evans Bay).—Preliminary plans for the development of Evans Bay as a regular water airport suitable for the operation of Solents in the trans-Tasman service are being considered by Government.

Night services by New Zealand National Airways Corpotation commenced during the year, and in order to meet operational requirements Government approval has been given to the installation of airport lighting at the following aerodromes :—

Auckland (Whenuapai) and Ohakea (permanent type).
Blenheim (Woodbourne) (semi-permanent type).
Paraparaumu and Christchurch (Harewood) (temporary type).

Installation work at Whenuapai, Paraparaumu, and Harewood is in progress. For Ohakea and Woodbourne certain items of equipment are still awaited from overseas.

The cost of maintaining all aerodromes in New Zealand, with a very few exceptions, has been borne by the Government. Eighty-two aerodromes were involved last year, the cost being approximately £200,000.

At Nadi (Fiji) Airport, on behalf of the other interested British Commonwealth Governments, New Zealand has continued to discharge the full responsibility for administration, operation, maintenance, and development. Heavy reconstruction work on the runways was necessary last year, and one runway was almost completely resurfaced. The other runway is receiving similar treatment and will be completed during the next dry season. The heavy programme of work in hand from previous periods, of converting wartime military buildings and installations to those required for a major civil airport, has been virtually completed, and construction has commenced on the erection of eighteen houses for staff.

Further surveys, investigation, and planning of the proposed new airport at Suva Point have been carried out, and a preliminary estimate has been presented to the Governments concerned.

National Airways Corporation regional Pacific air services have operated through Nadi and Nausori Aerodromes (Fiji), Faleolo Aerodrome (Samoa), Aitutaki and Rarotonga Aerodromes (Cook Group), and Fua'amotu Aerodrome (Tonga). Each of these aerodromes is under the administration of the Civil Aviation Branch, with the New Zealand Ministry of Works undertaking maintenance and general improvements where necessary. No works of a major nature have been undertaken during the past year.

(b) Crash/Fire Organization

In the section dealing with "Aerodrome Equipment" the report of the United Kingdom Civil Aviation Mission stated:—

Attention is drawn to the urgent need to improve the fire-fighting organization at aerodromes, both in equipment and personnel.

The Mission pointed out that expenditure on fire and crash rescue equipment is in the nature of an insurance premium, and, although it may be impossible to provide any fully effective system, the State and aerodrome authorities cannot neglect the obvious duty to provide what is possible to minimize loss of life and property.

Accordingly, in submitting recommendations to the Government regarding the needs of the various civil airports in New Zealand, very careful investigation has been necessary in order to assess the minimum requirements in each case, and the scale of equipment recommended has, in general, been governed by the amount of traffic and the size of the aircraft using the aerodromes.

Crash/fire facilities are now provided at the following civil aerodromes throughout New Zealand: Kaitaia, Auckland (Mangere), New Plymouth, Whangarei, Gisborne, Palmerston North, Paraparaumu, Nelson, Westport, Hokitika, Christchurch (Harewood), and Invercargill.

In addition, arrangements have been completed with R.N.Z.A.F. to take over existing facilities at Hamilton, Blenheim (Woodbourne), and Dunedin (Taieri).

Firemasters have now been appointed at Kaitaia, Gisborne, Palmerston North, Paraparaumu, Nelson, Westport, Hokitika, Invercargill, Dunedin (Taieri), Blenheim (Woodbourne), Hamilton, and New Plymouth.

Deputy Firemasters have also been appointed at Palmerston North, Paraparaumu, and Christchurch (Harewood).

Equipment is on order for the Napier, Rotorua, Tauranga, Kaikohe, and Waitaki Aerodromes and should be available within the next six months. With the supply of this equipment the initial stage of crash/fire protection will be completed. Vehicles are also on order and under construction for Faleolo (Western Samoa) and Rarotonga.

Tenders have been called through the Post and Telegraph Department for the supply of chassis on which to build modern crash tenders for the main airports.

3. Air Traffic Control Section (Including Search and Rescue Organization)

The Air Traffic Control Service has been maintained at a high level during the past year, but due to the unsettled staffing position is has not been possible to devote as much attention as desirable to long-range planning and research.

Training of new personnel has been restricted to "on the job" training, owing to difficulties in obtaining technical and domestic accommodation for the projected school of Air Traffic Control, but these difficulties have been largely overcome, and it is hoped to have the school opened at the R.N.Z.A.F. Station, Ohakea, in June, 1950.

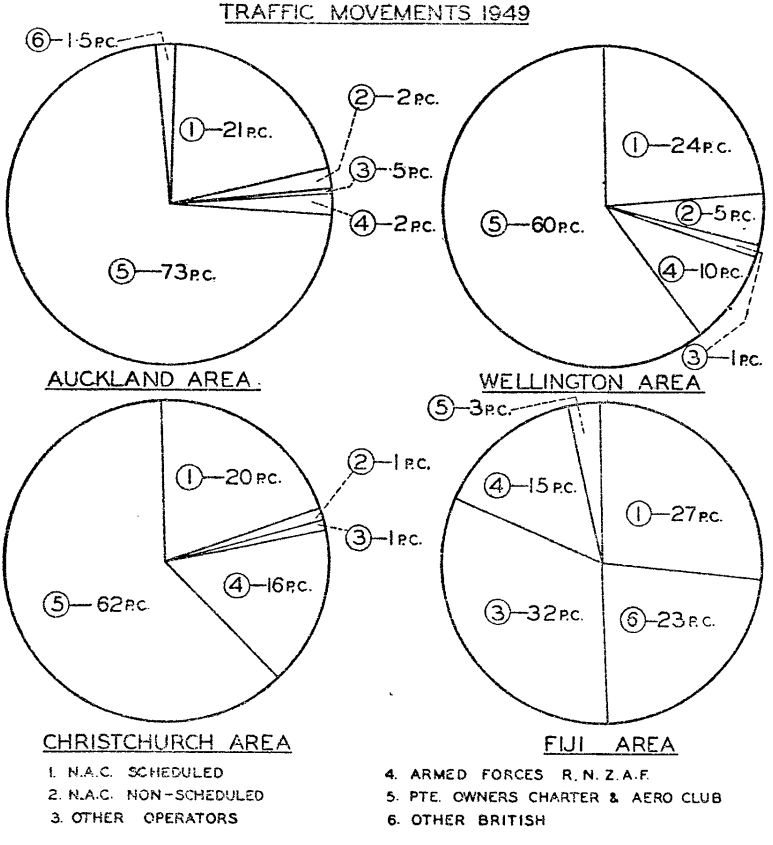
In order to keep abreast of changes in ICAO Standards, Procedures, and Recommended Practices, and also to provide working manuals for pilots and ground personnel, considerable effort has been expended in revising and preparing new publications. These should all be available within the next few months.

From an Air Traffic Control viewpoint the most significant factor during the past twelve months was the increase in movements conducted under Instrument Flight Rules—that is, movements conducted under positive control by the Air Traffic Control

Organization. This increase is well illustrated by the following figures taken from the Air Traffic Control Centre's records of movements through the Wellington Flight Information Region :—

—	1948–49.	1949–50.
Total movements	32,972	33,988
Instrument Flight Rule movements	5,280	13,360

It is worthy of mention that notwithstanding this increase of Instrument Flight Rule movements, where the standard of control and flying must be on a high level, the number of incidents involving irregularities in procedures and breaches of regulations has decreased, which would indicate a general improvement in the efficiency of both pilots and ground personnel.



The Search and Rescue Organization, operating through the Rescue Co-ordination Centres established at the Air Traffic Control Centres at Auckland, Wellington, Christchurch, and Nadi (Fiji), participated in twenty-two distress incidents during the year. On ten occasions the assistance of search and rescue aircraft was required for operations involving three aircraft, three marine craft, one unidentified SOS, and three searches

involving six missing persons. These figures do not include R.N.Z.A.F. mercy flights. During these search and rescue operations a total of 280 hours was flown, covering approximately 38,800 air miles.

While the Search and Rescue Organization is primarily intended to render assistance to aircraft in distress (and, in fact, has an international commitment in this respect), the scope of the Organization has been widened domestically to cover the provision of assistance to marine craft in distress and persons lost or in need of assistance in mountain or bush areas when called upon to do so by the responsible Government Department.

In this broadening of the Organization the co-operation and assistance of other Government Departments and interested parties has been obtained and Standing Search and Rescue Committees have been formed, including representatives of all the interested Departments. Facilities have been made available to the Organization by the R.N.Z.A.F., the Army, Navy, Police, Marine, and Post and Telegraph Departments, while other Departments will make certain facilities available as and when required. Private bodies such as the Federated Mountain Clubs, New Zealand Association of Radio Transmitters, and private launch-owners also fill an important part in the Organization on a voluntary basis. This reorganization has resulted in increased efficiency in operation and in the use of facilities available.

It should be noted that the Search and Rescue Organization, constituted as it is, does not incur any Government expenditure except at such times as an actual operation is in progress.

PART V—OPERATIONS AND AIR NAVIGATION DIVISION

This Division, under the control of the Acting Divisional Controller of Operations and Air Navigation, comprises two Sections :—

(1) The Operations Section,

(2) The Air Navigation Section,

the activities of which are recorded hereunder.

1. Operations Section

During the year a decision was made to man the Operations Section to an establishment which would enable the Section to assume its proper functions and responsibilities. Suitable appointments were made during the latter part of 1949 and early 1950. In addition, authority was given for the setting-up of a radio calibration flight with an establishment of two Dakota aircraft and three crews.

The functions of the Operations Section may be classified under three principal headings :—

(*a*) Operations inspection.

(*b*) Technical and research.

(*c*) Radio calibration.

(*a*) *Operations Inspection*

The main duties of this Section—the inspection and investigation of flight operations connected with scheduled and non-scheduled air transport and aerial work operations—were restricted due to the lack of personnel during the major portion of the year. However, with the recent appointment of two Operations Inspectors it will be possible to pay greater attention to these activities during the coming year.

Only two flight inspections were carried out during the year, and these were in connection with the inauguration of regular night schedules by the New Zealand National Airways Corporation and Tasman Empire Airways, Ltd.

A full programme of aerodromes inspection was carried out, main aerodromes being inspected at two-monthly intervals, secondary aerodromes at three-monthly intervals, and other aerodromes at six-monthly intervals. A total of 200 flying hours was

completed by the Aerodromes Inspector on this work. In addition to his inspection duties, the Aerodromes Inspector has been charged with the responsibility of conducting oral and practical examinations for the issue of Pilot's " A " Licences, and in the period under review he examined some 350 candidates.

It has, however, been obvious for some time that one officer cannot deal with both the regular inspection of aerodromes and the conduct of examinations, and it is hoped that an Operations Officer (air testing) will shortly be appointed to take over the latter duties.

(b) Technical and Research

Activities in this sphere included—

(i) The preparation of examination syllabi for flight crew personnel.
(ii) The drafting of aircraft performance requirements for New Zealand in the interim period prior to the implementation of ICAO requirements.
(iii) The approval of all aircraft weight and balance data affecting flight operation.
(iv) The preparation of requirements for aircraft instruments, equipment, and safety devices.
(v) The review of New Zealand aerodrome licences and the relation of aircraft performance to aerodrome dimensions.

A large programme of work still remains to be undertaken, particularly in regard to aircraft performance.

(c) Radio Calibration

Under this heading it is necessary to allow for some 2,000 hours flying per annum in New Zealand and in the South Pacific area.

During the latter part of the year under review appointments were being made to bring the personnel strength of this section up to twelve (six pilots, two navigators, three radio operators, and one flight engineer). The Branch is negotiating for the purchase of two Dakota aircraft, but in the meantime an aircraft is being operated under charter from the New Zealand National Airways Corporation.

During the year a total of 665 hours of radio calibration work was completed by one crew, including one flight entailing 105 flying hours in the Pacific area. With the appointment of new pilots some twenty-four hours dual and solo training flying has been carried out.

In addition to the matters referred to above, the Operations Section collaborated with the New Zealand National Airways Corporation and Tasman Empire Airways in the preparation of revised operations and route training manuals, which were duly approved by the Branch for the purpose of issuing Air Service Certificates to the respective operating companies.

Reports on the operational requirements and limitations of Nadi Airport (Fiji) and Rongotai Aerodrome (Wellington) have been completed, and investigations are proceeding with the proposed aerodrome sites at Harewood and Mangere.

2. Air Navigation Section

The Air Navigation Section is responsible for :—

(*a*) Supervision of training operations of aero clubs.
(*b*) Aeronautical Information Services.
(*c*) Licensing of personnel.
(*d*) Regulations enforcement.

(a) Supervision of Training Operations of Aero Clubs

These duties have been carried out during the year by the Airfields Inspector of the Operations Section and have involved a continuous check on the training facilities and methods in use by aero clubs, the periodical testing of flying instructors, the testing

of pilots for the grant of " A " Licences, and the examination of applicants for additional aircraft type ratings. A commencement was also made on a study of approved training curricula for aero clubs based on ICAO recommendations, but it is not expected that any finality will be reached on this subject until after the next ICAO Personnel Licensing Division meeting in 1951.

The number of aero clubs affiliated to the Royal New Zealand Aero Club remained unaltered at 24, and during the twelve months a total of 31,742 hours were flown, including 26,723 hours in training activities.

Owing to the increasing costs of operation, the majority of clubs have made financial losses on the year's activities, and it is not anticipated that these difficulties will lessen in the immediate future. One aspect which is causing concern to the clubs generally is the replacement of aircraft. At present, out of a total of 137 aircraft being operated by clubs, more than 60 per cent. are wartime surplus trainers which were made available to clubs at low cost. Few clubs have reserve funds sufficient to meet the high cost of modern aircraft suitable for club purposes.

