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NOTES ON EDUCATIONAL ASPECTS OF THE TECHNICAL TRAINING GIVEN IN THE ROYAL NEW ZEALAND AIR FORCE, WITH PARTICULAR REFERENCE TO THE TRAINING GIVEN FOR THE TRADES OF FLIGHT MECHANIC AND FITTER TWO (ENGINE).

V.R.A.F. non-flying
personnel - the "group" pay system, as in-
centive for qualifying for highly-skilled
trades.

Chapter I - Description of two particular
trades
Being a thesis for the degree
of M.A. in the University of
New Zealand, offered by
James Langton White.

consideration of relative efficiency of training
and experience given in R.N.Z.A.F. and that
given in civilian field - training of Air Force
service - civilian equivalent.

This thesis is submitted with approval of Air
Secretary, Air Department; but the views
expressed do not necessarily represent official
opinion.

Use of the material for further publication in
any way must not be made without reference to
Air Department.

Chapter II - Investigation of civilian back-
ground (age, occupation, education) of personnel
serving in the trades under study - influence of
these factors upon examination results.

Chapter III - examination standards - the "Trade
Test" system.

Chapter IV - Influence of features of civilian
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INTRODUCTION

PURPOSE OF THE THESIS

It is the endeavour of the writer to give:-

- (i) A factual report upon the chief aspects of
 - (a) the trade training given in the Royal New Zealand Air Force during the period September 1939 to August 1945, and
 - (b) the system of assessing standards attained by the individuals concerned.
- (ii) A detailed investigation into certain aspects of the training and examining of personnel in two particular trades, viz., flight mechanic and fitter two (engine), selected as typical of the more important Air Force trades, and illustrative of (i) above; and an endeavour to ascertain the success achieved in these trades by various types of recruits.
- (iii) A preliminary consideration of the extent to which Air Force trade training has contributed (if at all) to the qualification of personnel for civilian employment after demobilisation.

2. The writer, having been employed on personnel administration duties in the R.N.Z.A.F. from May 1942 until late in 1945, has been impressed by the fact that in the Air Force during the war years there has operated an educational system of some considerable magnitude. This system has included the aspects both of instructing and of examining. As shown in Appendix V, over 21,000 individuals were given courses of training, each course followed by a qualifying examination (or "passing-out trade test"). This refers only to the training given in ground-staff trades. Many thousands of men also were instructed and examined under the equally elaborate educational system which covered the training and testing of air-crew members. It was this latter system with which the specially-appointed Education Officers of the R.N.Z.A.F. were for a long period almost solely concerned. It was this system also which became known, to some degree at any rate, to the general public, whose interest in the

Air Force training programme somewhat naturally was directed upon the training of pilots and other flying personnel. Air-crew training is not touched upon in this thesis. But because of the magnitude of the educational effort involved in the training of ground-staff personnel, and because to the writer's way of thinking this training represents an important contribution to adult education, it was considered that even an outline study of the chief aspects of the trade training scheme could be a useful addition to the record of education in New Zealand. Admittedly it is not possible to cover the subject with any degree of completeness within the compass of a brief thesis. This will be obvious when it is seen that courses of instruction were given in no fewer than 48 trades (refer Appendix I for list of trades in which training was given). However, as stated above, two important Air Force trades have been selected for detailed study, and the facts elicited, as well as being of possible interest in themselves, for all practical purposes can be taken as indicative of the factors applicable to the training given in the various other trades.

3. All the training carried out was of course the result of the pressure of war requirements. The emphasis lay upon finding the recruits, getting them trained as quickly as possible, and into effective service as soon as they were qualified to be entrusted with the particular responsibilities involved. There was no time, and no facility, and probably very little need, to maintain any more than the essential records in connection with the training and examining of the individuals. Any treatment beyond these essentials has therefore called for some degree of research. It has been necessary also, in order to give a comprehensible background to the study, to frame an exposition of the basic facts relating to the scheme of differentiation into trades, and the selecting, training and examining for these trades. No such exposition is available within the Air Force, for the reason that its aspects are fully known to those directly concerned, and are supported by numerous Orders and authorities issued from time to time as the Air Force developed during the war years. So far as the writer has been able to ascertain, however, at no stage has any endeavour been made to answer in an objective manner such questions as the following - "Who is likely to secure best results in courses of training - the young man not long from school, or the older man?"; "Is it true that married men did not exert themselves to attain the highest passing-out standard, since the financial incentive does not weigh so much, in view of the application of the minimum (married) rate of pay?"; "Who made the best flight mechanics (judged by trade test standards) - motor mechanics, or others?"; "Who were more likely to

reach positions of leadership in the engine fitting trades - motor mechanics, or others?". It is not claimed that any such question is of great importance, but some of these aspects are not without a degree of academic interest, and it is submitted also that questions such as these could possibly be examined with advantage when the time comes to frame the policy which will decide who shall enter a permanent post-war Air Force. The writer has merely endeavoured to break the ground in seeking a little more information, on the personal aspects of the trade training programme, than is already available. In general, material appearing in the body of the thesis has been wholly prepared by the writer, while material made available from various departmental sources has been presented as Appendices. The list of Appendices is as exhaustive as possible, in order to throw as much light as possible upon the subject for the benefit of the lay reader.

4. This touches upon the point that anyone who writes of Air Force matters for the information of readers who are outside the Air Force, faces a difficulty in the choice of nomenclature. Such an organisation tends to use a specialised terminology which is not readily understood by the general public. Every endeavour has been made to avoid the use of Air Force jargon; but where a departure from the accepted terminology would only result in an unnecessary artificiality, an endeavour has been made to give a suitable explanation. In addition, a glossary of Air Force terms is given.

CHAPTER I

THE "TRADES" SYSTEM IN THE ROYAL NEW ZEALAND AIR FORCE

The personnel of the Royal New Zealand Air Force, like those of any Air Force, can be placed into two broad classes - flying personnel, or air-crew, and non-flying personnel, or ground staff.

2. An Air Force is of course a highly specialised military unit. Its function is the carrying out of military operations, offensive or defensive, essentially through the medium of aircraft. Its key personnel are obviously those who fly the aircraft - pilots, navigators, wireless operators, air gunners, bomb aimers, flight engineers, and others. Likewise essential however are the personnel who are directly concerned with placing and maintaining the aircraft in a suitable operational state - the technicians who ensure the running efficiency of the aircraft, its structure, controls, power units, communication devices, and armament.

3. Of such vital importance is the work of the technical ground staff that an elaborate and practically inflexible system of specialisation of function early became a feature of the development of the Royal Air Force, being closely copied in due course as an aspect of the growth of the Royal New Zealand Air Force, which is patterned upon the British organisation.

4. Under this system of specialisation of duties, each man of the non-flying strength, after initial selection and suitable training, is placed into a specific "trade". (This allotting to a trade is called "mustering"). The name of this trade is joined with his serial number, rank and name, to form his official Air Force description, thus -

NZ4224634 LAC ARMSTRONG, J.Y., Flight Mechanic.
or NZ4319586 SGT BRIAN, O.P. Electrician.

For convenience, the names of the trades are abbreviated - e.g., Flight Mechanic is always recorded as F.Mech; Electrician as Elt. An airman's name is never quoted in any official document or reference, without the trade abbreviation as a suffix, indicating the nature of the duties which he has been adjudged capable to perform and to which he must normally be invariably allotted to the virtual exclusion of all other duties, no matter how many times he may change his unit or location. (A full list of Air Force trades is given in Appendix I).

5. Under certain conditions (as when a particular trade is no longer required, or when an airman proves incapable of that particular duty) an airman may change from one trade to another. (This is called "remustering"). The incidence of such changes is small.

6. The specialisation of function which is the basis of the "Trades" system has several advantages when compared with any hypothetical plan which would seek to use the personnel vicariously from time to time upon widely differing duties. The chief advantages accruing are:-

- (i) Economy of time and effort in training the individual - since he is required to reach a working standard in one function only, instead of achieving ability in several.
- (ii) Achievement of specialised ability in carrying out work, with consequent economy of effort, clear definition of responsibility, improved efficiency, and higher standard of workmanship.
- (iii) Precision in estimating and supplying requirements in manning units.
- (iv) Encouragement of individual learning effort by providing for higher pay for the more skilled jobs.
- (v) Facility in estimating individual progress in acquisition of skill, by means of the examination or "trade test" system, which tests theoretical knowledge and practical ability by means of certain standards applicable to each separate trade.

7. As indicated above, a number of trades are directly concerned with the maintenance and repair of aircraft. These are the "technical" trades. In addition, there are a large number of ancillary trades of an administrative or domestic nature. The personnel in these trades provide clerical, catering, communication, transport, disciplinary, medical and other services necessary to enable the R.N.Z.A.F. to function as a self-contained organisation.

8. So strongly is it held that it is contrary to the interests of the Service to depart from the principle of specialisation of function, that officers commanding units are specifically forbidden as a matter of permanent policy to permit (except for short and unavoidable periods) "mis-employment", or the use of personnel upon duties other than those applicable to the trade in which they have been "mustered" and trained.