An important phase of aero club activities is still the training of Air Training Corps' cadets. One hundred and fifty cadets are selected each year by the R.N.Z.A.F. to undergo flying training. A number of these cadets qualify as civil pilots and continue membership with the clubs, thereby assisting to maintain utilization of club aircraft.

For the year ended 31st March, 1950, 325 club pilots were trained *ab initio* to " A " Licence standard, the total being made up by the following clubs :—

Auckland	35	South Canterbury	18
Canterbury	32	Southland	9
Gisborne	8	South Piako	16
Hauraki	3	Tauranga	9
Hawera	7	Waikato	30
Hawke's Bay and East Coast	12	Wairarapa and Ruahine	7
Marlborough	15	Wanganui	12
Middle districts	18	Wellington	21
Nelson	8	West Coast	13
New Plymouth	24		325
Otago	15		
Rotorua	13		

The twenty-four aero clubs had a total membership of 6,537, of whom 2,577 were flying members, on 31st March, 1950. In training activities, 26,723 hours were flown, and at the end of the year there were 706 pupils undergoing instruction for " A " Licence.

The following table shows comparative figures of aero club training activities over the period 1938 to 1950 :—

Year.	Number of Club Aircraft Owned.	Training Hours Flown.	" A " Licences Issued.
1937–38	58	17,726	186
1938–39	65	19,656	202
1939–40	66	11,740	70
1940–41	9	2,419	33
1941–42*	4	..	..
1942–43*	3	..	..
1943–44*	3	..	..
1944–45*	4	..	..
1945–46	13	676	224
1946–47	73	14,203	667
1947–48	101	26,592	438
1948–49	108	25,747	371
1949–50	137	26,723	325

* No flying operations were carried out by the aero clubs between December, 1941, and the end of the war.

1. Inspection Section

This Section comprises the Chief Surveyor, three District Aircraft Surveyors (one each at Auckland, Palmerston North, and Harewood), eight Surveyors, and one Assistant Surveyor.

Of a total of 284 aircraft on the New Zealand Register, 217 were surveyed during the year. Twenty Certificates of Airworthiness were issued, 9 validated, 188 renewed, and 13 cancelled.

Ratings issued to approved firms totalled 98 as at 31st March, 1950, 9 being issued during the year and 23 extended.

One of the major features of the Section's work is the written and oral examination of candidates for the various categories of the Aircraft Maintenance Engineer's Licence. Tables showing the current licences and the categories in which they are held appears in Appendix B to this report.

At the request of the Fiji Government, the Chief Surveyor visited Fiji for the purpose of surveying all civil aircraft in the colony.

2. Engineering Section

This Section is headed by a Senior Aeronautical Engineer (airframes) and a Senior Aeronautical Engineer (power plants).

The following table gives details of the new designs and specifications investigated during the year :—

Item.	Received.	Checked.	Approved.	Rejected.
Aircraft designs	1	1	..	1
Glider designs	1	1	..	1
New processes	2	2	2	..
New materials	1	1	..	1
Accessories	1	1	1	..
Aircraft type records	5	5	4	1
Glider type records	7	7	6	1
New material specifications	48	48	48	..

Numerous other special investigations were conducted, each of which was the subject of a special report. Fifty-five modifications and 9 repair schemes were submitted by operators and were accepted, returned for amendment, or rejected.

A detailed study of all existing British, American, and German design and performance requirements for gliders was made, and as a result a complete set of New Zealand Glider Requirements has been produced to the satisfaction of the New Zealand Gliding Association.

3. Technical Administration Section

The Section was primarily responsible for drafting the amendments to the regulations and Air Navigation Directions 9, 10, 10A, and 11, referred to in Part III of this report.

Details of the Requirements, Notices, &c., published during the year are as follows :—

(i) Requirements 2
(ii) Notices to Aircraft Owners and Engineers 65
(iii) Civil Aviation Information Circulars 24
(iv) Standing Instructions to Airworthiness Division 9

In addition to the foregoing, a number of draft amendments in respect of various matters is in course of preparation.

In addition to their primary function of training, the majority of clubs engaged in commercial activities, mainly in the charter and joyriding field. In these operations 5,166 trips were completed and 9,555 passengers carried. Commercial work involved 5,019 flying hours and a total flown distance of 501,900 miles.

(*b*) *Aeronautical Information Service*

The establishment of an Aeronautical Information Service (AIS) implements a procedure recommended by ICAO, and its functions may be briefly defined as the collection, collation, recording, editing, publishing, and rapid dissemination of aeronautical information to all concerned. The objects of the Aeronautical Information Service are achieved through the medium of three classes of basic documents—the New Zealand Air Pilot and Flight Information Manual, Notices to Airmen (NOTAMS), and aeronautical maps and charts.

The Service maintains the closest liaison with the Lands and Survey Department's Aeronautical Charting Section, which is responsible for the drawing of all aeronautical charts in New Zealand. Special instrument approach charts for all major airports have been completed, and charts of the lesser aerodromes are now in hand. The charts have been produced in conformity with international standards and have been the subject of high commendation from international authorities.

(*c*) *Licensing*

The licensing staff of the Section is responsible for the issue and renewal of the licences and certificates provided for in the Air Navigation Regulations 1933, and for the considerable amount of organization and clerical work involved in the conduct of examinations for these licences held at various centres during the year.

A record of the licences and certificates issued during the twelve months ended 31st March, 1950, appears in Appendix B to this report.

A total of 14 written and 22 oral examinations involving 269 candidates were held during the year in respect of flight crew and aircraft maintenance engineers. A summary of examination statistics is shown in Appendix C.

(*d*) *Regulations Enforcement*

Investigations into reported cases of breaches of the Air Navigation Regulations have resulted in the Police Department being requested to institute Court action against nine offenders, and fines totalling approximately £100 were inflicted. Less serious breaches were dealt with by direct departmental action, and twelve pilots suffered suspension of their licences for periods of up to twelve months.

In addition, warnings were issued in three instances where unsafe practices have been reported.

An analysis of the cases reported shows that the causes of complaint are chiefly unauthorized low flying and engaging in flying operations while not holding the appropriate licence. Both of these causes indicate lack of supervision on the part of the operating agencies.

PART VI—AIRWORTHINESS DIVISION

The title " Airworthiness Division " has been adopted as being more appropriate than the terms " Aeronautics Division " or " Aeronautical Engineering Division " previously in use.

Under the direction of the Chief Aeronautical Engineer the work of the Division in carried out by three Sections :—

(1) Inspection Section.
(2) Engineering Section.
(3) Technical Administration Section.

The Drawings Library, Technical Library, and Technical Index have been maintained up to date and fully amended.

In addition to the activities recorded under the Section headings above, a total of 8 serious accidents were investigated and reported upon by the Division at the scene of the crash, while 114 mechanical defects or failures were recorded, investigated, and reported on.

In September, 1949, one of the Branch's Aeronautical Engineers was seconded to the United Kingdom for a period of two years to gain wider experience and keep the Branch apprised of the latest engineering techniques. Monthly reports are received from this officer.

PART VII—AIR TRANSPORT OPERATIONS

Air transport operations can be classified under four headings :—

(1) Scheduled domestic services.
(2) Non-scheduled domestic services.
(3) International services.
(4) Aerial work.

(1) Scheduled Domestic Services

As was the case last year, scheduled operations in New Zealand were maintained exclusively by the New Zealand National Airways Corporation. Traffic figures again showed encouraging increases over the totals for the preceding year, as is evidenced by the following comparisons :—

——	1948–49.	1949–50.	Increase.
			Per Cent.
Passengers	174,836	204,707	17·0
Freight (lb.)	19,220,891	24,547,480	27·7
Mail (lb.)	752,492	873,305	16·5

The routes over which the Corporation operated are given in Appendix D, while detailed traffic statistics appear in Appendices E and F.

Minor changes in the frequency of services and in route patterns occurred during the year, but the only change of particular significance was the termination of the New Plymouth – Hamilton service, which was inaugurated on 13th June, 1949.

The Corporation continued to operate the freight services between Paraparaumu and Woodbourne and Paraparaumu and Harewood under charter to New Zealand Railways. At present a regular schedule of six return trips daily, with additional trips when necessary, is maintained on the Paraparaumu–Woodbourne route, a single return trip weekly being operated to Harewood.

Traffic figures in respect of the railway freight services are included in the statistics for domestic scheduled services, but the following summary is extracted for more convenient reference :—

Year Ended	Trips Flown.	Hours Flown.	Miles Flown.	Freight.	Freight Ton-miles.
				lb.	
31st March, 1947	299	173	22,585	2,040,101	71,297
31st March, 1948	1,786	1,114	138,266	13,081,232	448,891
31st March, 1949	2,230	1,482	181,630	17,286,265	600,682
31st March, 1950	3,018	1,949	232,042	21,789,779	745,781

At the 31st March, 1950, the New Zealand National Airways Corporation fleet totalled 33 aircraft, comprising 11 Lockheed Lodestars, 1 Lockheed Electra, 11 Douglas DC-3's (including 4 freighters), 6 de Havilland Dominies, 3 de Havilland Fox Moths, and 1 Short Sunderland III which was used on the regional services referred to later in this Part.

(2) Non-scheduled Domestic Services

Non-scheduled services have not developed in New Zealand to the same extent as in other countries, where this class of operation is transporting increasing numbers of passengers and volumes of freight. The only commercial activities in this field have been provided by the New Zealand National Airways Corporation, Blackmore's Air Services, Southern Scenic Airtrips, and Rotorua Air Tourist. These operators made, in the twelve-month period, 2,821 trips, flew 1,967 hours and 242,485 miles, and carried 8,804 passengers and 672,393 lb. of freight.

(3) International Services

International services were provided by the following operators :—

Tasman Empire Airways, Ltd.
New Zealand National Airways Corporation.
Pan-American World Airways
British Commonwealth Pacific Airlines.

Tasman Empire Airways, Ltd.

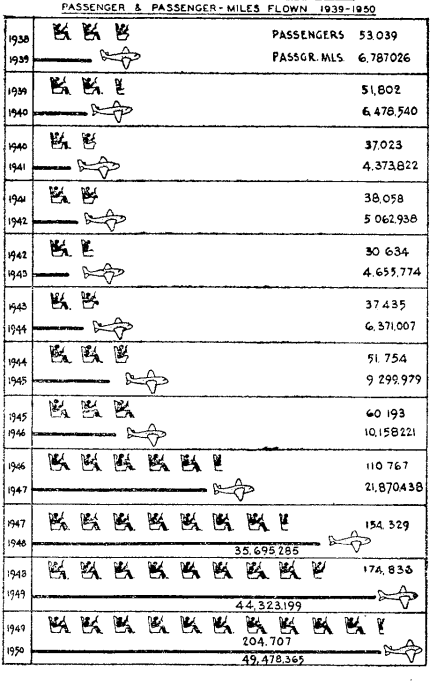
This company maintained a daily service between Auckland and Sydney, using Short Sandringham aircraft for the greater portion of the year, but these aircraft have now been replaced by the Short Solents, which are now providing a greater capacity on the 1,342-mile route. The scheduled service has been supplemented by aircraft of other airlines operated under charter to Tasman Empire Airways, Ltd., when backlogs of traffic have necessitated additional services.

The following is a summary of traffic statistics for Tasman Empire Airways, Ltd., for the years 1941–50, and includes services flown by other airlines under charter to Tasman Empire Airways, Ltd. :—

Year Ended,	Hours Flown.	Miles Flown.	Passengers Carried.	Freight, Including Excess Baggage.	Mail.	Passenger-miles.	Freight Ton-miles.	Mail Ton-miles.
				lb.	lb.			
31st March, 1941	1,181	174,200	1,507	18,800	78,179	2,019,380	11,246	46,768
31st March, 1942	1,382	211,920	1,959	32,230	167,275	2,625,060	19,280	100,066
31st March, 1943	1,265	192,960	2,256	35,195	101,741	3,023,040	21,054	60,863
31st March, 1944	1,502	229,140	2,924	40,024	94,106	3,918,160	23,943	56,296
31st March, 1945	2,798	427,460	5,803	84,189	142,812	7,796,020	50,363	85,432
31st March, 1946	3,270	493,764	6,100	99,584	214,792	8,174,000	60,019	128,492
31st March, 1947	4,863	778,704	11,648	176,687	278,789	15,608,320	105,697	166,776
31st March, 1948	6,128	991,916	18,792	223,229	331,926	25,194,933	122,506	198,556
31st March, 1949	7,202	1,215,103	24,597	377,178	345,715	33,004,924	207,749	207,324
31st March, 1950	6,660	1,183,644	22,579	361,623	405,587	30,301,018	216,337	243,046