9. One of the chief avenues of encouragement to personnel to qualify for employment in the skilled trades is the "group" pay system, which seeks to give higher rates of pay for the more highly skilled trades. Each trade is classified into one of five main divisions or groups, and all trades within a particular group earn the same rate of pay (other conditions being equal, such as rank). The trade groups can be broadly described as follows:-

- (i) Group One - This consists of the most highly skilled Technical trades, such as Fitter II (Engine), Electrician, Wireless Mechanic.
- (ii) Group Two - This consists principally of technical trades, rather less skilled than the trades of group one; examples are Flight Mechanic (who can later progress to be a Fitter II (Engine) Wireless Operator (who transmits and receives wireless messages, but is not qualified to carry out the more specialised duties of erecting, repairing and maintaining wireless equipment). The rate of pay in Group II is £5 per annum less than that given in Group I.
- (iii) Group III - Comprises a number of the ancillary trades - e.g. Cook, butcher, motor-boat crew, medical orderly, bushman - being in many cases occupations in which personnel were already fully or partly trained upon enlistment. These trades are regarded as somewhat less skilled again than those of Group II. The rate of pay is £5 per annum less than that of Group II.
- (iv) Group IV - This covers the trades of the Administrative group - clerks, accountants, equipment assistants. This group receives the same rates of pay as Group I, since it is held that the personnel to be employed in administrative work, although not the types who become technicians, are nevertheless required to be of a high standard academically. In point of fact, however, it is not impossible to criticise the granting, to the personnel employed in Group IV trades, of rates of pay equal to that given to personnel of Group I. A Group I technician, such as a Fitter II(E), will have undergone nearly 18 months instruction in his trade in the Air Force, and upon his efforts may depend the safety of lives and property; whereas a clerk in a Group IV trade acquires his Air Force training in three months and it cannot be held that his work, though important, has anything

has anything like the same degree of responsibility. Previous civilian experience of a nature allied to the respective trades can be assumed to be a constant factor. However, it is not the function of the present work to present criticism of any apparent anomalies in the pay system. This point is briefly referred to hereunder in paragraph 11.

- (v) Group V - This group includes the least skilled Air Force occupations - the patrolman (who is employed on guard and picket duties), and the Aircraft-hand (Works) who carries out labouring duties in connection with the maintenance of aerodromes and buildings. It includes also the large number of "Aircraft-hands, general duties" who are adjudged unsuitable for specialised training and are retained on general unskilled work; to this extent they provide an exception to the broad principle that every man in the Air Force is a specialist in a particular duty; however, they are not permitted to carry out work for which it is laid down that skilled workers will be provided, so it can be said that they "specialise in unspecialised work". The pay for this group is £50 per annum less than that of Group I (for an LAC).

10. The groups into which the various trades fall are indicated in Appendix I. The rates of pay applicable to each Group, and to the various ranks within each group, are shown in Appendix II - Scale of Rates of Pay. (This Scale was modified on 30th June, 1944 by certain all-round increases; but for purposes of comparison between trade groups these increases can be disregarded).

11. As indicated above, it is not within the scope of the present endeavour to criticise this somewhat elaborate system of pay differentiations. It is possible that a case could be prepared for the simplification of the system, on the grounds of efficiency and economy of administration, particularly as the difference in pay between e.g. Groups I and II, and Groups II and III, is comparatively small. The distinction between Groups I and IV is scarcely valid, since the groups themselves exist as a ready indication of the rate of pay applicable, and not as an indication of the nature of the duties. It could be held therefore that there could be three groups - the first (highly skilled) to include the present Groups I and IV; the second (not so highly skilled) to include the present Groups II and III; and the third to equal the present Group V. Alternatively, it would seem that it would not be impossible to pay all personnel at the same standard rate (equal to Army basic rate) with

the addition of a skilled worker or bonus rate, scaled on a simple variation according to the nature of the duties carried out. However, such considerations obviously have no application with the cessation of hostilities. They will possibly be studied when in due course such conditions are finalised for the permanent (peacetime) Air Force.

12. The differentiation in rates of pay has been referred to since it is obviously one of the factors which encourages personnel to qualify for selection for the highly-skilled trades. However, there is an important aspect of the pay system which tends to mitigate this favourable influence upon incentive. As a matter of higher policy, since 1st November, 1942, married men with children who under the Group pay schedule would have been paid a lower rate of pay than Army personnel of equal rank and domestic circumstances, have been enabled to draw the higher (Army) rate of pay and allowances. This establishes minimum rates of pay for married men. In the case of an aircraftman second class or an aircraftman first class (both these ranks being regarded as equal to that of private in the Army) who is married and without children, the basic Army rate of pay is £204 per annum, which is higher than the basic rate scheduled for these ranks under any of the five pay groups. The Army rate is therefore claimed (and received) by personnel so entitled, regardless of the nature of their duties. Similarly a Leading Aircraftman (equal in status to Lance Corporal) who is a married man with two children, claims £256 per annum, whether he is engaged upon highly specialised duties or upon unskilled duties.

(NOTE: The latter rate of pay just quoted is subject to the addition of a domestic allowance of £45 per annum payable direct to the wife; and both of the rates quoted are subject to the increases mentioned in paragraph 10, which became effective on 30th June, 1944; these factors do not affect the comparisons presented. As a matter of record, however, the scale of rates of pay which was current from 1st November, 1942 until 30th June, 1944 is presented below, Appendix II).

13. A word is said, in passing, regarding the Women's Auxiliary Air Force. The personnel of this body are engaged upon tasks largely of a domestic and administrative nature. A small proportion are employed on technical duties - e.g. Parachute packing, fabric working, instrument overhaul and repair. There are two pay groups only - skilled and unskilled; the former receiving £9 per annum more than the latter.

The effectiveness of the W.A.A.F. in replacing male effort in suitable work (principally within the Dominion) is not a subject of this study; and the extent to which women have been given technical training is not great enough to warrant specific reference. None at all have been engaged upon the duties of Flight Mechanic or Fitter II(E).

Many of the W.A.A.F. technical trades are closely allied with specific civilian occupations. This is apparent from a perusal of the list of trades, Appendix I. Some of the civilian occupations thus represented are important in the economy of the community at large. This is true of, for example, the trade of wireless mechanic. On the other hand, there are certain air force trades which are particularly associated with the purposes of war, which have no counterpart in civil industry. One such is that of gunner, whose duties consist of the installation, inspection and maintenance of aircraft equipment - machine-guns and bombs (but not the actual firing of these). Another is that of a fitter - one who repairs the mechanical parts of aircraft.

It is apparent to the researcher that the training and experience given by the Dominion to the W.A.A.F. is not in any way inferior to that given to the civilian trades. The W.A.A.F. is not a separate organization, but a part of the Dominion's training system. The training is given by the same instructors and in the same manner as that given to the civilian trades. The only difference is that the W.A.A.F. is not a separate organization, but a part of the Dominion's training system. The training is given by the same instructors and in the same manner as that given to the civilian trades. The only difference is that the W.A.A.F. is not a separate organization, but a part of the Dominion's training system.

The part of the Dominion's training system which is concerned with the W.A.A.F. is not a separate organization, but a part of the Dominion's training system. The training is given by the same instructors and in the same manner as that given to the civilian trades. The only difference is that the W.A.A.F. is not a separate organization, but a part of the Dominion's training system.

Flight Mechanic (Group II) and Fitter II(E) (Group I)

It may be said that these trades correspond with the civilian trade of motor mechanic. The Flight Mechanic (Group II) and Fitter II(E) (Group I) are not concerned with the engine of cars and other vehicles, but only with the engine of aircraft, as is seen from the official descriptions of duties:-

- (1) Flight Mechanic: The duties of the Flight Mechanic are to inspect, maintain and repair the engine, propeller, and other parts of the aircraft. He is also responsible for the operation of the engine and propeller.
- (2) Fitter II(E): The duties of the Fitter II(E) are to inspect, maintain and repair the engine, propeller, and other parts of the aircraft. He is also responsible for the operation of the engine and propeller.

CHAPTER 2.

THE "FITTING" TRADES - FLIGHT MECHANIC AND FITTER TWO (ENGINE).

1. Many of the R.N.Z.A.F. technical trades are closely allied with specific civilian occupations. This is apparent from a perusal of the list of trades, Appendix I. Some of the civilian vocations thus represented are important in the economy of the community at large. This is true of, for example, the trade of wireless mechanic. On the other hand, there are certain Air Force trades more particularly associated with the purposes of war, which have no counterpart in civil industry. One such is that of armourer, whose duties consist of the installation, inspection and maintenance of armament equipment - machine-guns and bombs (but not overhauling and repairing, which is done by a fitter-armourer who corresponds largely to the civilian gunsmith).

2. It is apparent to the observer that the training and experience gained by the individuals employed in certain trades in the R.N.Z.A.F. must possess a large element of permanent value to these individuals, particularly if in due course they take up similar employment in civilian life. Conversely, it would seem obvious that the Air Force benefited to a great measure by the influx of recruits who were skilled or semi-skilled technicians in civil life, and were consequently able to adapt themselves readily to carry out the technical duties required in the R.N.Z.A.F. No effort has yet been made, however, to examine these propositions in any objective way. It is the purpose of this thesis therefore to attempt to show the results of enquiries made with these arguments in view.

3. The particular trades selected for detailed study are the so-called "fitting" trades, i.e. -

Flight Mechanic (Group II) and Fitter Two (Engine)(Group I)

Speaking broadly, it may be said that these trades correspond with the civilian trade of motor mechanic. The Flight Mechanic and Fitter II(E) however are not concerned with the engines of cars and other vehicles, but only with the engines of aircraft, as is seen from the official prescriptions of duties:-

- (1) Flight Mechanics are required for the maintenance, inspection, starting, running up and testing of all types of power plant installed in aircraft. They require an elementary knowledge of repair by replacement.

- (ii) Fitters II(E) are required for the installation, maintenance, repair and testing of all types of aero-engines used in the R.N.Z.A.F.

Note 1: A flight mechanic or a fitter II(E) is not employed on any work connected with the maintenance and repair of airframes. (By "airframe" is meant the whole of an aircraft other than its engines, instruments, communication devices, and armament). Such work is carried out by flight riggers and fitters II(A). These are the "rigging" trades; and they have counterpart in industry to a very much smaller extent than do the fitting trades.

Note 2: A flight mechanic or a fitter II(E) is not employed on work connected with the maintenance and repair of motor vehicles. Such work is carried out by mechanics, Mechanical Transport (formerly known as Driver (Petrol) Mechanics); or by Diesel Mechanics or Mechanics Internal Combustion, where the vehicles are heavy diesel-powered units such as construction plant - graders, bull-dozers, etc.

4. In selecting the two fitting trades as the subjects of investigation it was borne in mind that the selecting and training of personnel for the duties of keeping aircraft engines in proper running order was obviously a task of considerable magnitude, when faced by an expanding Air Force which at the outbreak of war included only 92 fitters in its ranks. (See Appendix III). A few civilian aircraft mechanics were available for enlistment (from the Aero Clubs and private air transport firms). All others required had to be secured from other civil employment, and these were of two broad classes - those who were experienced on internal combustion engines (e.g. motor mechanics) and those who were not. The latter included men of such widely differing occupations as farmers, clerks, teachers, and taxi-drivers (see Figure 2, graph showing pre-service civilian occupations). With both classes, a period of training was essential, and this task in itself (disregarding all the other trade training given) represented a major effort in the technical education of adults, the extent of which is well worthy of being drawn to the attention of educational interests in the Dominion.

5. It is of course perfectly true that it was necessary to provide courses of instruction for many other trade specialists required by the R.N.Z.A.F. - riggers, armourers, instrument repairers, electricians, wireless operators, wireless mechanics, and so on. But it would be impossible in the present work to present details of the formal

training given in all the technical and administrative trades, other than to record that in the six years from August 1939 to August 1945 a total of 21,466 persons received technical training, representing 45 Air Force trades. The details later given, of the nature and results of the training of flight mechanics and fitters II(E), give an insight generally into the methods and results of the whole R.N.Z.A.F. technical training system.

6. The fitting trades are naturally of great importance in the Air Force scheme. It is unnecessary to attempt any comparison between the various trades; all are no doubt necessary to the successful functioning of the whole organisation. But even to the layman it seems apparent that a big responsibility, and a demand for a high measure of skill, rests upon the technicians whose special task it is to see that an aircraft's engines are functioning perfectly. The two trades concerned are amongst the most important numerically in the R.N.Z.A.F., since together they total 1961 airmen, as at July 1945.

7. Furthermore, the fitting trades, involving expert ability in the care of internal combustion engines, comprise an important potential in post-war transportation and communication, both in the ground and in the air. It is probably not without value then to place on record various aspects of the training given to the individuals who in due course will be available for these vocational fields.

8. The work involved in looking after aircraft engines largely falls into two broad classes -

- (i) Assembling, major repairs, major overhauls.
This is normally carried out by Fitters II(E).
- (ii) Minor repairs, minor overhauls or inspections.
This is normally carried out by Flight Mechanics.

It is seen therefore that a fitter two (engine) can be regarded as an advanced or more qualified flight mechanic. This is clear from the outline of the requirements for entry to these trades, as shown in the following paragraph.

9. (i) To become a flight mechanic, a recruit must pass entrance qualifying tests at the Elementary Basic School, undergo a course of training, and pass a qualifying trade test at the end of the course. If successful, he emerges with the "classification" (or rank) of Leading Aircraftman (LAC) if he gained 80 per cent or over in the trade test; Aircraftman first class (AC1) if he gained between 60 and 80 per cent; or Aircraftman second class (AC2) if he gained between 40 and 60 per cent.

- (11) To become a fitter II (engine) a flight mechanic of rank AC1 or higher, after suitable workshop or "flight" (i.e. working with his squadron's aircraft) experience, must undergo a "conversion" course of training of a more advanced nature than the flight mechanic course, and if he emerges from the trade test held at the end of the course with marks appropriate to the classification which he already holds, he will be "remustered" to fitter II (engine). This means that if an AC1 flight mechanic scores say 65 per cent at the end of his conversion course, he will be remustered to fitter II(E); but if an LAC flight mechanic scores 65 per cent at the end of his conversion course he will remain a flight mechanic until such time as he is able to pass a subsequent "routine" trade test (held twice yearly, entry optional) with marks equivalent to LAC standard (80 per cent or over). (Further aspects of this trade test procedure are dealt with in Chapter 4, and also in Chapter 6. Refer also to Appendix IV, Scheme of Selection, Training and Advancement).

10. An airman in either trade therefore may hold the classification of LAC, AC1 or AC2. (The term "rank" is used only when referring to non-commissioned officers). A broad analogy between this system and the University system of standards is seen in the following comparison (assuming for these purposes that the University awarded first class, second class, and third class honours with all Bachelor degrees as well as with all Master degrees):-

<u>Air Force</u>	<u>University</u>
Flight Mechanic - AC2	B.A. - third class honours
do. - AC1	do. - second class honours
do. - LAC	do. - first class honours
Fitter II (Engine) - AC2	M.A. - third class honours
do. - AC1	do. - second class honours
do. - LAC	do. - first class honours

This comparison of course is simply by way of illustration to show relationships. No similarity of actual standards is being implied.

11. A flight mechanic can advance by promotion only to Corporal. A fitter II(E) can advance to Corporal, Sergeant, Flight Sergeant, Warrant Officer. From Flight Sergeant or Warrant Officer he may be commissioned. This is a further indication of the increased status placed upon the fitter II(E) trade. Main responsibility for and oversight of airman's work, on behalf of the engineer officer of the Unit, is held by the senior N.C.Os, who are fitters II(E). An elaborate system of checking and countersigning of all work carried out is designed to reduce to a minimum any possibility

of an oversight or error which might result in danger to life. (An indication of the completeness of this checking system is gained from a perusal of the Aeroplane Maintenance Form (Form 700) which is shown herewith as Appendix VIII. Other forms are used for various purposes). That this system works, and that the tradesmen's abilities are satisfactory, is endorsed by the fact, officially stated, that the incidence of accidents in the R.N.Z.A.F. due to maintenance faults compares favourably with the rate in any other Air Force of which the rate is known.

12. The nominal distinction between the actual work performed by flight mechanics and fitters II(E) in practice tended to disappear, particularly early in the war years, when flight mechanics were available, but the training of fitters II(E) had not caught up with the demand. For all practical purposes (excepting for pay and promotion) flight mechanics and fitters II(E) were regarded as interchangeable, this being an "authorised substitution" as promulgated by Air Department. It is reported by the Officer Commanding the Technical Training School that in his view this tended to minimise one of the incentives for flight mechanics to undergo a conversion course and remuster to fitter II(E), since they would then return to much the same duty as they had previously carried out (e.g. routine inspections) instead of being given more advanced and more specialised work (e.g. major overhauls, workshop repairs, modifications, etc.)

13. The direct counterpart in civil life of the flight mechanic and fitter II(E) is obviously the civil aviation ground engineer, categories "C" and "D".

Note - Re Ground Engineer's Licenses.

The Air Navigation Regulations, 1933, provide that an aircraft registered in the Dominion and employed for commercial, or Club instructional purposes, shall not fly unless it has been inspected daily and certified as safe for flight by competent personnel in possession of Ground Engineers' Licenses in Categories "A" and "C", and, where radio is fitted, in Category "X" Section (vii). Furthermore, appropriately licensed personnel are required to certify any major overhauls and modifications to civil airframes and engines, and to supervise and accordingly accept full responsibility for the work involved. The competence of persons permitted to undertake the above and related duties is recognised by the issue of Ground Engineers' Licenses in five categories as follows:-

- "A" - Certification of Safety for Flight (Airframes only), and of certain minor repairs, modifications and replacements.
- "B" - Certification of airframes after overhaul, major repairs or modifications.
- "C" - Certification of aircraft engines before flight and of modifications and replacements.
- "D" - Certification of Aircraft Engines after overhaul, major repairs or modifications.
- "X" - Certification of the overhaul, repair or modification of specialised equipment.

(Various Sections - compasses, parachutes, radio, etc.)

Licenses in categories "A", "B", "C" and "D" may be issued as Restricted or Unrestricted Licenses. The former permit the holder to operate on certain aircraft and/or engines only, a list of which will be published from time to time; the unrestricted license is granted only to individuals with very wide experience, and is valid for all types of land and marine aircraft and for all aircooled or liquid cooled petrol engines.

Applicants for Restricted Licenses are required to produce evidence of three years' approved aeronautical experience including one year's practical experience exclusively on aircraft or engines. In the case of unrestricted licenses, the periods of approved aeronautical and practical experience are five and two years respectively.

- Civil Aviation Pamphlet, August 1945.

The licenses referred to in the above Note are granted after examination. Time served in the R.N.Z.A.F. on the appropriate duties is counted as qualifying time, as referred to in the last paragraph of the Note, but no matter what trade tests have been passed in the R.N.Z.A.F., it is still necessary to pass the full (civil) examination before qualifying for a ground engineer's license.

14. Only a very small number of civil aviation ground engineers were absorbed into the R.N.Z.A.F., for the reason that very few were available. (The numbers so enlisted, and their achievement in the Service, are referred to in Chapter 5). Conversely, at the time of writing the number of Air Force fitters who had left the Air Force and entered civil aviation was also low, since post-war

developments in civil aviation have not yet begun; air lines have not yet expanded, and club flying has not yet recommenced.

15. By far the more important civilian counterpart of the Air Force fitting trades, therefore, is seen in the trade of motor mechanic, from whose ranks came a very large proportion of the men who were trained as flight mechanics and fitters II(E), including the majority of those who reached N.C.O. rank (see Chapter 7). The two trades are obviously allied, although the Air Force usage calls for work upon engines only, of an advanced type, while the motor mechanic deals not only with the car engine but also with other car mechanisms - transmission, gear box, etc.