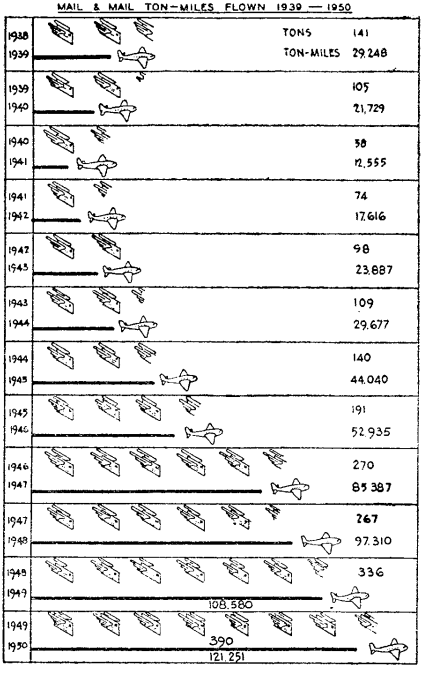
DOMESTIC SCHEDULED SERVICES

PASSENGER & PASSENGER-MILES FLOWN 1939-1950



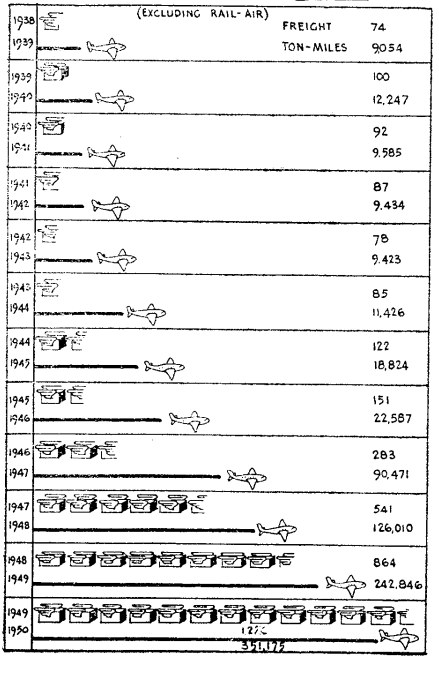
DOMESTIC SCHEDULED SERVICES

MAIL & MAIL TON-MILES FLOWN 1939 — 1950



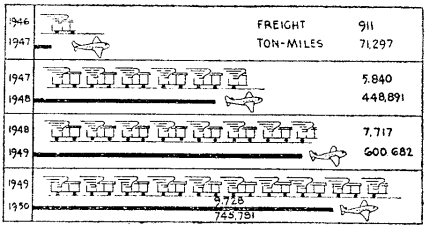
DOMESTIC SCHEDULED SERVICES

FREIGHT & FREIGHT TON-MILES FLOWN 1939-1950



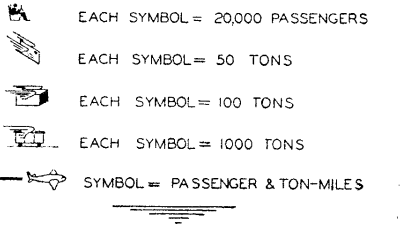
NEW ZEALAND RAILWAYS FREIGHT SERVICE

FREIGHT & FREIGHT TON-MILES FLOWN 1947-1950



COMPARATIVE TRAFFIC RECORDS

DOMESTIC SCHEDULED SERVICES



New Zealand National Airways Corporation

New Zealand National Airways Corporation continued to operate services in the south-west Pacific over the following routes :—

Route No.	Route.	Route Miles.	Frequency.
1	Auckland–Suva–Labasa	1,453	One return trip weekly.
2	Auckland – Norfolk Island	661	One return trip weekly.
3	Auckland – Norfolk Island – Nadi–Nausori–Tonga–Faleolo–Aitutaki–Rarotonga	3,820	One return trip fortnightly.

Traffic statistics for these routes for the year ended 31st March, 1950, were :—

Service.	Auckland–Labasa.	Auckland – Norfolk Island.	Auckland–Rarotonga.	Total.
Hours flown	962	444	1,312	2,718
Miles flown	150,572	68,744	198,315	417,631
Passengers	Not available for individual services			6,336
Freight (lb.)	Not available			82,028
Mail (lb.)	Not available			24,642

A Short Sunderland flying-boat was used on the Auckland–Suva–Labasa route, the remaining services being operated by Douglas DC–3 landplanes.

In addition to the scheduled services referred to above, the Corporation carried out three charter flights in the Pacific. On these trips, which involved 46 flying hours and covered 7,037 miles, 58 passengers and 1,266 lb. of freight were carried.

Pan-American World Airways (Inc.), U.S.A.

Pan-American World Airways continues to operate its service between San Francisco and Auckland (via Honolulu, Canton Island, and Nadi) with DC–4 (Skymaster) aircraft. Two return trips per week continued to be operated up to 12th April, 1949, when the frequency reverted to one return trip weekly.

Traffic carried by this operator is shown in the following table :—

——	Entering New Zealand.	Leaving New Zealand.	Total.
Passengers	903	704	1,607
Freight (lb.)	40,229	77,426	117,655
Mail (lb.)	21,378	1,355	22,733

In its San Francisco – Auckland operations P.A.W.A. flew 3,694 hours and covered 770,266 miles.

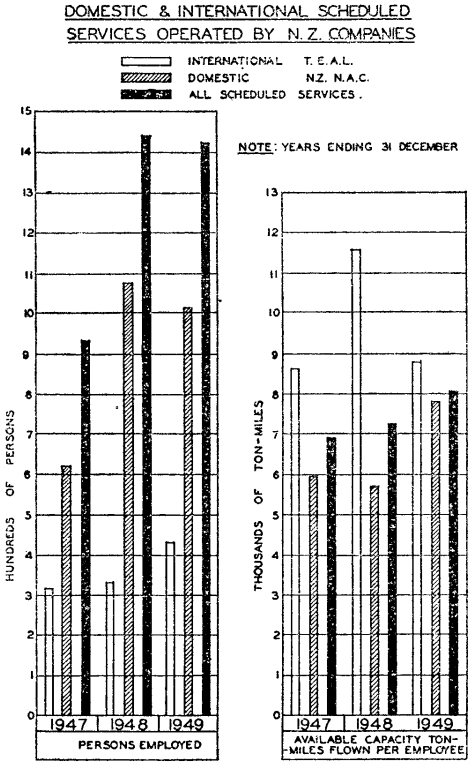
British Commonwealth Pacific Airlines

The service between Vancouver and Auckland (via San Francisco, Honolulu, Canton Island, and Nadi) continued to be operated by British Commonwealth Pacific Airlines. DC–6 aircraft were used with a frequency of one return trip per week.

Traffic to and from New Zealand for the year ended 31st March, 1950, was :—

——	Entering New Zealand.	Leaving New Zealand.	Total.
Passengers	1,336	1,048	2,384
Freight (lb.)	95,792	67,388	163,180
Mail (lb.)	4,372	7,828	12,200

B.C.P.A.'s flying figures on the route were 2,815 hours and 750,887 miles.



(4) Aerial Work

The experimental aerial top-dressing carried out by the R.N.Z.A.F. with Grumman Avenger aircraft created a most favourable impression on the farming community, particularly on those sections which are concerned with inaccessible hill areas and marginal lands.

A number of light-aircraft operators have been quick to realize the commercial possibilities of this type of aerial work, and following a number of individual experiments it has been found that the Tiger Moth aircraft is capable of being used commercially for spreading such manures as lime and superphosphate after undergoing a relatively simple modification involving the fitting of a hopper in the front cockpit. It was obvious that hand loading of the aircraft was not practicable, and a mechanical loading device was quickly developed.

Since the first private operators began aerial top-dressing work, experience gained has enabled improvements to be effected in flying technique and equipment, so that the units now in the field are giving the farmer an efficient and economic service which compares favourably with other methods of distribution.

The development of aerial top-dressing work has progressed so quickly that a shortage of aircraft in New Zealand has made it necessary for operators to investigate the supply position from overseas.

Apart from the benefit to the individual farmer, it is generally appreciated that aerial top-dressing can ultimately affect the national economy through increased primary production. It is apparent, even at this stage, that the aerial method of top-dressing marginal lands alone will soon be carried out on such a large scale that enormous areas of unproductive land can be brought back to use.

The Branch is doing all it can to encourage this new phase of civil aviation, and the appropriate sections are keeping in close contact with the operators in an effort to assist in further improving the safety and economy of operations. Liaison is also maintained with overseas Administrations, and any useful information received is passed on to the operators in New Zealand through the medium of the New Zealand Aerial Work Operators' Association.

The scale of operations is greatly affected by the supply of superphosphates, and unless the present shortage which exists in some areas can be alleviated, it is probable that some operators will be adversely affected.

To date, eight organizations are actively engaged in aerial top-dressing work, and further companies are at present in the process of formation.

Up to the end of the year under review a total of 5,003 tons of superphosphate has been distributed by air, covering an area of 48,741 acres, and involving 2,137 hours of flying-time.

It has been successfully demonstrated that trace elements such as cobalt can be sprayed in liquid form by light aircraft, and one firm which has carried out extensive experiments in this work has distributed over 17,000 lb. of cobalt solution over 5,000 acres. In this case the flying-time amounted to 18 hours 45 minutes.

Aerial seed-sowing has developed in parallel with aerial top-dressing, and during the past year light aircraft were used to distribute 154,050 lb. of grass-seed over 25,673 acres.

Rabbit-control is another phase of aerial work which has developed considerably over the past year. The aerial method of spreading phosphorized pollard bait has been found to be most effective, as aircraft can easily treat areas difficult of access by ground means, and can cover areas on a scale which would otherwise be impossible. Poison rabbit bait spread by air amounted to approximately 107 tons.

Light aircraft are now playing an important part in the deer-control programme being carried out by the Department of Internal Affairs. Supply dropping to deer-cullers has been carried out over some of the most rugged and remote areas of the country, requiring considerable skill on the part of the pilots undertaking this work. A high degree of accuracy has been achieved, the percentage of loss being estimated at only 5 per cent. of the material dropped. Since this type of work commenced, a total of 135,000 lb. of supplies has been dropped, of which 100,000 lb. have been dropped by light aircraft.

During the year the one company specializing in large-scale aerial photographic work carried out aerial mapping operations in various parts of the country, involving the coverage of approximately 4,000 square miles of land. Some of the larger projects were carried out in the Canterbury, Marlborough, Lake Manapouri, and Heretaunga Plains areas. Using a Beechcraft AT–11 aircraft, 25,325 miles were flown, the flying-time being 140 hours.

The aerial mapping photographic work was normally done at altitudes ranging between 12,000 ft. and 17,000 ft.

PART VIII—ACCIDENTS

In contrast with the previous report, it is pleasing to record that during the past twelve months no major disasters occurred on the national air transport network.

A total of forty-seven accidents was reported, in which two pilots and three passengers were killed and seven pilots and three passengers injured. The most serious accident was that in which a four-seater aircraft belonging to the Otago Aero Club crashed at Invercargill, causing the death of the pilot and the three passengers.

Accidents on landing and on take-off, and mechanical failures, accounted for over half the total number. The remainder were due to a variety of reasons such as stalls, bad weather, and forced landings.

All incidents or actual accidents were examined by officers of Civil Aviation Branch. Some cases were also the subject of an investigation by the Inspector of Accidents, whose separate report appears at page 71.

I have, &c.,

E. A. GIBSON,

Director of Civil Aviation.

APPENDIX A

TOTALS OF AERADIO STATIONS, RADIO NAVIGATIONAL AIDS, AND EQUIPMENT IN SERVICE IN NEW ZEALAND AND IN THE PACIFIC

(i) Aeradio stations (communications)—

New Zealand—	
North Island	12
South Island	10
Pacific islands	6
Total	28

(ii) Medium-frequency Homing Beacons—

New Zealand	19
Pacific islands	7
Total	26

(iii) Radar responder beacons—

New Zealand	5
Pacific islands	6
Total	11

(iv) Radio ranges—

New Zealand	4
Pacific islands	2
	6

(v) High-frequency direction-finding (H.F.D.F.) Stations—

New Zealand	4
Pacific islands	1
Total	5

(vi) Radio equipment in service (including radio ranges and medium frequency beacons but excluding standby equipment)—

Transmitters	239
Receivers	172

NOTE.—Transmitter power outputs range from 60 watts to 2·5 kilowatts, the majority of general-purpose transmitters being of the order of 250 watts. Medium-frequency beacons account for the bulk of the high-power equipment.

(vii) Teletype equipment—

	Machines.
Meteorological Services	33
Communications and Air Traffic Control	31
Total	64

APPENDIX B

Personnel Licences (Including also Aerodrome Licences)

	Total Current as at 31st March, 1949.	Total Issues, 1st April, 1949, to 31st March, 1950.	Total Current as at 31st March, 1950.
Pilots " A " Licences	1,003	376	1,135
Pilots " B " Licences	297	40	372
Navigators' Licences—			
First Class	35	8	40
Second Class	22	1	17
Radio Telegraph Operators'—			
First Class	19	2	17
Second Class	2	1	3
Third Class	111	15	149
Special	12	9	10
Radio Telephone Operators'	9	5	8
Flying Instructors' Authorities	71	8	69
Instrument Ratings	82	38	184
Flight Engineers' Licences	..	3	3
Aerodromes Licences	24	..	14*
Aircraft Engineers' Licences	204	53	219
Total	1,891	559	2,240

* Ten lapsed 1949–50.