16. The relationship between the two trades is recognised by the Department of Labour, in its administration of the Suspension of Apprenticeship Emergency Regulations 1944 (which make provision for the crediting of apprentices with time served during military service). In 1943 an investigation into the value of Air Force trades, from the point of view of civilian occupations, was carried out by an officer of the Department of Labour, with the assistance of the Air Force. Following this investigation, the Department published for the guidance of district Registrars of Apprentices, and for the information of all concerned, a table of estimations of the percentage value of Air Force trade experience in relation to civilian occupations under certain awards, together with a method of assessment of the time with which an airman's apprenticeship should be credited in recognition of his Air Force experience. This table, and method of assessment, are appended as a matter of record, since it is considered to be a document of some importance. (Appendix XXIV). In so far as the trades of flight mechanic and fitter II(E) are concerned, it will be seen that service in either of these trades is equally regarded as equivalent to 75 per cent of a civilian apprenticeship of five years (with a maximum of three years). The equal value placed upon these two trades recognises the interchangeability which is found in practice (referred to above, paragraph 12). The method of assessment makes full allowance for the fact that during the first year or so in the R.N.Z.A.F., a recruit who undergoes a long full-time training course learns more of the motor mechanic trade than does his civilian counterpart, the first-year motor apprentice. E.G., a flight mechanic who served 12 months in the Air Force would be credited with 15 months towards apprenticeship (under the formula, 12×75 , result divided by 60). On the other hand, it is maintained that no matter how long a fitter II(E) may serve, he obviously does not learn the whole of the motor mechanic trade, and the maximum credit he may receive towards the 5 years' apprenticeship is 3 years.

17. Following the publication of the Regulations in 1944, airmen of various Air Force trades submitted requests for Air Force certificates of service, for the purpose of securing credit towards their apprenticeships. Up to October 1945, 77 such applications had been received from flight mechanics and fitters II(E). Of 91 replying to a questionnaire which the writer sent to 250 demobilised flight mechanics and fitters II(E) (see Chapter 8), six indicated that their apprenticeships had been credited as a result of their Air Force service. These figures are not very high; but after the main process of demobilisation and rehabilitation has taken place, it is possible that the numbers thus being accredited will be found to be very much increased. Possibly the authorities more directly interested in this aspect - the Department of Labour, and bodies affected by the N.Z. Motor Mechanics' Award - will in due course secure completed figures on the whole subject.

CHAPTER 3

METHODS OF SELECTION

During the first three years of the war, the selection of recruits for the various Air Force trades was effected largely by the recruiting officers, either prior to enlistment or immediately afterwards. Allocation to a particular trade depended firstly upon the vacancies existing from time to time in the impending training programme, and secondly upon the personal choice of the recruit considered with his civilian occupation and educational standard. In 1942, the third year of the war, when the R.N.Z.A.F. was faced with a programme of expansion as a result of New Zealand's entry into war in the Pacific, the requirements of ground staff personnel were increased greatly. This expansion continued into 1943 and 1944. Entry into the Air Force was on a voluntary basis practically throughout the war, and every effort was made to encourage the enlistment of men who were skilled technicians in civil life. Whether a man entered from a skilled manual occupation or not, however, it was required that he undergo the appropriate course of training and pass the qualifying trade test before he could be placed to effective duty in most of the trades. (Trades in which no training was given, but which could be entered only by those of suitable civilian occupation, are shown in Appendix I; these are principally works (i.e. building and aerodrome maintenance) trades, or trades requiring very few personnel).

2. Largely for reasons of expediency, therefore, trade selection was carried out by the recruiting officers, and personnel upon enlistment were "mustered" into the trade in which they would later be trained (after a period of recruit training - marching, musketry, physical education, anti-gas training, etc.) A motor mechanic or fitter and turner (apprentice or journeyman) in most cases would seek enlistment as a flight mechanic, and in most cases this would be agreed to. Such initial mustering was given subject to eventual qualification by Trade Test.

3. Upon completion of recruit training it was not always possible immediately to place personnel upon their course of specialised trade training. (Intakes to technical courses did not always coincide numerically or chronologically with outputs from recruiting courses, particularly when the latter included unusually large numbers, as for example by bulk transfers from Army in 1943). During the interim period, an airman would

usually be given unskilled duties related to the trade for which he was selected. E.g. an airman selected for training as a flight mechanic would be given cleaning and labouring duties in a hangar or in an aircraft repair or assembly shop. This practice no doubt had some value in making recruits familiar with Air Force conditions. Recruits however were usually impatient to commence their trade training, since the sooner they were trained, the sooner they could hope to receive the higher rate of pay as Leading Aircraftmen, and to be placed to more interesting duties, including service in the Pacific. From a Service point of view, moreover, it was found desirable that the prospective trainees should reach the Technical School some time before commencing on their main trade training course, in order to allow adequate opportunity for

- (i) imparting of basic educational instruction (including use of tools) to those whose schooling had not been adequate or who had forgotten much of what they had acquired at school;
- (ii) a further selecting process whereby trainees might change from one prospective trade to another if they so desired on being further informed regarding Air Force trades, or if they were deemed after tests to be more suitable for a trade other than that to which they had been mustered on enlistment, or if the needs of the Service made such a change necessary in order to fulfill the required output of trained tradesmen.

4. The Directorate of Training accordingly commenced the Preliminary Technical Training School ("P.T.T.S.") as a part of the Technical Training School (The P.T.T.S. was instituted early in 1942). The name was later changed (September 1944) to the Elementary Basic School (E.B.S.) The mustering of recruits directly into the skilled technical trades ceased, and instead (as from recruits who were deemed by recruiting officers to be suitable generally for technical training (i.e. for training as mechanics, riggers, instrument repairers, armourers, parachute packers, coppersmiths) were enlisted as Technical Trainees ("ACH/Tech.") After a course of ten weeks preliminary training at the P.T.T.S., the selection for their main course of trade training was carried out by the staff of the P.T.T.S., and the airmen entered upon their courses in accordance with these selections. This procedure is detailed in Appendix XVII - Notes on Training and Selecting in the Elementary Basic School. These notes were supplied by the Officer Commanding the Technical Training School.

5. Incidentally, it is to be noted that the terms "screening" or "filtering" of personnel, as applied to a process of deciding upon the individuals more suitable for certain capacities than for others, are not used in the R.N.Z.A.F. The term "selection" is used instead. (The term "screening" is used in another connection, to connote the process whereby an individual is annotated to be retained in his present location, i.e., screened against being posted elsewhere).

6. A further change in enlistment procedure took place in 1944, when, in order to give greater flexibility in allotting recruits to the trades in which there were vacancies, it was decided that all recruits would be initially mustered into the unskilled trade of Aircraft-hand, General Duties. During the period of ground training given upon entry, they were interviewed by a selection committee appointed by the Director of Manning (who is responsible for the administration of matters of mobilisation, selection, advancement, and allotting to duty of airmen). The Manning selection committee visited the recruit training depot to interview each draft of recruits and (using a standardised interview record sheet - reproduced at Appendix XVIII -) decided upon a suitable remustering for each recruit. Recruits judged suitable for entry to the Elementary Basic School for selection for technical trades were made Technical Trainees ("ACH/Tech.") and the selection for the actual technical trade was left to the Elementary Basic School stage, as formerly. Recruits suitable for other skilled trades were remustered accordingly. Recruits unsuitable for trade training remained in the trade of ACH/GD. The Manning Selection Committee included a technical officer, who by oral questioning of would-be technical trainees assisted the Committee to form an opinion as to past experience (including hobbies) and general suitability. In addition an elementary arithmetic test (approximately Standard six level) was given to all recruits (see Appendix XIX). The results of this were used at first in a broad way only to indicate whether a particular candidate's performance was above or below the class mean. A recruit entering from an unskilled civilian occupation, who showed no technical or scientific knowledge or aptitude upon being questioned, and whose arithmetic result was below the average, would not be accepted for technical training but would usually remain an ACH/GD. The purpose of this policy was to keep the standard of the technical trainees arriving at Elementary Basic School as high as possible, and thus to reduce the incidence of (i) personnel being rejected from the School as unsuitable for any form of technical training and (ii) personnel being held back at the end of their course of training to join a course which commenced later (thus prolonging the period of training for those individuals). No reliable figures are available to show to what degree this purpose was achieved, but the School reports an apparent benefit, of moderate extent.

7. Early in 1945 an officer (Manning Guidance Officer) was appointed to act as a trade guidance and selection officer at the recruit training depot. This facilitated the application of tests and gave more opportunity for interviews with recruits, on matters likely to affect their service careers, than had been possible during the brief visits of the external Manning Selection Committee. The Manning Guidance Officer (an experienced educationalist) finalised the introduction of two forms of standardised tests - a classification test (as shown at Appendix XX) and a mechanical arithmetic test (reproduced as Appendix XXI). (Both of these tests were produced and printed under the direction of the New Zealand Council for Educational Research).

8. The use of these two tests had continued only for several months before recruiting ceased (following the end of the Pacific war), and the Manning Guidance Officer and his staff were disbanded. Any detailed report upon the use of these tests in themselves, or any follow-up investigation of their validity, was therefore not made. It is considered of value, however, to set out in tabular form the results of the tests and interviews given to a typical recruit course (Course No. 9, 1945 - 103 individuals). This table (Appendix XXII) includes an indication of the score gained by each recruit in the mechanical arithmetic test (column 7) and the classification test (column 8). It will be seen that in ten cases the trade training applied for by the recruit was not made available to him, on account of low scores made in each of the tests (these cases marked "A" in column 5). It is to be remembered that the decision of the Selection Committee to this effect was made after taking into consideration other relevant factors - e.g., civilian occupation, and number of vacancies in the trade desired. The latter was an important factor at the time of this particular selection, since the Air Force was manned practically to full requirements, and training was proceeding on a basis of providing replacements for those leaving the Service. Consequently it was possible generally to exercise a choice in selection of recruit material offering for the various trades, to a greater degree than was possible at the time of the rapid expansion of the Air Force several years ago.

NOTE - In perusing the tabular record, it is to be noted that in some instances a recruit sought entry to a particular technical trade, e.g. F/Mech or F/Rigger, while in other instances he merely desired training in any one of the technical trades, leaving the actual trade course to be decided after entering the Elementary Basic School at the Technical Training School. In either case, if successful, he would be made a Technical Trainee, recorded as "Aircrafthand under Technical Training", abbreviated to "ACH u/t Tech" and shown in this table simply as "Tech".