Summary of Aircraft Maintenance Engineers' Licences, by Categories

Categories.	Number Current as at 31st March, 1950.	Issues During 1949–50.	Number Current as at 31st March, 1950.
" A "	120	15	125
" B "	28	4	34
" C "	117	18	128
" D "	28	..	26
" X ", Section (i)	42	3	51
" X ", Section (ii)	13	5	17
" X ", Section (iii)	15	1	17
" X ", Section (iv)	14	1	16
" X ", Section (v)	3	..	3
" X ", Section (vi)	11	1	10
" X ", Section (vii), Classes 1 and 2	22	14	26
" X ", Section (viii), Classes 1 and 2	2	3	5
Totals	415	65	458

APPENDIX C

EXAMINATION STATISTICS FOR PERIOD 1ST APRIL, 1949, TO 31ST MARCH, 1950

Examination.	Number of Written Examinations.	Number of Oral Examinations.	Number of Candidates.	Number Passed.	Number Failed.
Pilot's "B" Licence	3	5	67	29	38
Pilot's "B" Licence Extensions	4	3	38	36	2
First-class navigator's	2	1	14	10	4
Second-class navigator's	1	1	2	2	..
Aircraft Maintenance Engineer's—					
Category "A"			24	10	14
Category "B"			13	4	9
Category "C"			37	15	22
Category "D"			7	..	7
Category "X," Section (i)			7	3	4
Category "X," Section (ii)	4	4	5	5	..
Category "X," Section (iii)			..	..	..
Category "X," Section (iv)			1	1	..
Category "X," Section (vi)			..	..	..
Category "X," Section (vii)			17	15	2
Category "X," Section (viii)			12	9	3
Aircraft Maintenance Engineer's (Extension Examinations): The Candidates listed below were orally examined for extension to existing licences:—					
Category "A"			10	10	..
Category "B"		8	3	3	..
Category "C"			8	8	..
Category "X," Section (i)			4	4	..
Totals for year	14	22	269	164	105

APPENDIX D

Routes Operated by Domestic Scheduled Services During 1949–50

Route No.	Route.	Route Miles.	Frequency.
1	Palmerston North – Dunedin (via Wellington and Christchurch)	468	One south-bound trip daily, plus one north-bound trip daily Dunedin–Christchurch–Wellington.
2	Dunedin–Invercargill	107	Three trips daily in each direction.
3	Wellington–Nelson	96	Three trips daily in each direction.
	Wellington–Blenheim	72	Three trips daily in each direction.
4	Auckland–Wellington (via New Plymouth and Palmerston North)	332	Once daily in each direction.
5	New Plymouth – Hamilton	102	Once daily in each direction up to 27th February, 1950.
6	Auckland–Gisborne (via Tauranga) ..	226	Once daily in each direction, plus one return trip daily Auckland–Gisborne direct.
7	Gisborne–Wellington (via Napier and Palmerston North)	226	Once daily in each direction, plus one return trip daily Gisborne–Napier.
8	Auckland–Kaitaia (via Whangarei and Kaikohe)	148	Once daily in each direction, plus one return trip daily Auckland–Whangarei –Kaitaia, plus one return trip daily Auckland–Kaikohe–Kaitaia, plus three return trips daily Auckland – Whangarei.
9	Auckland–Wellington (via Rotorua–Hamilton – Palmerston North)	364	One return trip daily Auckland–Hamilton –Rotorua, plus one return trip daily Auckland–Hamilton–Palmerston North–Wellington
10	Auckland–Dunedin (via Wellington and Christchurch)	703	One return trip and one north-bound trip daily, plus one trip daily Auckland –Christchurch–Dunedin, plus one return trip and one south-bound trip daily Auckland – Wellington – Christchurch, plus one trip daily Christchurch–Auckland.
11	Wellington–Westport (via Nelson) ..	191	Once daily in each direction.
12	Westport–Hokitika (via Greymouth) ..	78	Once daily in each direction.
13	Hokitika–Haast (via Wataroa and Waiho)	125	One return trip three times weekly. Others as required.
14	Auckland – Chatham Islands (via Wellington)	788	Not yet placed on regular schedule.
15	New Zealand Railways freight charter— Wellington–Blenheim	72	Six return trips daily, Monday to Friday (schedule increased or decreased as required).
	Wellington Christchurch	218	One return trip weekly.

APPENDIX E

Domestic Air Services: Traffic Statistics

Route No.	Route.	Hours Flown.	Miles Flown.	Passenger-miles Available.	Passenger-miles Used.	Percentage of Seat Utilization.	Passenger Ton-miles.	Baggage Ton-miles.
1	Auckland–Dunedin ..	6,142	929,172	13,625,555	9,003,184	66·1	662,155	99,063
2	Dunedin–Invercargill ..	2,112	208,222	1,248,690	797,686	63·9	57,742	7,031
3	Nelson–Wellington–Blenheim	3,068	339,588	4,410,964	3,278,290	74·3	228,092	33,546
4	Auckland – New Plymouth–Wellington	1,997	273,676	4,135,812	2,823,200	68·3	197,031	31,068
5	New Plymouth – Hamilton	329	42,210	634,716	263,514	41·5	17,549	2,556
6	Auckland – Tauranga – Gisborne	2,047	294,064	4,472,688	3,448,206	77·1	235,826	39,489
7	Gisborne–Napier–Wellington	1,895	239,036	3,610,374	2,226,653	61·7	156,520	24,436
8	Auckland–Kaitaia ..	2,871	270,202	2,386,824	1,782,785	74·7	120,774	17,536
9	Auckland–Rotorua–Hamilton–Wellington	2,425	281,795	3,213,758	2,173,658	67·8	151,265	23,617
10	Auckland–Dunedin ..	9,919	1,389,099	29,503,454	22,253,313	75·4	1,633,865	272,116
11	Wellington–Nelson–Westport	933	113,380	1,723,471	1,218,049	70·7	85,210	13,585
12	Westport–Hokitika ..	622	48,324	142,425	74,064	52·0	5,197	734
13	Hokitika–Haast ..	855	74,810	210,268	71,275	33·9	5,145	703
14	Auckland – Wellington–Chatham Islands	34	4,728	122,928	64,488	52·5	4,653	868
15	Wellington–Blenheim Wellington–Christchurch N.Z.R. freight charter	1,949	232,042	..	..	..	..	..
	Totals	37,198	4,740,348	69,441,927	49,478,365	71·3	3,561,024	566,348

Route No.	Route.	Excess Baggage Ton-miles.	Freight Ton-miles.	Mail Ton-miles.	Total Ton-miles.	Total Ton-miles Used.	Percentage of Aircraft Utilization.
1	Auckland–Dunedin	11,349	59,771	33,214	1,338,373	865,552	64·7
2	Dunedin–Invercargill	563	3,092	1,607	109,058	70,035	64·2
3	Nelson–Wellington–Blenheim ..	3,753	20,745	1,522	473,751	287,658	60·7
4	Auckland – New Plymouth – Wellington	3,308	7,798	3,052	427,371	242,257	56·7
5	New Plymouth – Hamilton	214	475	115	67,529	20,909	31·0
6	Auckland–Tauranga–Gisborne ..	5,131	11,033	2,990	447,954	294,469	65·7
7	Gisborne–Napier–Wellington ..	3,021	10,333	3,472	383,947	197,782	51·5
8	Auckland–Kaitaia	1,878	2,575	1,072	237,087	143,835	60·7
9	Auckland–Rotorua–Hamilton–Wellington	2,637	7,562	1,692	311,083	186,773	60·0
10	Auckland–Dunedin	35,780	147,097	66,408	3,206,271	2,155,266	67·2
11	Wellington–Nelson–Westport ..	1,623	7,486	2,397	184,606	110,301	59·7
12	Westport–Hokitika	59	441	432	12,217	6,863	56·2
13	Hokitika–Haast	158	2,964	3,112	18,309	12,082	66·0
14	Auckland – Wellington – Chatham Islands	128	201	166	16,437	6,016	36·6
15	Wellington–Blenheim .. Wellington–Christchurch .. N.Z.R. freight charter ..	..	745,781	..	846,849	745,781	88·1
	Totals	69,602	1,027,354	121,251	8,080,842	5,345,579	66·2

APPENDIX F

The following is a summary of traffic statistics for all domestic scheduled services for the years 1935–50 :—

Year Ended.	Hours Flown.	Miles Flown.	Passengers.	Freight.	Mail.	Passenger-miles.	Freight Ton-miles.	Mail Ton-miles.
				lb.	lb.			
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, 1937	6,588	776,938	24,251	44,074	111,377	2,673,860	2,047	9,288
31st March, 1938	11,327	1,331,100	43,782	81,853	216,238	5,518,363	4,301	18,205
31st March, 1939	12,821	1,574,395	53,039	166,278	316,380	6,787,026	9,054	29,248
31st March, 1940	10,541	1,326,234	51,802	223,018	234,989	6,478,540	12,247	21,729
31st March, 1941	5,036	645,702	37,023	206,936	130,806	4,373,822	9,585	12,555
31st March, 1942	5,206	688,723	38,058	194,858	165,670	5,062,938	9,434	17,616
31st March, 1943	5,576	685,953	30,634	174,757	220,527	4,655,774	9,423	23,887
31st March, 1944	6,421	832,966	37,435	191,113	244,614	6,371,007	11,426	29,677
31st March, 1945	7,129	965,787	51,754	272,251	313,013	9,299,979	18,824	44,040
31st March, 1946	8,541	1,108,134	60,193	338,950	428,709	10,158,221	22,587	52,935
31st March, 1947*	16,616	1,525,079	110,767	2,674,596	605,086	21,870,438	161,768	85,387
31st March, 1948†	27,849	3,459,258	154,329	14,292,577	597,231	35,695,285	574,901	97,310
31st March, 1949	32,868	4,197,461	174,836	19,220,891	752,492	44,323,199	843,528	108,580
31st March, 1950	37,198	4,740,348	204,707	24,547,480	873,305	49,478,365	1,096,956	121,251

* Includes hours flown, passengers carried, passenger-miles, freight ton-tmiles, and mail ton-miles flown by R.N.Z.A.F. Air Transport, but does not include miles flown or freight and mail carried by R.N.Z.A.F. Air Transport. Statistics for the New Zealand Railways freight service are included from 1947 onwards. † Freight ton-miles include excess baggage ton-miles from 1948 onwards.

REPORT OF THE DIRECTOR OF METEOROLOGICAL SERVICES FOR THE YEAR ENDED 31st MARCH, 1950

The Hon. the MINISTER IN CHARGE OF AIR DEPARTMENT.

I HAVE the honour to submit the following report on the work of the Meteorological Service for the year ended 31st March, 1950.

I have, &c.,

M. A. F. BARNETT,

Director of Meteorological Services.

1. FUNCTIONS OF THE METEOROLOGICAL SERVICE

The Meteorological Branch of Air Department is the State Meteorological Service in New Zealand, and is responsible for the meteorological organization throughout the Dominion and its island territories. In addition, by agreement with the United Kingdom and Australian Governments, the Branch is responsible for the provision and operation of the meteorological organization throughout the British Colonial Territories in the Pacific east of longitude 170° east. Contributions towards the cost of this latter service are recovered from the Governments concerned under agreements with the South Pacific Air Transport Council and with the Government of Fiji and the Western Pacific High Commission.

The Meteorological Service has the following general functions :—

(1) Provision of meteorological service for the Armed Services, Civil Aviation, Government Departments, local bodies, merchant marine, and the various sections of the general public.
(2) Collection, distribution, analysis, and publication of meteorological information.
(3) Organization of meteorological observations.
(4) Meteorological research.
(5) Liaison with overseas Meteorological Services and international organizations.

2. ORGANIZATION

(i) STRUCTURE

The Meteorological Branch has a Head Office located in the observatory reserve at Kelburn, Wellington, and a number of branch forecasting offices and observing stations.

The Headquarters organization is developed on a functional basis and is illustrated in Appendix I. The Assistant Director, in addition to acting as deputy to the Director, is primarily responsible for all aspects of the meteorological service for aviation.

The principal activities of the Service can be grouped into the following main divisions, and each of these aspects will be discussed in turn in subsequent sections of this report :—

(1) Reporting organization and instruments.
(2) Services for aviation.
(3) General forecasting.
(4) Climatology.
(5) Research.

Each of these divisions, in its own field, is concerned with problems of liaison with overseas Meteorological Services and international organizations. This subject is dealt with in the final section of the report.

(ii) Staff

The staffing position has improved during the year. Comparative figures are shown in the following table :—

——	Approved Establishment.	Strength at 31st March, 1950.	Strength at 31st March, 1949.
Professional officers	56	43	38
Observers	168	144	127

Two Pan-American World Airways forecasters remained on temporary attachment to the Service during the year and are included in the total of forty-three professional officers. Their services have been of the greatest value during a period of acute shortage of forecasters. They are being released on 1st May, 1950, when the agreement with the Company will be terminated.

It was mentioned in last year's report that further efforts were being made by the Public Service Commission to recruit suitable forecasters in the United Kingdom. Vacancies were again advertised and the response was very encouraging. Five of the six new professional officers appointed during the year have come from England. Two of them are employed at the International Airport at Nandi. Two or three additional appointments from the United Kingdom are expected during the coming year.

Attachment to the Meteorological Service is one of the avenues open to applicants for Public Service science bursaries. One man was appointed under this scheme during the year. He is taking his B.Sc. course, on a full-time basis, at Otago University and works in the Meteorological Office during the long vacations.

Two senior officers are still engaged on advanced studies overseas. Mr. J. F. Gabites, Officer in Charge of the Forecasting Service for Aviation, is the holder of a Commonwealth Fund Service Fellowship and is attached to Massachusetts Institute of Technology. Mr. E. H. Howell, Officer in Charge of the General Forecasting Service, has a rehabilitation bursary and is taking a post-graduate course in meteorology at London University.

A major reorganization in the Observer establishment was made during the year and better opportunities are now provided in the senior grades. The improved conditions have had the effect of providing a much more stable staff.