9. An obvious comment upon the recruit testing procedure referred to in the preceding paragraphs is that if it were judged necessary, at the stage at which it was commenced upon systematic lines (after the war had progressed five years), it would seem that its introduction several years earlier would have been justified. On the other hand, it is true that during the earlier years of the war a much higher proportion of skilled and semi-skilled technical workers sought enlistment than was the case later in the war. Accurate figures in this connection are not available, but reports of the recruiting officers and selection officers to this effect are definite. A further indication along these lines is seen in the gradual lowering of the average performance at end-of-course trade tests (flight mechanics) as revealed in the table given with paragraph 9 of Chapter 4.

10. It might be argued that, as fairly searching tests are carried out at the Elementary Basic School before a prospective technical trainee is allotted to a specific course of training, the tests given at the recruit school stage are redundant unless it is shown beyond doubt that they assist initial selection at the recruit stage to such an extent that wastage from the Elementary Basic School (for educational reasons) is practically eliminated. The procedure had not continued long enough for this point to be demonstrated with any finality. Such demonstration would be difficult in any case, on account of the influence of other factors, such as the lowered standard of technical ability in recruits offering, and varying demands to fill courses. But the whole trade training scheme is one involving compromise between on one hand the educational desideranda of careful selection, thorough and unhurried training, and soundly-based assessment of standards attained, and on the other hand the practical reality of supplying capable men as quickly as possible to meet the urgent demands of war. The Air Force trains a flight mechanic in 28 weeks of actual full-time technical instruction (including night study). The motor industry trains a motor mechanic in five years of actual full-time experience (usually including study at night school). In view of the element of haste which is one of the aspects of the Air Force training, and the unavoidable neglect of human relationship factors which is typical of the working of any big machine of this nature, it would seem desirable to maintain as many opportunities as practicable for ascertaining the capabilities and potentialities of the individuals concerned. To this extent there will be justification for any provision which in due course is made for standardised tests for recruits seeking entry into trade training in the post-war permanent Air Force.

CHAPTER 4 - COURSES OF TRAINING.

Prior to the commencement of the war, courses of instruction for flight mechanics and flight riggers were held at the Technical Training Centre, Hobsonville. Early in 1940, with the need for a rapid increase in the number of technicians, courses in these two trades were commenced simultaneously at the Railway Workshops at Otahuhu, Woburn, Addington, and Hillside. These were known as Technical Training Centres No.1, No.2, No.3 and No.4 respectively. Four courses of training for flight mechanics and flight riggers were held at each of these centres, the last concluding in September 1940. The R.N.Z.A.F. Technical Training School at Rongotai was formed at this time, and technical training was centralised at this School, which moved to Nelson in September 1944. From 1940 onwards the Technical Training School gave instruction in all the more important technical trades, including "conversion" courses for flight mechanics and flight riggers to become fitters II(E) and fitters II(A) respectively. Where the trade was one in which the numbers needed were comparatively few (such as coppersmith and metal worker) one course at a time was held; but in the basic trades (including flight mechanics) three courses ran concurrently, the commencing dates being "staggered" at intervals of six weeks.

2. Other schools of training were being developed at the same time, until eventually the following separate schools were operating:-

- Technical Training School
- School of Armament
- Instrument School
- Electricity and Wireless School
- School of Administration (for clerical workers).
- Marine School
- School of Cookery

In addition, courses of training were held at various Air Force stations and at other places, to give instruction in those trades for which the formation of a special school was not necessary (e.g. telephone mechanic training, carried out at Telephone Exchange, Wellington).

3. As will be seen from a perusal of Appendix V (Table of Trade Tests completed), the number of trainees passing out from courses soon reached impressive totals, reaching their height in 1943 and 1944, with over 5,000 end-of-course trade tests in each of those years.

4. Courses for flight mechanics were standardised at 18 weeks' duration, and for fitters II(E) ("conversion" courses) at 12 weeks. For six courses in the latter half of 1943 the length of the flight mechanic course

was reduced to 12 weeks (in order to cope with the demand for personnel as a result of expansion in the Pacific) but this expedient was regarded as a temporary measure only, and the 18-weeks course was reverted to in December 1943. The effect of the reduction of the course from 18 weeks to 12 weeks, is referred to hereunder (Paragraph).

5. Early in 1942 a special section of the Technical Training School was commenced, known as the Preliminary Technical Training School, to give basic instruction in elementary mathematics, use of tools, and knowledge of materials, and to carry out tests and make selections for entry to the trade courses given by the Technical Training School proper. In September 1944 the name of the P.T.T.S. was changed to Elementary Basic School. (Its functions were referred to also in Chapter 3, paragraph 4). The Technical Training School gave courses of instruction in the following trades -

- Flight Mechanic
- Fitter II (Engine)
- Flight Rigger
- Fitter II (Airframe)
- Coppersmith and Metal Worker
- Machine Tool Setter and Operator
- Mechanic (Internal Combustion) (for Diesel engines).
- (Fitter (Internal Combustion) (for Diesel engines).
- Safety Equipment Assistant (formerly known as Parachute Packer)
- Safety Equipment Worker
- Fabric Worker

Personnel selected as suitable for training as Armourers or Instrument Mechanics were sent from the E.B.S. to the Armament or Instrument School, situated elsewhere, and not connected with the T.T.S. These two trades, together with those named above, comprise the more important of the technical trades, apart from those taught at the Electricity and Wireless School. Trainees for this last named school do not attend the E.B.S. but are sent straight from the recruit camp to the E. & W. school.

6. Detailed syllabi of the courses of instruction given to flight mechanics and fitters II(E), as laid down by the Directorate of Training, are appended (Appendices VI and VII). The stipulations of the training to be given in the various aspects of each trade are set out in full detail, partly as an instruction to the school to ensure that all the important aspects of the desired training are dealt with, and partly as a guide to the school in arranging the course so that the intensive programme involved will proceed without repetition, omission or delay.

7. (i) The selection of suitable instructors is obviously an important matter to those responsible for the Technical Training programme. Applications are invited from time to time, both from those who are themselves undergoing training (who may apply to be given instructional duties after successfully completing their course), and also from those who, after being trained, have had working experience with squadrons or repair depots. If personality, civilian background, and trade performance, justify an assumption that an applicant is likely to become a successful instructor, he enters a probationary period. He is given tuition by the Education Officer attached to the T.T.S., and his ability in practical teaching is observed. Failure to satisfy in all respects results in rejection. The rejection rate is estimated by the Officer Commanding the T.T.S. to be 50 per cent. The chief reason for rejection is the obvious one - inability to instruct. An analysis of particular failings in this respect is not kept.

(ii) In the early years of the war, arrangements affecting the status of instructors were not entirely satisfactory. There was no standardised system of promotion, and sometimes an instructor would remain in the ranks for a considerable period, instead of receiving N.C.O. status as is obviously desirable. Furthermore, during the extensive overseas movement which resulted from entry into the Pacific war, flight mechanics and fitters II(E) fit for overseas were occasionally warned for embarkation while at an important stage in instructing a particular course of trainees. The first of these difficulties was overcome by creating a new Air Force Trade called "Instructor, Technical" to which suitable technicians were "remustered". Continuity of instructional service was thus assured, since Instructors Technical were not "established", or provided for, elsewhere. It was arranged also that instructors, upon being appointed, automatically would be granted N.C.O. rank (subject to confirmation after a satisfactory period of service). The average length of time upon which instructors have been retained on instructional duties is approximately $2\frac{1}{2}$ years.

(iii) Instruction in mathematics and physics is given by Education Officers (commissioned officers), under the general direction of the Director of Educational Services, Air Department; the majority of Education Officers were school teachers in civil life. All the technical instruction is given by the N.C.O. instructors. Classes are planned so that there will be one instructor to a maximum of 15 trainees. This proportion has been fairly closely maintained during the greater part of the six years under review, excepting the early part of 1940, when there were insufficient instructors, and classes were much larger, reaching 50 per instructor.

(iv) Civilian occupations of the instructors of the flight mechanic and fitter II(E) courses (August 1945) are as follows:-

Motor Mechanics	-	8
Ground Engineer,		
Civil Aviation	-	2
Permanent Air Force	-	1
Fitters & Turners	-	2
Diesel Engineer	-	1
Blacksmith	-	1
Engineer (Graduate)	-	1
Accountant	-	1
Student	-	1

(v) Chief difficulties experienced by instructors are reported by them to be as follows:-

- (a) Lack of equipment. (This was gradually corrected as the war progressed).
- (b) Not enough time allowed on most subjects. (A layman perusing the extensive syllabi, referred to in paragraph 6, would probably be inclined to agree with this. It is recognised by the training and trade testing authorities as being a valid criticism, and that the intensive "cramming" system necessitated by the demands of the war programme is not an ideal training method, but that its adoption was inevitable).
- (c) Daily spread of hours too long. (Necessity for this is much as stated in (b) above).
- (d) Lack of incentive on the part of the trainees. (Instructors, examiners, recruiting officers, and personnel administrators generally, report upon this factor as becoming more and more pronounced as the war progressed. The keenness to study shown during the early war years was probably due to two main influences -
 - (A) a strong desire to assist the war effort fully, and to become as efficient as possible towards this end;
 - (B) a large proportion of recruits came from the ranks of qualified motor mechanics and other trained technicians, who were habituated to this type of work, liked it, and desired to profit fully by extending their experience in the allied field of caring for aircraft engines.

According to observers (including the writer) the positive effect of the first of these influences

appeared to wane as time went by; this was apparent once it became reasonably certain that the Allies could not be defeated, and strongly noticeable after the cessation of hostilities in Europe.

The effect of the second influence gradually disappeared as in due course all the older men who were qualified technicians were absorbed into the Services so that a very much larger proportion of recruits consisted of young men - sometimes under 18 years of age - who had served but a short time of their apprenticeships. This aspect was referred to in Chapter 3, paragraph 9 (comment on selections made from a particular recruit course). It is also referred to hereunder, paragraph 9 .