(iii) Accommodation

Attendance at Meteorological Offices is on a twenty-four hour basis and involves night shifts and work at week-ends. This creates serious transport difficulties where the offices are situated in remote localities. In 1946 approval, in principle, was given to a proposal for providing a limited number of houses or flats for married officers at stations which are some distance from main centres of population. Some further progress with this project was made during the year. Two houses became available at Kaitaia, and one at each of the following places : Rarotonga, Gisborne, Palmerston North, Nelson, and Hokitika.

The new quarters for the Meteorological Office at Taieri were completed early in the year. A tender has been let for the office building at Invercargill Aerodrome required to house radiosonde and radar wind-finding equipment. Plans have been prepared for extensions to the forecasting office at Kelburn and to the Meteorological Office at Paraparaumu.

An extension of the Head Office of the Meteorological Service at Kelburn is urgently required and was approved in principle in 1945. During the war the office expanded into a number of temporary huts alongside the main building. Some of these huts are on City Council property. The existing space is already severely overtaxed and until

relief can be provided by means of an addition to the main building, it will be impossible to vacate the huts. Plans have been prepared for a suitable permanent addition to the main building.

3. WEATHER REPORTING ORGANIZATION AND INSTRUMENTS

(i) Reporting Organization

Weather reports comprise the basic information with which the meteorologist works, and a comprehensive weather reporting organization must be in operation before any Meteorological Service can function efficiently.

Weather observing stations are of three general classes :—

(1) *Rainfall Stations.*—Equipped with a rain-gauge only, making daily readings and forwarding reports monthly.

(2) *Climatological Stations.*—At such stations the basic instruments consist of a rain-gauge and five thermometers known as the dry bulb, wet bulb, maximum, minimum, and grass-minimum thermometer. Many more instruments are available at certain selected stations. At the more fully equipped, the additional instruments include thermometers for measuring soil temperatures at various depths down to 3 ft., evaporimeter, anemometer, as well as automatic instruments to give continuous records of the temperature, rainfall, humidity, wind, and sunshine. Observations are made at 9 a.m. each day and records are forwarded at the end of the month.

(3) *Synoptic Reporting Stations.*—These stations make weather observations usually several times a day and forward reports immediately to the nearest collecting centre by telephone, telegraph, or radio. The information is then distributed over the meteorological teleprinter circuit for use in the Forecasting Offices.

There are three orders of synoptic reporting stations, defined as follows :—

First-order Stations : These make full upper-air soundings as well as surface observations. They are provided with radiosonde and/or radar wind-finding equipment, together with the usual instruments for surface observations,—namely, mercury barometer, barograph, thermometers, anemometer, and rain-gauge. They are staffed by Meteorological Office personnel, and make observations at least at three-hourly intervals throughout the twenty-four hours.

Second-order Stations : These make visual upper-air observations by means of pilot-balloon theodolite equipment and have a full set of instruments for surface observations. They are staffed by Meteorological Office personnel and normally make observations at least at three-hourly intervals.

Third-order Stations : These make surface observations only. Some of them have no instrumental equipment and are limited to visual observations of cloud, wind, and weather. Others have the full set of instruments that are provided for making surface observations at first-order stations. The number of reports made varies greatly at different stations and ranges between the limits of one every hour and one per day. The stations are not usually staffed by Meteorological Office observers, but are located at lighthouses, signal-stations, post-offices, &c., where the weather observing is included as part of the normal duties of the staff concerned.

The Reporting and Instruments Section is responsible for the setting-up and maintenance of all weather reporting stations. It also has to ensure that the quality of the observations is kept at a high standard. The Principal Meteorologist (islands) and the staff of the branch offices in Fiji assist in running the network of Pacific Island stations, and the technical maintenance of all electronic equipment is carried out by the Radio Engineering Section of the Civil Aviation Branch.

Every endeavour is made to arrange a personal visit to all synoptic reporting stations, and to climatological stations at least once every two years, to check instruments and give any instruction to the observers that may be necessary. Inspections in the Pacific Islands were greatly facilitated by the co-operation of the Royal New Zealand Navy in visiting some forty-two island stations in the Pacific during their 1949 winter cruise in those waters.

(ii) Reporting Station Network

Rainfall Stations.—Automatic rain-gauges of the Dines tilting-syphon type were set up during the year at Summit, Kurow, Wither Hills, Ohakea, Greymouth, Haast, Hastings, Winchmore, Adair, Tara Hills, Mid Dome, Kohatanui, Gwavas, and Taupo, while an additional forty manual rainfall stations were installed.

Climatological Stations.—New stations were established at Cromwell, Taupo, Hastings (additional station), Winchmore (Agriculture Department Experimental station), Otautau (State Forest Service), Tara Hills and Mid Dome (Soil Conservation and Rivers Control Council's research stations). The original Balmoral station was closed down.

Synoptic Reporting Stations.—Invercargill was raised from a second-order to a first-order station by the commencement of radiosonde flights on 16th January, 1950.

A preliminary survey was made for possible sites for a new first-order station at Campbell Island, and a series of experimental radiosonde flights was carried out.

Penrhyn, in the Northern Cook Islands, was raised from a third-order to a second-order station in July, 1949.

New third-order stations were set up at Mokohinau, Port Pegasus, Oban, Monowai, Waitaki, Okarito, Bruce Bay, Inchbonnie, Beaumont, Kaingaroa, and Waharoa, while an additional station, making hourly reports, was established at Taumarunui.

Jacksons Bay, a climatological and synoptic station, was closed down on the transfer of the radio-station to Haast. The instruments from Jacksons Bay were re-erected at Haast.

The following table shows the present extent of the complete reporting station network. The location of all the island synoptic stations and of the first- and second-order stations within New Zealand is shown on the map at Appendix II, page 70.

Type of Station.	Within New Zealand.	In New Zealand Dependent and Trust Territories in the Pacific.	In Fiji and High Commission Area.
Synoptic Reporting Stations—			
First-order	5	0	1
Second-order (*a*)	9	6	3
Third-order (*b*)	95	10	24
Climatological stations ..	109 (*c*)	14 (*d*)	21 (*e*)
Rainfall stations (*f*) ..	879	54	83

Notes.—(*a*) Excluding first-order stations. (*b*) Excluding first- and second-order stations. (*c*) Includes twenty-one of the synoptic reporting stations. (*d*) These are all synoptic reporting stations. (*e*) Includes nine synoptic reporting stations. (*f*) Includes *all* stations making rainfall observations.

(iii) Weather Reports from Ships

A very important part of the organization is the obtaining of reports from ships at sea. Such observations often provide vital information from areas where it is impossible to set up permanent reporting stations.

All ships visiting New Zealand waters are encouraged to make weather reports while in this area. This is accomplished by the Port Meteorological Officers paying personal visits to all overseas vessels that call at Auckland or Wellington. In addition, letters asking that weather reports be made are often sent to ships to reach them at their nearest port of call on their voyages to this country.

Japanese whaling-vessels operated far to the south of New Zealand during the recent summer and their weather reports proved particularly useful.

Ships normally make observations every six hours, and the total number of reports received during the past year has averaged just over twelve hundred per month.

The excellent co-operation received from the shipping of all nations visiting the New Zealand area is gratefully acknowledged.

(iv) Training of Observers

The Reporting and Instrument Section is responsible for the training of all meteorological observers, including the co-operative observers who are not in the employ of the Meteorological Service.

Examinations for the permanent observing staff of the Service are conducted during August each year and are of two grades—Junior and Senior. As a preparation for the Senior Observers Examination a correspondence course in upper-air meteorology is arranged and brief personal tuition in this subject by a senior officer is provided wherever possible.

Instructional courses of three months' duration for newly appointed observers were arranged during the year at Mechanics Bay and at Harewood. Twenty observers completed their initial training and were allocated to various branches for duty.

Preparatory to the opening of the first-order station at Invercargill, special tuition in radiosonde operating was given to six observers.

(v) Instruments

The supply position for most types of thermometers continued to be difficult until early in 1950, when substantial deliveries were made by manufacturers in England on an order placed during 1947. Other classes of meteorological instruments have been in good supply and all demands have been met.

After initial difficulties, supplies of radiosonde transmitters from Australia have been well maintained, while the first of the British Kew type of radiosonde equipment was received in New Zealand towards the end of March.

During the year development work was done on a suitable plotting-board for use with the M.E. 7 radar wind-finding sets. A prototype was built at the Dominion Physical Laboratory, and after further modification, was put in service at Nandi.

A new micrometer standard for evaporimeters was designed, and three stations were equipped with the modified fitting.

The need for a low-pressure hydrogen generator was discussed with the Dominion Laboratory which has provided a report describing the design requirements of a suitable unit.

Investigations were carried out by the Dominion Physical Laboratory into the design of a subsidiary radar set for wind finding. However, after preliminary work had been done, it was found that a suitable set, fulfilling the meteorological requirements, would prove more expensive than the results obtainable would justify, and the scheme was abandoned.

The overhaul of the wartime automatic weather station which was recovered from Chesterfield Reef, has been completed, and the set was placed on a long-term test in Wellington on 25th November. It has continued, since then, to operate automatically in a satisfactory manner.

4. METEOROLOGICAL SERVICE FOR AVIATION

(i) Organization

Branch offices are maintained at the following airfields and flying-boat bases :—

Within New Zealand

Forecasting Officers.	Observing Officers.
Mechanics Bay.	Kaitaia.
Ohakea.	Whenuapai (*a*).
Paraparaumu.	Gisborne.
Wigram.	New Plymouth.
Taieri.	Palmerston North (Milson).
	Nelson.
	Blenheim.
	Hokitika.
	Harewood.
	Invercargill.

Island Area

Nandi, Fiji.	Lauthala Bay, Fiji (*a*).
	Fua'amotu, Tonga.
	Apia, Samoa.
	Aitutaki, Cook Islands.
	Rarotonga, Cook Islands.

Note.—(*a*) Forecasting office temporarily reduced in status through shortage of staff.

The above list comprises all but two of the branches staffed by the Meteorological Service. These are the second-order observing stations at Raoul Island (Kermadecs) and Campbell Island. Neither is directly concerned with the provision of service to aircraft but they are mentioned here to complete the list of branches. Both these stations are maintained by the Ministry of Works on behalf of the Meteorological Branch.

Apart from their aviation activities, the branch forecasting offices provide, to varying extents, other locally required meteorological services, while, in addition, both the forecasting and observing offices act as key observing stations in the weather reporting network.

Forecasts are available on a twenty-four hour basis from Mechanics Bay and Nandi. Other offices are manned during such hours as are necessary to provide the services required by Civil and R.N.Z.A.F. aviation and to maintain the general programme of observations. Continuous service is normally available between 6 a.m. and 11 p.m.

The observing offices are dependent on one of the forecasting offices for the provision of forecasts to aviation interests. The General Forecasting Office at Kelburn provides a limited number of aviation forecasts when the Paraparaumu office is closed. It also assisted Wigram for a period when the forecasting staff there was below strength.

(ii) Functions

The purpose of the Aviation Section is to see that the needs of Civil and Service aviation are fully met for both internal and overseas operations.

(*a*) *Civil Aviation.*—For Civil aviation operations, forecasting services are maintained strictly in accordance with international and regional procedures. To this end a written forecast is supplied on a routine basis to the pilot of every scheduled commercial aircraft and, where practicable, is supplemented by personal briefing. A similar service is available for all non-scheduled and private flights. Frequent discussions, both directly and by telephone, take place between forecasters and aviation operators, including pilots engaged on aerial survey work, top-dressing, &c. These services are free of charge.

The forecast service provided covers the whole of New Zealand and a large area of the South-west Pacific. In addition to routes within New Zealand, forecast service and flight watch was maintained during the year over the following overseas air routes :—

From Auckland to	Sydney.
	Norfolk Island.
	Nandi.
	Lauthala Bay.
From Nandi to	Auckland.
	Norfolk Island.
	Sydney direct.
	Sydney via Tontouta.
	Canton Island.
	Rarotonga via Tonga, Apia, and Aitutaki.
	Tahiti via Tonga, Apia, and Aitutaki.
From Lauthala Bay to ..	Auckland.
	Noumea.
	Tarawa.
	Tulagi.

To supplement the services provided directly to aircraft commanders, a considerable amount of service is provided to the operations personnel of the several operating companies and to the staffs of Air Traffic Control Centres. To enable them to fulfil their functions, these officers are kept informed of the general weather situation and its developments, and are supplied with current meteorological reports and with relevant forecasts and amendments.

(*b*) *R.N.Z.A.F.*—The Meteorological Office is responsible also for service to the Royal New Zealand Air Force, and forecasting offices are accordingly maintained at Wigram and, since April, 1949, at Ohakea. At both stations courses of lectures in meteorology are provided for trainees, in addition to the normal forecasting work.

Shortage of staff has, so far, prevented the reopening of the forecasting offices on the R.N.Z.A.F. Stations at Whenuapai and Lauthala Bay (Fiji).

The R.N.Z.A.F. have co-operated in providing aircraft for daily upper-air soundings at Ohakea.

(iii) Forecasting

Paucity of upper-air information throughout the South Pacific is still causing concern and makes more difficult the provision of accurate forecasts, particularly for the high altitudes at which modern aircraft normally operate. A comprehensive network of upper-air stations throughout the area has already been approved but New Zealand, together with the other nations concerned, is experiencing difficulty in implementing the scheme, and it will probably be some years before the full network is installed.

The Australian authorities have recently reopened the radiosonde observing station on Norfolk Island. This station is of fundamental importance to forecasting in the Tasman Sea area and along the air routes of the South-west Pacific.