- (e) Too high a standard required by the examining body, the Central Trade Test Board. This is a criticism with a very human flavour, which might be made by any instructor about the examiner. It is sufficient to comment that the Central Trade Test Board's avowed policy is to set the standard of workmanship as high as practicable, with the ultimate objective of safeguarding men and machines. The effect was however that trainees, knowing that according to the records of previous courses only the exceptional individuals among them would attain LAC standard (80 per cent) tended to exert themselves only to the extent of reaching ACI standard (60 per cent).

8. Instruction is given principally by the lecture method, and trainees are required to maintain complete and legible notes. Extensive demonstrations are given, using the actual engines and components on which the trainees are to become experienced. Trainees are required to carry out under supervision, within the limits of the time available, as many of the practical processes as possible, such as simple taking-down and assembling, starting, timing, cleaning, minor inspections, etc. Films and strip-films are used, with a wide range of appropriate titles. For several years, three nights per week were laid down for compulsory night study, in suitable rooms, with an instructor available if required for reference. This was varied in mid-1945, and the periods made voluntary; the Officer Commanding reports that this was not altogether successful, since some men through laziness and lack of interest avoided this revision opportunity.

Each Saturday morning is given to revision of the work of the previous week, including an oral test. In addition, written progress examinations are given at the conclusion of teaching each main subject of the syllabus. Those trainees who average less than 40 per cent in these

progress tests are not presented for Trade Test, but are interviewed by the Officer Commanding, and according to his judgment, they are sometimes permitted to sit the Trade Test, or (more usually) are either sent from the School as unsuitable for training or are deferred to join the next course, thus obtaining six weeks' more tuition. This last line of action is the one most frequently adopted, and it invariably resulted in the men concerned being able to pass their Trade Test when they attempted it in company with the later-entered course of trainees. Flight Mechanics deferred in this way to join the next course averaged two per course, or about 5 per cent. Flight Mechanics who actually sat the Trade Test but failed (i.e., did not gain even AC2 standard, 40 per cent) numbered 18 only out of 2,151 cases, or .83 per cent. Trainees who for educational reasons were rejected from the School altogether, as unsuitable for any form of technical training, were few in number (approximately 5 per cent of the entries to the Elementary Basic School, and approximately .5 per cent of the trainees who had commenced a trade course after completing the E.B.S. course. Occasionally, however, trainees were diverted from courses which were proving somewhat beyond their capacities, to courses rather easier to master; e.g. from flight mechanic course to safety equipment worker course. Figures are not available detailing such cases, but they were few in number.

9. A record of the results of the Flight Mechanic courses held since 1940 is given in the following percentage table (in which results are totalled for groups of six or more courses).

T A B L E

1	2	3	4	5	6
Courses	Year	Total Individuals	Percentage Scoring		
			AC2	AC1	LAC
<u>Courses at the four Technical Training Centres</u>					
(Railway Workshops) (4 courses each centre)	1940	227	32	60	8
<u>Technical Training School</u>					
Courses 1 to 6	1940	514	22	66	12
Courses 7 to 12	1941	281	8	73	19
Courses 13 to 18	1942	232	7	60	33
Courses 19 to 26	42-43	407	7	52	41
Courses 27 to 32	1943	458	16	64	20
Courses 33 to 38	1944	250	18	66	16
Courses 39 to 44	44-45	172	20	64	16
TOTALS	40-45	2495	17	61	22

The chief interest attaching to this table lies in the variation in the proportion of successes at LAC standard (column 6). During the first two years the proportion gaining LAC standard climbed from a low average (8) to 19, with a corresponding drop in the proportion gaining AC2 standard. So far as can be assessed at this time, the greatest single factor assisting towards this improvement was the gradual reduction in the size of classes. In 1942 and 1942-43 there was a further marked improvement (LAC passes climbing to 33 per cent and 41 per cent). It is possible that the contributing factor here was the commencement in 1942 of the Preliminary Technical Training School, which had the effect of prolonging the tuition given. Courses 27 to 32 (1943) showed a sharp drop to 20 per cent; these courses were of twelve weeks only, instead of 18 weeks as were the previous courses

(this was an emergency measure to produce more technicians quickly to meet urgent demands in the Pacific). However, when the courses reverted to 18 weeks, as they did for Courses 33 to 38, a further decline to 16 per cent of LACs was noted, and this was maintained until Course 44 (completed in August 1945). The reason for the decline seen in 1944-1945 is thought to lie in the lower standard of trade knowledge possessed by the average recruits joining in those years; this was discussed in paragraph 7, (v) (e).

10. The record of achievement in "conversion" courses designed to train flight mechanics to become fitters II(E) is seen in the Table presented hereunder.

NOTE: Until July 1945, if an LAC flight mechanic gained only AC1 marks upon completing a fitter II(E) course, he was not remustered to the new trade (since this would have meant reclassifying to AC1 with consequent loss of pay, and this possibility would have prevented many from undertaking the conversion course and thereby gaining increased trade knowledge). Instead, he remained LAC flight mechanic, until such time as he was able to pass a "routine" fitter II(E) trade test (April and October each year) with LAC standard. Accordingly, large numbers undergoing fitter II(E) courses registered technical failures, and remained as flight mechanics. In July 1945 a new arrangement was announced whereby all flight mechanics who had undergone fitter II(E) courses would be remustered to flight mechanic in the classification (usually AC1) which they had gained at the trade test, but that the rate of pay would remain unchanged for 12 months, to allow the personnel time to pass the routine trade test if necessary. Approximately 200 flight mechanics (mainly LACs) have been remustered to fitters II(E) (mainly AC1s) under this arrangement. This, however, has not been taken into account in any way in the various sets of figures presented herein, and is mentioned purely as a matter of record.

TABLE

Courses	Year	Total Individ- uals	Per- cent- age Scoring		Standard reached at Trade Test did not equal existing classification therefore "Failed"; and remain F/Mechs. (Percentage)
			AC1	LAC	
<u>Hobsonville</u>					
(4 Courses)	1940	84	45	43	12
<u>Technical Training School</u>					
Courses 1 to 6	40-41	94	12	59	29
Courses 7 to 12	1941	186	16	43	41
Courses 13 to 18	1942	246	12	41	47
Courses 19 to 24	42-43	255	11	54	35
Courses 25 to 30	1943	254	11	42	47
Courses 31 to 36	1944	223	18	25	57
Courses 37 to 40	44-45	140	14	29	57
	40-45	1582	16	41	43

11. The table given with the previous paragraph shows that of nearly 1600 flight mechanics who were given a course of training to enable them to become fitters II(E), 16 per cent (who were AC1 flight mechanics) qualified with AC1 marks, and became AC1 fitters II(E); 41 per cent (who were LAC flight mechanics) qualified with LAC marks, and became LAC fitters II(E); while 43 per cent reached a fitter II(E) trade test standard lower than that which they already held as flight mechanics, so they remained flight mechanics until such time as they were able to pass a routine fitter II(E) trade test with the marks appropriate to the higher classification. The Note to paragraph 10 comments upon this procedure. It is to be noted that the majority of the 682 flight mechanics who failed to become fitters II(E) immediately on completion of the fitter II(E) course eventually qualified for remustering to this trade, by passing a routine trade

test at the required level, leaving some 200 who were unable to pass a trade test with the appropriate marks (or who in some cases did not choose to attempt it, as no increase in pay would result for them).

12. Some of the reasons are examined hereunder, for the high proportion of flight mechanics who failed to pass the fitter II(E) course with the required standard (note this stipulation; most of them technically did not fail, since 40 per cent is a bare pass; but to qualify for change of trade the pass standard had to equal their present flight mechanic standard).

- (1) In many cases the flight mechanics passed out of their original flight mechanic course with AC1 standard, and after practical experience at the trade on an Air Force Unit, they succeeded later in passing a routine trade test with 80 per cent, thus becoming LAC flight mechanics. In other words, their capabilities at first attempt at an examination of this nature averaged 60 to 80 per cent; and they revealed the same average performance at first attempt at the fitter II(E) trade test. Their failure to attain LAC standard on both occasions is at all events consistent. Further detail in this connection is set out in the following table:-

T A B L E
COMPARISON OF PASSING-OUT CLASSIFICATION WITH PRESENT CLASSIFICATION (F/MECHS.) OR CLASSIFICATION UPON CONVERSION (FITTERS II(E))

Passed out F/Mech. Course	Flight Mechs. as at Aug. 1945			Totals	Fitters II(E) as at August, 1945		TOTALS
	Now AC2	Now AC1	Now LAC		Passed out F2E Course as AC1	Passed out F2E Course as LAC	
AC2	61	40	36	137	18	4	22
AC1		192	235	427	159	134	293
LAC			149	149	18	143	161
	61	232	420	713	195	281	476

(ii) In the opinion of the Officer Commanding the Technical Training School, the chief reason for the large number of technical failures was the fact that, despite the nominal trade superiority of the fitter II(E), in practice the flight mechanic and fitter II(E) were usually interchangeable in their duties. The incentive to qualify for employment on more difficult duties offering wider experience therefore did not exist. To what extent this opinion is valid it would be difficult to ascertain.

(iii) In some cases flight mechanics were sent to fitter II(E) courses contrary to their own desire. E.g. an airman might be located on a unit situated close to his home, enabling him to live at home, and would realise that upon completion of the fitter II(E) course there was a possibility of his being sent to some other distant unit. Airmen reaching a fitter II(E) course against their will would scarcely be in the cooperative and receptive frame of mind which would favour the possibility of emerging with LAC standard.

13. Results attained by 1,274 Flight Mechanics in their passing-out trade tests are shown in the graph, Figure 1, herewith. The skewed nature of this graph is partly due to the reasons stated in paragraph 13 of Chapter 6. It will be seen that, of those attaining LAC at their Flight Mechanic course, a greater proportion eventually become Fitters II(E) than is the case with those who emerge from their initial course as AC1s.

14. As a matter of record, it was desired to include in this account an estimate of the approximate cost of training a flight mechanic. It was found that this matter had been investigated by the Accounts Branch, and an estimate made that the over-all cost of training (including pay and allowances, instruction, and materials) was £12 per week for the whole period from enlistment to date of qualification at end of course trade test. As shown in Appendix IV, this period comprises a minimum of 36 weeks, and may be considerably longer if there is any delay or waiting-period between commencing the various courses. The cost of training therefore would be between £400 and £500 per capita. During such a waiting period, the trainee is usually employed on duties appropriate to the trade in which he will be trained. He may be employed, for example, on cleaning duties and unskilled duties generally, in a hangar, in much the same way as an apprentice is

usually employed in a motor garage during the early portion of his apprenticeship. An apprentice however is usually able to contribute to some degree to the earning capacity of his employer, and to this extent it could be held that the cost of training a motor mechanic is comparatively low. This is not so in the Air Force, since, during the period of training, the trainee is entirely unproductive. On the other hand, the period of training in the Air Force is highly intensive, and of comparatively short duration.

FIG. 1 - GRAPH SHOWING PASSING PERCENTAGE OF 274 FLIGHT MECHANICS (SHOWN FROM 1945 EXAMINATION WHO LATER QUALIFIED AS PRIVATE ENGINEERS AND THE CLASSIFICATION)

FIG. 1 - GRAPH SHOWING PASSING OUT CLASSIFICATION OF 1274 FLIGHT MECHANICS. (SHADED AREA SHOWS PROPORTION WHO LATER QUALIFIED AS FITTERS II(E) IN THEIR EXISTING CLASSIFICATION)

CHAPTER 2

CIVILIAN BACKGROUND OF PERSONNEL OF UNITED STATES AIR FORCE -
FACTORS AFFECTING TRAINING ACTIVITIES

As was indicated in the opening paragraph of Chapter 1, the Air Force in order to meet its needs in technical workers, drew upon the ranks of civilian technicians as much as possible. Individuals with unskilled technical skills were also utilized, and many of these only qualified as Air Force technicians. The same amount of instruction was given to all, regardless of civilian experience. When a qualified "A" grade mechanic, an accountant, and a laborer entered a flight mechanics course together, it was assumed that each one had equal need for full instruction in every item of the syllabus. Since all were given the full course of training designed to convert a totally unskilled person into a skilled technician, the question arises as to whether or not the civilian background of the individual was a factor in determining the individual's standard, age, mental status. No attempt appears to have been made during the six years in which training has been given to examine this aspect in any objective manner. According to the records of the Air Force, the civilian background of an individual is not a factor in determining his standard, age, mental status, or physical condition. In order to ascertain if any facts tend to reveal which would tend to show that of recruits who were not successful trainees for the particular purpose in view.

2. A considerable amount of research was necessary, since it was not found possible to obtain all information desired from any single one of the three sets of records available; the Central Postal Directory records, the Civil Service Record maintained at Air Department (Form 513), and the Postage Card also maintained at Air Department (Form 578). The most convenient record was found to be the Postage Card, used in conjunction with an alphabetical roll (postcard mechanism) of all flight mechanics and others II(2).

3. A total of 1,274 individual records were examined. This comprised slightly over half of all the flight mechanics (2,455) who were trained during the six years under review, up to June 30, 1945. Of the remaining half, 400 had left the Air Force during the period (to the Army or to the Air Force Reserve), and had transferred to other Air Force units, principally Flight Mechanics II(2). The records of the remainder were not conveniently available. Of the 1,274 above

CHAPTER 5

CIVILIAN BACKGROUND OF PERSONNEL OF FITTING TRADES - FACTORS AFFECTING TRADE ACHIEVEMENT

As was indicated in the opening paragraphs of Chapter 2, the Air Force in order to meet its needs in technical workers, drew upon the ranks of civilian technicians as much as possible. Individuals quite unskilled technically were also enlisted, and many of these duly qualified as Air Force technicians. The same amount of instruction was given to all, regardless of civilian experience. When a qualified "A" grade Motor Mechanic, an accountant, and a labourer entered a flight mechanic course together, it was assumed that each one had equal need for full instruction in every item of the syllabus. Since all were given the full course of training designed to convert a totally unskilled person into a skilled technician, the question arises did any importance attach to the various factors of the civilian background of the individuals concerned - such factors as civilian occupation, educational standard, age, marital status? No attempt appears to have been made during the six years in which training has been given to examine this aspect in any objective manner. Accordingly this was deemed to be a suitable avenue for investigation, in order to ascertain if any facts could be revealed which would tend to show what kind of recruits made the most successful trainees for the particular purpose in view.

2. A considerable amount of research became necessary, since it was not found possible to obtain all information desired from any single one of the three sets of records available, the Central Trade Test Board records, the main Service record maintained at Air Department (Form 543), and the Postings Card also maintained at Air Department (Form 678). The most convenient record was found to be the Postings Card, used in conjunction with an alphabetical roll (produced mechanically) of all flight mechanics and fitters II(E).

3. A total of 1,274 individual records were examined. This comprised slightly over half of all the flight mechanics (2,495) who were trained during the six years under review, up to Course No. 44 inclusive. Of the remaining half, 400 had left the Air Force during the period (to the Army or to the Air Force Reserve), and had transferred to other Air Force trades, principally Flight Mechanic-Air Gunners; the records of the remainder were not conveniently available. Of the 1,274 cases

perused, 536 had duly qualified as Fitters II(E), while 738 were still Flight Mechanics (as at 1st August, 1945). These 1,274 individuals had achieved the following results on passing out of their Flight Mechanic course:-

	Passed out of Flight Mech. Course as AC2	Passed out of Flight Mech. Course as AC1	Passed out of Flight Mech. Course as LAC	Total Cases
Personnel still Flight Mechanics (as at 1.8.45)	145	446	147	738
Personnel who later converted to Fitter IIE (as at 1.8.45)	31	330	175	536
	176	776	322	1,274

It will be seen that, of the 176 who passed out from their Flight Mechanic course with the minimum qualifying standard (AC2), 18 per cent became fitters II(E); of the 776 who achieved AC1 status, 43 per cent duly qualified in the higher trade; and of the 322 who emerged from their initial course as LACs, 54 per cent later qualified to become fitters II(E). The passing-out standard achieved on completion of the flight mechanic course can therefore be taken as an indication of the probability of further progress being made, namely entry into the more advanced trade as fitter II(E). This is indicated in the graph, Figure 1.

4. An examination was made of the civilian occupations of the 1,274 flight mechanics referred to in the preceding paragraph. The result is shown herewith in Table 1 (see also the Graph, Figure 2). It will be seen that motor mechanics (454) comprise by far the largest occupational group. It is possible that this figure would be larger still if more exact description had been given of the vocations of some of the men now included under the second largest group, "Other skilled engineering and metal working trades". This group, for purposes of the Table, includes any men who described themselves as "mechanics" and not specifically as "motor mechanics". When the passing-out achievements are converted into percentages

within each occupational group (see Table 1A), and the relative achievements (AC2, AC1, LAC) are scrutinised, it is seen that the motor mechanics and the other skilled engineering and metal-working tradesmen have registered the best average performances, with the lowest proportion of AC2s and the highest proportion of LACs. (This disregards the two groups "professional" and "ground staff aero clubs, etc." in which the numbers involved are too small to be of significance). (These results are shown also in graphic form, Figure 6). Further comment is not thought necessary, since the Table indicates that civilian occupation is an important factor influencing the result of the R.N.Z.A.F. trade training given. This view is actually at variance with the opinion of the Officer Commanding the Technical Training School, who reported that "although a detailed record was not kept, it had been found that the training was such that the civilian occupation had very little bearing on the ultimate result. There had been outstanding examples for and against".

That the vocational background is an important factor is indicated also by the variation between the trade groups in respect to the proportion who were able to advance in the trade to the stage of fitter II(E). The graph, Figure 2, shows clearly that a high proportion of motor mechanics (57 per cent) duly became fitters II(E); and the proportion is high for other skilled engineering and metal working trades (53 per cent) and for fitters and turners (41 per cent). The proportion drops to 31 per cent and less, for the other trade groups, and is only 15 per cent in the case of farmers (who comprise the third highest group, numerically). It is to be noted that of the whole of the 1,274 cases examined, only 536 graduated or "converted" from flight mechanic to fitter II(E) - this represents 42 per cent.

NOTE: In all cases the individual's own description of his occupation has had to be accepted at face value. It is possible that in some instances men employed in garages and car repair shops have called themselves motor mechanics who were not actually apprentices or journeymen. It is possible also that some who have described themselves as "mechanics" (and are included under "other skilled engineering and metal working trades") are actually motor mechanics. "Garage workers" are grouped with "semi-skilled manual trades". "Car salesmen", "salesmen", and "warehousemen" are all placed under "shop assistants".

5. The educational back-ground of the flight mechanics was also surveyed. The educational standard reached before enlistment was stated in 1,164 cases. The passing-out

classifications gained by trade test, for the various educational groupings ranging from "no secondary education" to "University or equivalent", are shown in Table 2 and (expressed as percentages) in Table 2A. It will be seen that, as the number of years of secondary education increases, there is a decline in the proportion who pass out from their course with AC2 standard. There is also an increase in the proportion of cases who pass out with LAC standard (with an exception in regard to the "one year secondary" group, in which 17.6 per cent reach fitter II(E) qualifications, as compared with 20.8 per cent who have had primary school education only. The writer is unable to account for this exception, excepting by the theory that boys leaving primary school straight to employment possibly would tend to become apprentices in the motor industry to a greater proportion than would be found from boys leaving school after one year's secondary education. No practicable way to verify or disprove this theory is seen). A graphic representation of the educational groupings (shown as Figure 3) is also used to indicate the percentage of each group who eventually qualified as Fitters II(E). The variations are sufficiently marked to indicate a positive correlation between number of years of schooling and probability of advancing to the higher level of the "fitting" trade.