(iv) Communications

Within New Zealand a teleprinter network is provided for meteorological purposes, linking the main branch offices. The equipment is supplied and maintained by the Post and Telegraph Department and operated by Meteorological Office staff or, in key centres, trained Post and Telegraph Department or Air Department staff.

This network serves a dual purpose in that it provides means of both collecting and disseminating information without delay. For aviation purposes, and particularly on the short flights of internal routes, it is necessary to have frequent reports from a

selection of strategically located stations, mainly on airfields. Such reports must be available without delay as they are required for preparing forecasts and for checking forecasts carried by aircraft already airborne. During daylight hours reports are prepared hourly from some twenty-one airfields and five other key points. These are exchanged rapidly between all offices on the meteorological teleprinter network. To ensure the maximum availability and utilization of these reports they are also broadcast from Wellington radio.

Throughout the Pacific, and within New Zealand beyond the limits of the teleprinter network, the necessary meteorological communication facilities are provided either by the Telecommunications Section of the Civil Aviation Branch or by the appropriate Post and Telegraph organization.

(v) Examinations

Assistance is given to the Civil Aviation Branch in the preparation and revision of the meteorological portions of the syllabus for various pilots' and navigators' examinations.

During the year three examinations were held for pilots' "C" licences, one for second-class navigators and two for first-class navigators. The preparation and the marking of the meteorological papers for these examinations were undertaken by this Branch.

In addition, Meteorological examinations are held on R.N.Z.A.F. Stations as required by the training programmes.

(vi) Liaison

Close liaison is maintained with the aviation operating companies, particularly New Zealand Airways Corporation and Tasman Empire Airways, Ltd., and with the R.N.Z.A.F. and other branches and sections of Air Department.

In furtherance of this liaison, the Assistant Director normally attends the routine staff meetings for senior controlling officers held respectively by the Chief of the Air Staff and the Director of Civil Aviation. He also attended the annual conference of R.N.Z.A.F. Station Commanding Officers.

Discussions with the Telecommunications and Air Traffic Control Sections of the Civil Aviation Branch have resulted in the supply of regular weather reports from certain stations manned only by Civil Aviation Branch personnel. This assistance, and that provided by Air Traffic Control staff at other offices, has obviated the need for increasing meteorological establishments.

The nature of aviation meteorology demands considerable co-ordination of meteorological practices throughout the world, and accordingly, close liaison is maintained with other individual countries, particularly with Australia. On the broader international basis, the main liaison is through the South Pacific Air Transport Council and the International Civil Aviation Organization.

(vii) South Pacific Air Transport Council

To facilitate the provision of Commonwealth air services, and to maintain adequate facilities for aviation in the South-west Pacific, a South Pacific Air Transport Council was established in 1946 by agreement between the New Zealand, Australian, United Kingdom, and Fiji Governments. Canada has, more recently, participated in this arrangement. Under the agreement, New Zealand accepts responsibility in that portion of the South-west Pacific lying east of 170° east for the maintenance of the necessary ground facilities required for trunk aviation services. The requirements under this agreement, together with those in our own New Zealand Trust and dependent territories, involve New Zealand in considerable meteorological commitments in the island area.

As a matter of convenience, and to obtain overall economy, New Zealand has also undertaken to provide the domestic meteorological requirements of the Fiji and Western Pacific High Commission territories, in addition to the major services supplied for aviation requirements. In this connection, formal agreements are at present being negotiated between New Zealand and the Fiji and High Commission administrations, covering the provision of meteorological services in the respective territories.

5. GENERAL FORECASTING SERVICE

(i) Organization

The supply of forecasts to various sections of the general public and to shipping interests, as distinct from the more specialized service for aviation dealt with in the previous section, is probably the most important function of the Meteorological Service and is the one from which greatest material value is derived by those concerned. For the farmer in particular, the receipt of an accurate forecast often makes it possible to avoid serious financial loss and, in many other fields, money can be saved by a timely warning of weather changes.

In New Zealand the general forecasting work is largely concentrated in the General Forecasting Office at Kelburn, Wellington, but certain local services are provided by the branch aviation forecasting offices. For the tropical area, the Meteorological Office at Nandi combines both aviation and general forecasting duties.

(ii) Services Provided

(*a*) *General Forecasting Office, Wellington.*—The principal routine task of the Kelburn Office continues to be the preparation of forecasts for the press and radio. In addition to the four daily broadcasts over the main national network of the New Zealand Broadcasting Service, local forecasts are supplied directly or through branch offices to most of the commercial and subsidiary broadcasting stations.

District forecasts are supplied to eleven morning and twenty-eight evening newspapers. Appropriate forecasts are also provided for display in the post-office of fourteen of the main ports throughout the country.

To meet the needs of shipping in New Zealand waters, two types of service are provided. For vessels trading overseas, forecasts and a selection of weather reports are broadcast twice daily by wireless telegraphy from Wellington radio. These forecasts normally cover an area up to about three hundred miles from the coast but, where appropriate, reference is made to any storms situated beyond these limits. For coastal shipping and fishing-vessels, more localized forecasts and reports are issued each morning and evening by short-wave radiotelephony from Auckland, Wellington, and Awarua.

Special warnings for shipping, of exceptional weather conditions, are also arranged as "Navigational Warnings" through the Marine Department. Such warnings are broadcast by the New Zealand Broadcasting Service as well as from the Post and Telegraph Department stations.

During critical seasonal periods, such as those of shearing or haymaking, a great many farmers lodge requests for special forecasts to assist in planning their operations. For example, during the haymaking season numerous letters are received asking that advice be sent on the first occasion, after a specified date, when three or four days of settled weather can be expected. Such information is sent to the farmer by collect telegram. Another common request is that for a telegraphed warning of the onset of a cold southerly during shearing operations. In the routine broadcasts it is impossible to give a detailed description of the weather expected in a particular locality, and individual requests of this nature are welcomed by the forecaster.

Close co-operation is maintained with the State Forest Service during the summer months, and special forecasts are provided during dry spells in connection with the fire-prevention service.

In order to ensure the most economical distribution of electricity, the forecaster has a telephone discussion each day with the State Hydro-electric Department's Load Despatcher at Hamilton.

By arrangement with the Soil Conservation and Rivers Control Council, warnings of heavy rain are sent to the appropriate Catchment Boards, and during flood situations contact is maintained between the forecaster and the Catchment Board engineer. Warnings of heavy rain in the Gisborne-Wairoa area are also issued on a routine basis to the Railways Department.

Routine forecasts are issued in connection with aerial mapping and from time to time many other specialized services are provided. As an example, the issue of special forecasts during cable-laying operations in Foveaux Strait might be mentioned.

Although primarily concerned with general forecasting, the General Forecasting Office at Kelburn provides routine aviation forecasts at times outside the normal hours of duty of the forecasters at Paraparaumu. It has also supplied forecasts for occasional flying-boat visits to Chatham Islands.

(*b*) *Meteorological Office, Nandi, Fiji.*—In addition to the aviation services it provides, the Nandi Office is responsible, under the agreement already mentioned, for all forecasting requirements in the island areas under the control of the Fiji Government and the Western Pacific High Commission respectively. Forecast requirements in the New Zealand Trust and dependent territories are also handled from Nandi.

The major requirement in the general forecasting carried out at Nandi is in respect of the Fiji Group and, throughout the year, weather broadcasts are made twice daily over the Fiji Broadcasting Company's Station, ZJV, at Suva. These broadcasts cover the weather expected over the Fiji Group and are of very considerable value to plantation and shipping interests. Copies of the daytime forecasts prepared for broadcasting are supplied to the Fiji *Times* and *Herald* and are displayed on public notice-boards in Suva. Routine forecasts are also supplied daily to the authorities at Apia and at Rarotonga, the forecasts supplied to Apia being broadcast over the local radio-station.

During the southern summer the Nandi Office is charged with the responsibility of issuing hurricane warnings to all the island territories referred to above, and is also responsible for seeing that adequate storm warnings are issued to shipping in the island area. The locating of any particular storm and forecasting its subsequent movement and development is a matter of considerable difficulty in an area where reporting stations are so scarce and this duty imposes a severe strain at times upon the forecasting personnel. It is, however, a most important service and, when adequate notice is given of impending storm activity, can result in the safeguarding of many thousands of pounds worth of property and, in some cases, may be the means of saving human life.

Special forecasts for specific operations, either of a shipping or an agricultural nature, are supplied on request from Nandi.

(*c*) *Other Branch Offices.*—The branch offices are primarily concerned with aviation services but they deal also with numerous local inquiries for general information. They are responsible for issuing the forecasts for the city area to their local broadcasting-stations. In Auckland, storm warnings are issued to the Harbour Board and special forecasts are provided for yachtsmen. Numerous other specialized services are made available from time to time from the branch offices.

(iii) Collection and Dissemination of Weather Reports

The rapid collection of weather information from a wide area is an essential adjunct to forecasting. The weather chart used in New Zealand extends from the equator to the latitude of Campbell and Macquarie Islands in the south. It embraces the whole of Australia and extends as far east as Pitcairn Island. It will be seen, therefore, that some internationally co-ordinated system is needed for the rapid exchange of information between adjacent countries. This is effected by broadcasting in an international figure

code all the reports gathered together at appropriate collecting centres. The main broadcasting-station for this purpose in Australia has recently been transferred from Melbourne to Canberra. For convenience, the area under New Zealand control is subdivided into two parts. The reports for the tropical regions of the South Pacific are collected in the Meteorological Office in Nandi and broadcast by Nandi Aeradio Station. Reports for New Zealand and the surrounding islands are collected in the General Forecasting Office and broadcast from Wellington radio. In each case the information is broadcast simultaneously on an appropriate selection of frequencies to ensure reception over a very wide area.

Collective messages comprise reports from land stations, ships and aircraft, as well as upper-air information. Coded copies of analyses of the surface-weather charts and of the chart for the 700-millibar level are also included. The principal "collectives" go out every six hours. In addition, three subsidiary broadcasts are made from Wellington and two from Nandi.

Counting both incoming and outgoing collectives, Wellington and Nandi each handle approximately nine thousand five-figure groups daily.

Cyclostyled monthly bulletins are prepared containing all the information collected each day at two of the main reporting hours—0000 and 1200 G.M.T. These are circulated to a number of overseas Meteorological Services on an exchange basis.

6. CLIMATOLOGY

(i) Source of Statistical Data

The basic data used in the compilation of climatological statistics are obtained from monthly returns sent forward from a close network of observing stations spread throughout the area under the control of the New Zealand Service. Stations in New Zealand and the Cook Islands send returns to Head Office, Wellington; returns from the Colony of Fiji and the territory administered by the Western Pacific High Commission are collected at Lauthala Bay, Suva; and the Apia Observatory, Samoa, collects data for Samoa and the Tokelaus.

Since the New Zealand Meteorological Service took over responsibility for the preparation and publication of meteorological statistics for Fiji and the Western Pacific High Commission, some minor changes have been made by agreement with the Meteorological Office, London, in order to introduce current New Zealand forms and procedures for use in this area both as a measure of convenience and to meet changes in the methods of applying meteorological statistics to present-day problems.

Information supplied in the monthly returns varies greatly from station to station, ranging from a single daily rain-gauge reading to a detailed weather observation each hour. However, it is convenient to group the observing stations into three main classes—climatological, rainfall, and synoptic reporting. A few stations, chiefly those located at branch offices combine the functions of all three classes. Further information on the number and distribution of observing stations has been given in Section 3 of this report.

At climatological stations, the basic data recorded consist of rainfall, air temperature and humidity, extreme daily temperatures and frost, as well as the general weather conditions. From the more fully-equipped stations additional data include soil temperatures at various depths, evaporation, wind flow, and sunshine.

Further progress has been made in setting up new rainfall stations to provide detailed data from the catchment areas of the larger rivers. With the co-operation of the Catchment Boards and the Ministry of Works in finding new observers, some forty additiona rainfall stations were established during the year. This has resulted in greatly improved coverage in some areas, particularly in Southland, Hawke's Bay, and Wairarapa.

Rainfall records are also available from all climatological stations as well as from some one hundred and twenty private observers who supply copies of their readings.

Once again I wish to acknowledge on behalf of the many users of rainfall data our indebtedness to those hundreds of voluntary observers who continue year by year to send in their regular monthly rainfall returns.

Monthly returns for statistical purposes are also prepared at synoptic reporting stations. Weather observations are made several times a day—hourly at main stations—so that these reports are a source of much detailed information, particularly as regards visibility, cloud height and amount, and other meteorological elements which cannot be conveniently recorded by automatic instruments.

The principal reporting stations, which are mostly located at branch offices of the New Zealand Meteorological Service, also provide data from the free atmosphere by the use of pilot balloons, radar wind-finding equipment, and radiosondes.

The standard hour for observations at climatological and rain-fall stations in New Zealand was changed on 1st January, 1950, from 9.30 a.m. to 9 a.m.

(ii) Publication of Climatological Observations

A summary of returns from all climatological stations is published monthly in the form of a table in the *New Zealand Gazette*. Reprints are distributed to all climatological observers and to some eighty other addressees.

The " Annual Meteorological Observations " are still some years in arrears due to printing and other delays. The latest available issue is that for 1944.

Routine summaries of climatological data were supplied for publication in the *Journal of Agriculture* and *Meat and Wool* as well as in the press.

Climatological data for the Colony of Fiji and the Western Pacific High Commission are published in Fiji. Data for Samoa are included in the annual report of Apia Observatory. Both of the above publications were suspended during the war but it is expected that publication will be resumed in the immediate future.

In order to speed the international exchange of all climatological data, a special broadcast of selected information was started in February, 1950. By arrangement through the International Meteorological Organization similar information is broadcast by all the member countries of the world on or before the sixth of each month.

(iii) Information Service

On the average, about a dozen written inquiries were received each month. Many of these were concerned with rainfall data applied to such problems as the design of bridges, river control, irrigation, hydro-electric generation, and calculation of insurance risks. Others dealt with the effect of climate on primary production, establishment of new plant species in favourable areas, health of individuals, transportation and storage of perishable goods, &c. Local telephone inquiries were even more numerous, and many people called personally to discuss special problems in which climate and weather played some part.

Some of the inquiries could be answered from summaries and tabulations already available, but in many cases it was necessary to carry out special investigations. Among these may be mentioned :—

(1) A series of climatic maps which were completed during the year and are later to be published in the long-awaited " Centennial Atlas."

(2) The preparation of several short climatic notes for inclusion in bulletins dealing with soils or plant-growth.

(3) Detailed investigation of rainfall distribution in a number of floods.

(4) Analyses of wind, cloud, and visibility for design of aerodrome runways and instrument landing systems.

Shortage of trained staff has forced the postponement of several current investigations. The revision of rainfall averages and the preparation of summaries for publication had to be suspended upon the departure of one of our officers on indefinite sick leave.

The Meterological Service keeps in close touch with the Soil Conservation and Rivers Control Council, and is represented on the Central Standing Committee and on the Council's Technical Committee (Hydrology).

7. RESEARCH AND DEVELOPMENT

(1) Research

The Research Section is chiefly concerned with carrying out systematic research on the meteorology of New Zealand and the surrounding areas. Only by using the results of such basic research will the way be open for any substantial improvement in the quality of the current forecasts or any extension of the period for which accurate forecasts can be prepared. Not unnaturally, close attention is paid to meteorological research being done overseas, and the possible applications of this work to New Zealand problems and conditions.. The section is also responsible for the co-ordination of research work done at branch offices of the Service, both in New Zealand and in the Pacific. Training of professional staff for forecasting duties is another function of this section, as well as a certain amount of public relations and information service work. Library service and publications are also included.

Unfortunately, during the year under review only one professional officer was able to devote any considerable part of his time to research, and no observers were available to assist in this work. Again, although under normal staffing conditions the forecaster establishment is such as to permit each forecaster to devote about one-quarter of his time to study and research, the current shortage of professional staff has necessitated most officers being kept fully occupied on routine forecasting duties. In spite of these difficulties, a limited number of research projects has been carried out.

At Head Office the work started last year on the analysis of available upper-air data from New Zealand and Pacific Stations has been continued and is now being extended so as to cover the fields of pressure and wind to high levels in the atmosphere. This work has demonstrated the existence, on the average, of a belt of very strong westerly winds at an altitude of about 40,000 ft. lying to the north of New Zealand. Further study of individual cases has confirmed the results reached in this research. Such information will be of great importance in the near future with the introduction of high-flying jet aircraft on trans-Pacific routes. In this connection special endeavours have been made to secure fundamental wind measurements at very high levels, following the plan for world-wide co-operation in this field arranged by the International Meteorological Organization. Two ten-day aerological periods are chosen each year when all Meteorological Services make simultaneous efforts to obtain the maximum amount of information from the greatest possible heights. In New Zealand, during these periods, larger balloons than usual are used at many of our stations, and the R.N.Z.A.F. Station at Ohakea provides "meteorological flights" to maximum height using Mosquito aircraft. The results of such large-scale international scientific co-operation have proved very satisfactory indeed, and provide data indispensible for research into many practical problems.

Some research work has also been done on the problem of the distortion of the upper-wind flow by the mountainous country in the central parts of the North Island. Reports had been received from pilots of aircraft on the North Island main trunk air routes that, in a few cases, the upper winds actually experienced differed considerably from those forecast on the assumption of a fairly uniform wind distribution between the

meteorological upper-wind observing stations. To test the reality of strong local deviations of the wind by the neighbouring high country, a mobile pilot-balloon station was established, first at Taumarunui and then at Raetihi for a period of three months. A large amount of data was secured by the observation parties, but a careful scrutiny of the results does not lend any support to the supposed existence of extreme local deviations of the wind at these particular places. At all events, any cases of significant local variations of the upper winds from the general wind over the area would seem to be of very rare occurrence.

The Meteorological Office co-operated with the Department of Scientific and Industrial Research in the final stages of the project known as the Canterbury Project, which investigated anomalous propagation of radio waves off the coast of Canterbury. Technical advice was given on all meteorological aspects of the programme, and the weather charts and synoptic information were supervised during the preparation of the final report.

Some theoretical work has been done on the relation of variations in atmospheric pressure to warm and cold air advection in the upper atmosphere with the aim of making use of such relations in daily forecasting. However, the work, although promising, is still in the preliminary stages and further tests are necessary before its prognostic usefulness can be established.

The Research Officer attended the Annual Geophysical Conference of the Department of Scientific and Industrial Research held at Christchurch during December, 1949.

At branch offices, the following projects are in progress, or have already been completed during the year :—

Meteorological Office, Nadi, Fiji.—Pressure of work at this office has seriously interfered with research into the more fundamental aspects of tropical meteorology. However, the upper-air work which was started last year has been continued and extended to include an analysis of the upper winds up to high levels over Fiji. Such information will prove of particular value to high-flying aircraft in the tropical zone. During the year, notes were prepared by a senior member of the staff with a view to summarizing and systematizing the present state of knowledge regarding tropical weather on the air routes for which Nadi has direct forecast responsibility. These should serve as a useful basis for further study.

Meteorological Office, Auckland.—Research done at this office has been mainly of an operational nature and has been chiefly concerned with obtaining data and experience at the higher levels in the atmosphere suitable for the coming requirements of high-level jet transport aircraft. With this aim in view experiments have continued with the drawing of weather charts at the 300, 200, and 100 mb. levels, and special attention has been paid to the temperature fields at these levels. Where data is available, pressure changes at all heights up to 16 km. are being tabulated in order to observe any correlations which might exist between the various levels. A paper is being prepared by staff members which will embody their latest experience in the interpretation of radiosonde data and will result in a revision of the paper prepared last year entitled "A Method for the Interpretation of Radiosonde Ascents." In addition to this work, some research has also been done on the forecasting of cloud amount and the height of cloud tops by means of the data obtained from radiosonde flights.

Following a request for information by the Canterbury Internationa Air Race Council, a detailed study of the Sydney-Christchurch air route was made and forwarded to the Council.

Meteorological Office, Paraparaumu.—At this office it is intended to make a detailed study of cloud, wind, and weather on the main air routes in relation to different meteorological situations. During the year, all reports from airline pilots have been assembled and plotted on vertical cross-section diagrams, and a preliminary analysis has been made. This will be improved as further data come to hand. For the information of airline pilots a brief account of the climatology of Paraparaumu Aerodrome has been published in the *Civil Aviation Journal.*

General Forecasting Office, Wellington.—Research at this office has been mainly concerned with matters relating to the improvement of the daily weather forecast service. With this in view, a detailed study of the rainfall patterns over New Zealand, as related to the synoptic situation, was undertaken and suggestions were made which may lead to some slight alterations in the forecast districts in order to fit in better with the observed rain patterns.

Investigations of some flood-producing weather situations were carried out, with special reference to the Oreti floods of December, 1948. Some aerological work was also undertaken using the upper air data from Norfolk Island.

Meteorological Office, Taieri.—Research has been continued on the frost investigations for the fruitgrowing districts of Central Otago, and the Taieri Office has assisted in the inspection and maintenance of meteorological research equipment at the Government Research Orchard at Earnscleugh. A special study of severe frosts during the months of August to November has been made, and the applicability of Brunt's formula has been tested.

(ii) Training of Professional Staff

During the year, one course in basic meteorology for the initial training of three prospective forecasters was conducted, the course lasting approximately two months.

(iii) Library

As in previous years, the library has continued to provide a specialized service covering all phases of the work of the Meteorological Service. This year has also seen a great increase in the use made of the library by other Government Departments and research workers in the University colleges. The number of publications received from overseas on an exchange basis has continued to increase and, in this way, many important additions have been made to the library. More use has also been made of microfilm copies of important publications and meteorological data, and better provision for this class of material will have to be made in future years. The appointment of a library assistant has enabled a more effective use of the library facilities, and a number of translations of important foreign works on meteorology has been made and circulated to the professional staff. Lack of space for the adequate handling of library material is still a very serious problem.

(iv) Publications

In addition to the routine publication of climatological information, the following publications were issued by the Meteorological Service during the year under review.—

(*a*) *Meteorological Office Notes.*—These publications contain the results of meteorological research work carried out by staff members. Where such work is not of an over-specialized nature and the results are of general interest, they are usually published in the *New Zealand Journal of Science and Technology,* and the Meteorological Office Note is issued as a reprint from that *Journal.* During the year the following two Notes were published, and three more are with the printer :—

No. 32, " Weather Forecasting To-day," by J. F. Gabites, M.Sc.

No. 33, " The Frequency of Heavy Rainfalls in New Zealand," by C. J. Seelye, Ph.D.

(*b*) *Technical Information Circulars.*—In order to supplement the library material circulated to branch Meteorological Offices, extracts or abstracts of the more important papers appearing in overseas journals are cyclostyled and issued for retention by branches as N.Z.M.O. Technical Information Circulars. During this year circulars Nos. 68 to 76 were issued.

(*c*) *Circular Notes.*—To promote investigations into local weather phenomena and to improve the standard of forecasting and observing throughout the Service, members of the staff are encouraged to prepare papers containing the results of any special work that is undertaken. These notes, which are chiefly of local interest, are cyclostyled and issued within the Meteorological Service as N.Z.M.O. Circular Notes. No. 50 was issued during the year.

(*d*) *Miscellaneous Instructional Booklets.*—These publications are issued from time to time as permanent instructional manuals for meteorological observers, voluntary observers, aviation interests, and others concerned with current procedures in the routine operation of the Meteorological Service. No. 106 was published during the year.

(*e*) *Instructional Circulars.*—These cover all necessary instructions to branch offices. Circulars 123 to 142 were issued during the year.

(v) Public Relations

During the year under review, the public relations work of the Service has continued to increase. A large number of general requests for information from the public and from Government Departments has been dealt with and various articles were prepared for the press regarding the work of the Meteorological Service.

The Research Officer attended the annual conference of dairy-farmers held at Massey Agricultural College and gave an address entitled " Weather Forecasting and its Service to Farmers." This was later printed in the " Dairy Farming Annual, 1949 " and the " New Zealand Dairy Exporter," as well as being broadcast by radio in the " Farming Session " over the National stations. This opportunity to make contact with a large number of farmers and to gain a first-hand knowledge of their problems and requirements in regard to weather forecasting has proved of material benefit to all concerned.

The text of a post-primary school bulletin (Vol. 3, No. 10) entitled " The New Zealand Meteorological Service " was prepared during the year. This has been published and circulated widely by the Education Department to post-primary schools in New Zealand.

An article was also written for the journal " Radio and Electronics " giving a brief description of the automatic weather station which was recently recovered from Chesterfield Reef in the Pacific. This article aroused widespread interest in the operation of the set, and many reports of reception of signals from the station have been received.

Opportunity was taken to illustrate the work of the Meteorological Service to the general public by arranging and staffing a meteorological exhibit at a scientific exhibition arranged by the Wellington Branch of the Royal Society of New Zealand. This exhibition, entitled " Science and Food," opened on 30th March in the Wellington Town Hall, and the meteorological exhibit aroused much attention from interested members of the general public.

A meteorological exhibit was also provided for the Industries Fair which was held at Christchurch and at Hamilton during 1949.

8. INTERNATIONAL CO-OPERATION

(i) International Meteorological Organization

That close international co-operation is essential in meteorology was recognized as long ago as 1872. In this year the International Meteorological Organization first came into being, and since then it has continued to function with conspicuous success. Until

very recently, the Organization has operated on an official level as an association of the Directors of National Meteorological Services throughout the world. The great developments in the application of meteorology that have taken place in recent years, and are still taking place, made it desirable to raise the status of the Organization to an intergovernmental level, similar to such bodies as the International Civil Aviation Organization or the International Telecommunications Union. Thus, a convention for a new World Meteorological Organization was prepared in October, 1947. It has since been ratified by more than thirty Governments, including New Zealand, and entered into force on 23rd March, 1950.

Apart from its higher status, the new World Meteorological Organization follows the same general lines as the earlier International Meteorological Organization. The governing body is the Congress, which will consist of representatives of all participating Governments, and corresponds to the earlier "Conference of Directors." The existing Regional and Technical Commissions will be carried on in the new Organization. It is expected that the first Congress will be convened early in 1951 and, meantime, the existing machinery of the International Meteorological Organization continues in operation.

New Zealand is represented on the following bodies of the Organization:—

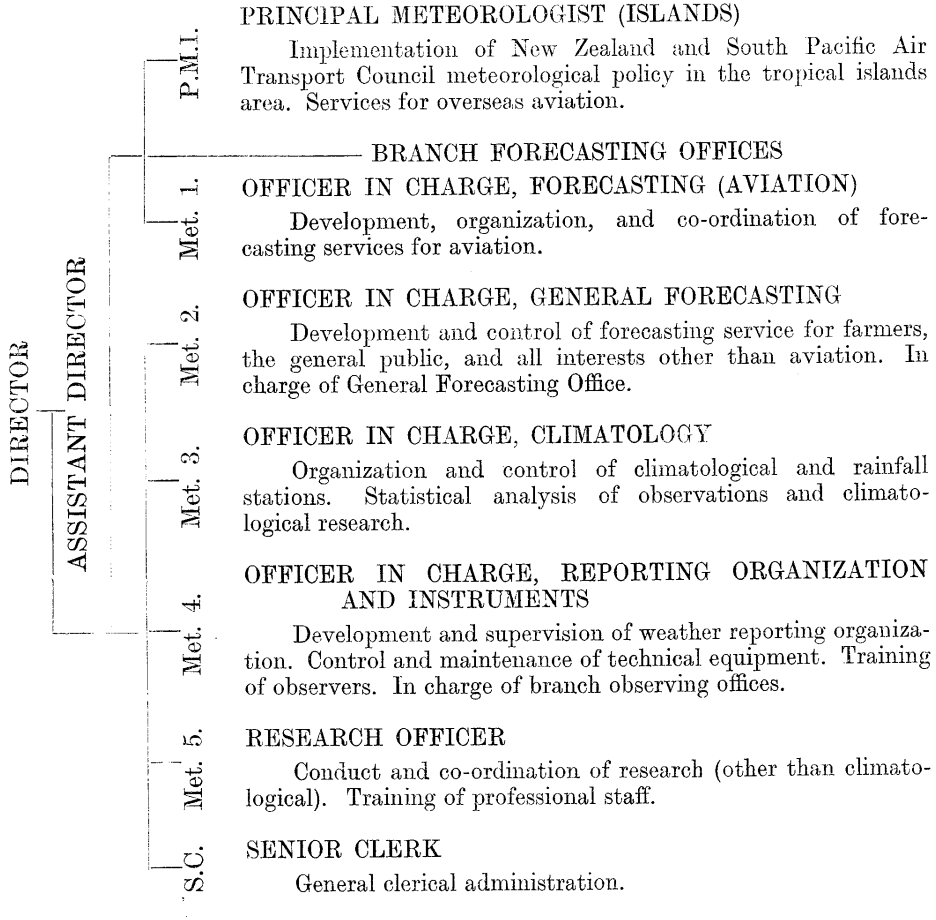
International Meteorological Committee	M. A. F. Barnett.
Regional Commission for the South-west Pacific	M. A. F. Barnett.
Commission for Aerology	J. F. Gabites.
Commission for Aeronautical Meteorology	R. G. Simmers.
Commission for Agricultural Meteorology	N. G. Robertson.
Commission for Climatology	N. G. Robertson.
Commission for Hydrology	N. G. Robertson.
Commission for Instruments and Methods of Observation	R. A. Ewing.
Commission for Maritime Meteorology	R. A. Ewing.
Commission for Polar Meteorology	R. G. Simmers.
Commission for Synoptic Weather Information	M. A. F. Barnett and J. F. Gabites.

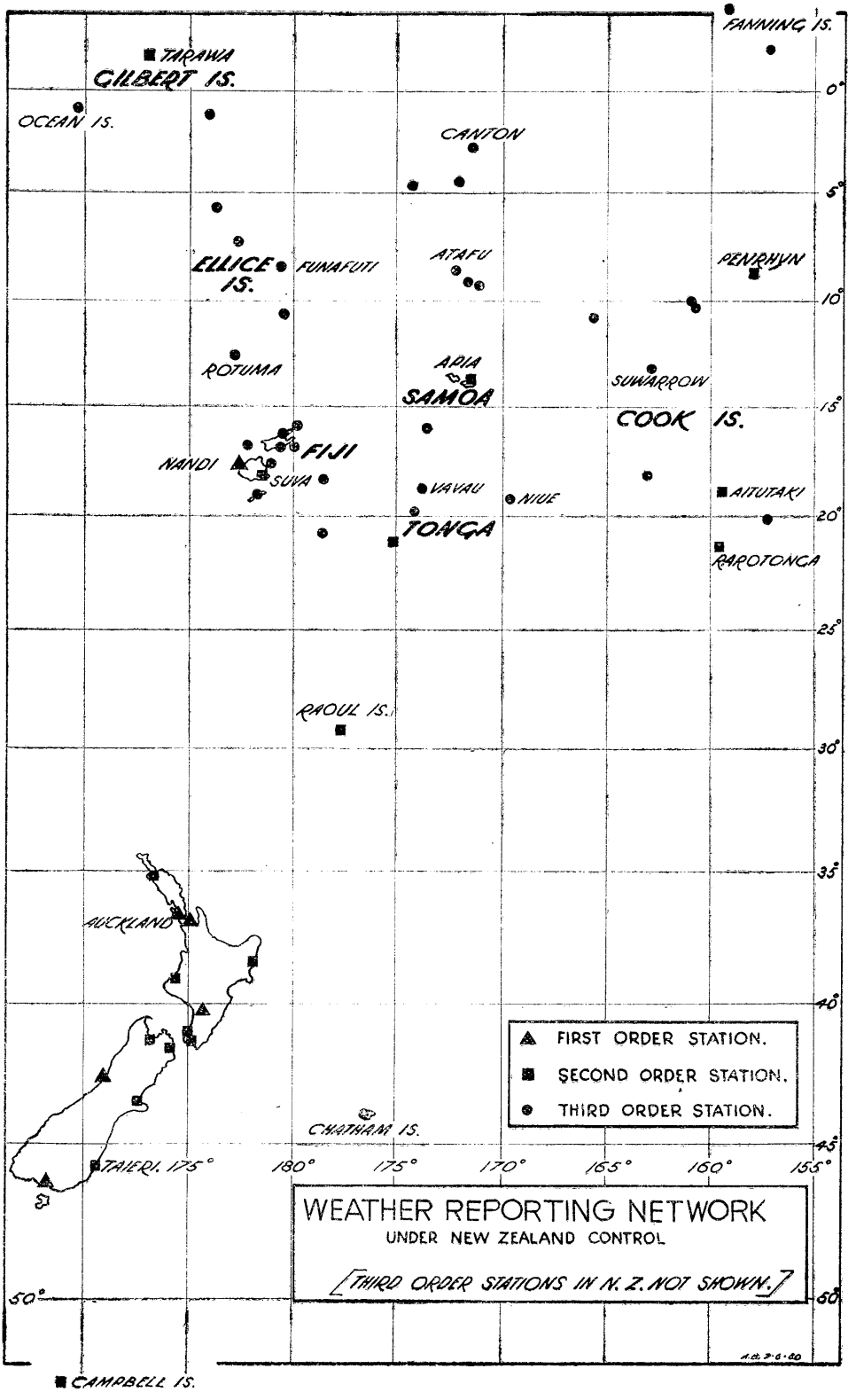
(ii) International Civil Aviation Organization

The third session of the Meteorological Division of the International Civil Aviation Organization was held in Paris from 14th February to 25th March, 1950, the meetings being held jointly with those of the Aeronautical Commission of the International Meteorological Organization. The meetings were the most widely representative yet held by either body, with members from thirty-two countries and four interested international organizations. Dr. R. G. Simmers, the Assistant Director of the Meteorological Branch, attended as the New Zealand delegate.

The agenda for the meetings was particularly exhaustive but action on all items was completed. The major work was a detailed revision of the document entitled "Specifications for Meteorological Services to International Air Navigation," which contains the procedures and policies for observance internationally in the provision of aviation meteorological services. The meeting made substantial changes to the document to take into account the changes and developments in aircraft operating procedures of recent years and the special problems which have arisen in various regions of the globe. Due attention was also given to anticipated further developments in aviation and, in particular, to the impending introduction of jet aircraft operating at very high speeds at high altitudes. Owing to the lack of civil operational experience with this type of aircraft, it was not possible to formulate precisely the meteorological requirements, but it was quite apparent that they will place greatly increased demands on meteorological services and will add substantially to the technical difficulties of forecasting.

APPENDIX I—ORGANIZATION OF METEOROLOGICAL SERVICE

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TARAWA
GILBERT IS.
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OCEAN IS.
CANTON
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ELLICE IS.
FUNAFUTI
ATAFU
PENRHYN
10°
ROTUMA
APIA
SAMOA
SUWARROW
COOK IS.
15°
NANDI
FIJI
SUVA
VAVAU
NIUE
AITUTAKI
20°
TONGA
RAROTONGA
25°
RAOUL IS.
30°
AUCKLAND
35°
40°
FIRST ORDER STATION.
SECOND ORDER STATION.
THIRD ORDER STATION.
CHATHAM IS.
45°
TAIERI
175°
180°
175°
170°
165°
160°
155°
WEATHER REPORTING NETWORK
UNDER NEW ZEALAND CONTROL
[THIRD ORDER STATIONS IN N. Z. NOT SHOWN.]
50°
60°
CAMPBELL IS.

REPORT OF THE INSPECTOR OF ACCIDENTS FOR THE YEAR ENDED 31st MARCH, 1950

The Hon. the MINISTER OF DEFENCE.

I HAVE the honour to submit the following report on air safety during the year ended 31st March, 1950.

There was considerable increase in both Service and Civil flying, and there was a marked decrease in the number of serious flying accidents compared with previous years. This year's flying in the R.N.Z.A.F. was completed without injury to personnel. Scheduled airline services within and beyond New Zealand were operated without injury to passengers or crews. The Tasman and island services were operated free from incident. In aero club flying there were two fatal accidents causing five fatalities. Other non-scheduled and private flying was carried out without serious accident.

The absence of accidents of a serious nature from scheduled Service operations during the period under review provides confirmation that accidents need not occur if such flying is carried out within the framework of available facilities. The high-lighting of certain practices and procedures during the course of inquiries into previous accidents has undoubtedly created a wider awareness of the many factors which can create an accident and has thus contributed to the common effort to improve safety in the air.

Aero club flying continues to produce a number of serious accidents of the avoidable type despite the expensive experience of past years. The endeavours of the Flying Safety Organization are being directed to create a wider appreciation of the elements of accident prevention with the aim of eliminating the type of accident which has appeared to be inseparable from the particular organization and nature of this class of flying and which can be exceedingly harmful to the continued development and public acceptance of all civil aviation. Some aero clubs have already initiated action to avoid the serious loss they suffer by reason of needless accidents.

ROYAL NEW ZEALAND AIR FORCE

During the 24,700 hours flying completed in the period under review there occurred twenty-one reportable accidents in which twenty-two R.N.Z.A.F. aircraft and sixty-five personnel were involved. Three further accidents occurred while aircraft were being serviced on the ground by maintenance personnel. Five aircraft were destroyed as a result of these twenty-four accidents but no injury was caused to personnel.

The majority of the accidents occurred during training and were typical of this class of flying. In only two of them could carelessness be attributed as the cause, the remainder being caused by inexperience in the particular manoeuvre being performed. One accident which did not result in serious damage was due to the shortage of technical supervisory staff.

The detached transport flight operating with the Far East Air Forces were on four occasions required to make forced landings owing to engine failure developing out of minor mechanical defects which could, to a large extent, be associated with maintenance and servicing facilities available in the particular area in which the flight was operating. In none of these landings was the aircraft damaged.

Two accidents occurred during the course of training in the Territorial Air Force.

CIVIL AVIATION

Two fatal and forty-five non-fatal accidents occurred in Civil aircraft operation during the year as against six fatal and forty non-fatal in the preceding period.

The table below shows the degree of injury caused in the various classes of flying :—

Type of Flying.	Number of Accidents.		Number of Occupants of Aircraft Involved in Accidents.			Degree of Injury.					
						Crew.			Passengers.		
	Total.	Fatal.	Crew.	Pass.	Total.	Fatal.	Serious.	None.	Fatal.	Serious.	None.
Scheduled airline	4	..	6	31	37	..	..	6	..	..	31
Aero club	32	2	32	29	61	2	6	24	3	3	23
Private	2	..	2	4	6	..	..	2	..	..	4
Commercial	9	..	10	3	13	..	1	9	..	..	3
Totals	47	2	50	67	117	2	7	41	3	3	61

Eight of the total of fifty-one aircraft involved in accidents were destroyed and fourteen were substantially damaged.

Scheduled Air Services

Freedom from injury to passengers or operating personnel marked the year's scheduled airline flying. This compares with twenty-four passenger and six crew fatalities in the previous year. On internal operations there were four accidents all of which occurred on the ground. The most serious was the destruction by fire of a Dominie aircraft as the result of faulty technique in starting one of its engines prior to departure on a scheduled flight.

Aero Club Flying

The number of accidents in aero club flying was the same as for the previous year, but there were five fatalities as compared with two. Four lives were lost as the result of a club instructor engaging in low flying in an overloaded aircraft. A student pilot on a solo flight went missing in the vicinity of the coast and, despite extensive search, has not been found. Two other club pilots wrecked aircraft while indulging in unauthorized low flying. R.N.Z.A.F. aircraft were engaged for a number of days in aerial search for another club aircraft which was wrecked in mountainous country as a result of inexperience of the pilot in cross country flying.

The remainder of the aero club accidents were of the type associated with training.

Non-scheduled Commercial Flying

The increase in the number of accidents in this class of flying arose from the growing use of light aircraft in aerial top-dressing work. Six of these accidents can be attributed to the absence of facilities, common on established aerodromes, in the area from which the aircraft were operating.

The remaining accidents in commercial flying occurred while the aircraft were on the ground.

Private Flying

In private flying there were two accidents of a minor nature.

I have, &c.,

R. C. Kean,

Inspector of Accidents.

Approximate Cost of Paper.—Preparation, not given ; printing (1,209 copies), £220.

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Price 1s. 6d.]