6. In an endeavour to examine further the effect of civilian occupation and educational standard upon results gained, an analysis was made of these two factors as applying in respect to the 146 airmen who passed out of both flight mechanic course and fitter II(E) course with LAC standard. This analysis is shown in Table 3. When the totals of the groups under each of the two main headings (occupation and education) are converted into percentages, and compared with the percentages of the groupings for all cases (as shown in Cols. 6 of Table 1 and Table 2), there is seen to be (A) a distinct advantage in favour of "motor mechanics" and "other skilled engineering and metal working trades", and (B) a slight advantage in favour of those of 3 and 4 years secondary education, with a more noticeable disadvantage to those of no secondary education and 1 year secondary. These percentages are tabled herewith (Tables 3A and 3B).

TABLE 3A

CIVILIAN OCCUPATIONS OF 146 PERSONNEL GAINING LAC STANDARD ON PASSING OUT OF BOTH FLIGHT MECHANIC AND FITTER II(E) COURSES, expressed as percentages of the group of 146 (column 2); compared with percentages represented by each occupational group within the total of all cases studied (column 3) as transferred from Table 1.

1.	2.	3.
Motor Mechanics	43 per cent	36 per cent
Fitters & Turners	8	8
Other Skilled Engineering and Metal Working trades	22	15
Other Skilled Manual trades	7	6
Semi-skilled Manual trades	2	5
Farming	6	11
Shop Assistants	2	4
Clerical	4	5
Drivers	1	3
Students	1	2
Labourers	1	3
Professional	1	1
Civil Aviation	2	1
	100	100

TABLE 3B

EDUCATIONAL STANDARD OF 146 PERSONNEL GAINING LAC STANDARD ON PASSING OUT OF BOTH FLIGHT MECHANIC AND FITTER II(E) COURSES, expressed as percentages of the group of 146 (column 2); compared with percentages represented by each educational group within the total of all cases studied (column 3) as transferred from Table 2.

1.	2.	3.
No secondary education	11	19
1 year secondary	5	10
2 years secondary	25	26
3 years secondary	29	27
4 years secondary	16	12
5 years secondary	4	5
University or equivalent	5	1
Not available	5	Not applicable
	100	100

7. In order to ascertain whether age was a factor of any importance in influencing the results of the training given, the ages (at enlistment) were ascertained, and totalled in seven main groupings (see Table 4). When the classifications gained by trade test are converted into percentages (Table 4A, also graph Figure 4) it is seen that on the average the older men reveal somewhat better results than the younger. (The period elapsing between date of enlistment and completion of training can be regarded as a constant factor, for all practical purposes). The fact that a higher proportion of the more mature men qualify as fitters II(E) is probably due to the longer period of civilian trade experience which they will have had (the majority as motor mechanics, fitters and turners, or in other skilled engineering trades). This aspect, it is considered, would outweigh the handicap of having been longer away from school; since in the trade test the written portion of the examination (assisted in some degree by scholastic knowledge) is awarded a maximum of 20 per cent, while the "trade oral" portion, administered as searching questions on all practical aspects of the trade in much less academic fashion, is awarded 60 per cent of the possible marks. (Refer on this point to Chapter 6, paragraph 8, and also to the graph, Figure 8).

8. In Chapter 1 (paragraph 12) it was mentioned that the monetary incentive to attain a higher classification, or to enter the highest paid group (Group I) which includes fitters II(E), is likely to lose its force in the case of married men (particularly those with children) to whom minimum rates of pay are given in any case. (E.g. - an LAC of a Group I trade, who is single, receives £225 per annum; an LAC even of a Group V trade, who is married with 1 child, receives £228 per annum. An AC2 flight mechanic (Group II) who is single receives £141 per annum; an AC1 (single) receives £175 per annum; but a flight mechanic, married with one child, receives £219 per annum if he is AC2 or AC1. (The scale of rates of pay is shown at Appendix II).

The Officer Commanding the Technical Training School reported that he had known cases of trainees (married men) stating that they did not intend to exert themselves, as it would make no difference to their pay whatever the result. On the other hand, he reported, married men appeared to show a majority of successes in passing out with LAC standard (though figures were not available). It was considered desirable to ascertain these figures, and the records of the 1,272 flight mechanics under study were examined accordingly. It was found (Table 5) that one third were married and two-thirds were single. This was as recorded at August 1945; some were not necessarily married at date of trade test, but the majority would have entered the Service as married men. Upon examining the

trade test results within each of the two groups, it is found that the married men show better results than the single men (shown graphically at Figure 5). Insofar as advancement to the trade of fitter II(E) is concerned, the percentage of married men so advancing is more than double that of the single men. These facts would seem to deny any assumption that the majority of married men do not seek advancement in the trade. On the other hand, it is not held that there is any direct incentive to advancement attached to the fact of being married instead of single; it would seem probable that the factor of importance is the obvious one that the married men are older on the average than the single men, the majority of whom were under 22 at enlistment.

9. To summarise, it would seem that the figures produced indicate that the back-ground factors of civilian occupation, educational standard, and age tend to influence achievement in trade test after undergoing a flight mechanic course, and tend also to indicate the degree of probability of later qualifying as fitter II(E). It must be conceded that the recruit who can reach LAC standard quickly, and qualify as completely proficient in his trade by becoming fitter II(E), is obviously the most desirable type of recruit (other factors being equal). It would seem therefore that if recruiting were to be carried out on a highly selective basis (as is likely for the permanent post-war Air Force), men to be accepted for training as flight mechanics and eventually as fitters II(E), should preferably be drawn from the ranks of those who have been employed as motor mechanics or in other skilled engineering trades, have had two or more years' secondary education, and are over 21 years of age.

Further reference to this topic is made in Chapter 7, relating to advancement in the trade (by promotion to N.C.O. rank).

**TABLE 1 - CLASSIFICATION GAINED AT TRADE TEST AT
END OF FLIGHT MECHANIC COURSE - GROUPED ACCORDING
TO CIVILIAN OCCUPATION**

Civilian Occupation	AC2	AC1	LAC	TOTALS	Percentage of whole represented by each occupational group
Motor Mechanics	36	296	122	454	35.8
Fitters & Turners	14	63	23	100	7.9
Other skilled Eng. and Metal Working Trades	19	116	57	192	15.1
Other skilled Manual Trades	14	47	21	82	6.4
Semi-skilled Manual Trades	13	39	13	65	5.1
Farming	25	79	31	135	10.6
Shop Assistants	8	33	9	50	3.9
Clerical Workers	18	33	19	70	5.5
Drivers	6	24	6	36	2.9
Students	5	17	7	29	2.3
Labourers and other unskilled workers	6	22	4	32	2.6
Professional etc.		3	5	8	.6
Ground Staff Aero Clubs, etc.	3	7	7	17	1.3
	167	779	324	1270	100

TABLE I(a)

Totals on previous page expressed as percentages within each occupational class:-

Civilian Occupation	AC2	AC1	LAC	TOTALS
Motor Mechanics	7.9	65.2	26.9	= 100% of 454
Fitters & Turners	14	63	23	= " 100
Other Skilled Eng. & Metal Working Trades	9.9	60.4	29.7	= " 192
Other Skilled Manual Trades	17.1	57.3	25.6	= " 82
Semi-Skilled Manual Trades	20	60	20	= " 65
Farming	18.5	58.5	23	= " 135
Shop Assistants	16	66	18	= " 50
Clerical Workers	25.7	47.1	27.2	= " 70
Drivers	16.6	66.7	16.7	= " 36
Students	17.2	58.6	24.2	= " 29
Labourers & other Unskilled Workers	18.7	68.8	12.5	= " 32
Professional etc.		37.5	62.5	= " 8
Ground Staff Aero Clubs, etc.	17.6	41.2	41.2	= " 17
TOTALS	13.1	61.2	25.7	= " 1270

TABLE 2

CLASSIFICATION GAINED AT TRADE TEST AT END OF
FLIGHT MECHANIC COURSE - 1164 CASES : GROUPED
ACCORDING TO EDUCATIONAL STANDARD

(Note: 2 years Night School equals one year Day Secondary).

1	2	3	4	5	6
Educational Standard	AC2	AC1	LAC	Total	Percentage of whole represent- ed by each edu- cational group
No Sec.	40	140	47	227	19.5
1 yr. Sec.	20	78	21	119	10.3
2 yrs. Sec.	45	178	74	297	25.5
3 yrs. Sec.	36	195	83	314	27
4 yrs. Sec.	9	82	44	135	11.6
5 yrs. Sec.	4	31	23	58	4.9
Univ. or Equiv.		7	7	14	1.2
	154	711	299	1164	100%

TABLE 2(a)

Above Table expressed as Percentages of each Educational Group:

No Sec.	17.6	61.6	20.8	227 cases
1 yr. Sec.	16.8	65.6	17.6	119 "
2 yrs. Sec.	15.1	60	24.9	297 "
3 yrs. Sec.	11.5	62	26.5	314 "
4 yrs. Sec.	6.7	60.8	32.5	135 "
5 yrs. Sec.	6.9	53.5	39.6	58 "
Univ. or Equiv.		50	50	14 "
	13.2	61.2	25.6	1164 "

TABLE 3

CIVILIAN OCCUPATION AND EDUCATIONAL STANDARD
OF PERSONNEL WHO GAINED LAC STANDARD ON
PASSING OUT OF BOTH FLIGHT MECHANIC AND
FITTER II(E) COURSES

	No Sec.	1 yr. Sec.	2 yr. Sec.	3 yr. Sec.	4 yr. Sec.	5 yr. Sec.	Univ. or Equiv.	Not stated	Totals
M. Mechanics	8	4	21	15	8	1	3	3	63
Fitters and Turners				3	4	1	3	1	12
Other Skilled Eng. Trades	6	2	5	11	5	3	1		33
Other Skilled Manual Trades		1	4	3	1	1			10
Semi Skilled Manual Trades			1	2					3
Farming	1		4	3	1				9
Shop Assistants			1	1	1				3
Clerical				1	5				6
Drivers		1							1
Students	1								1
Labourers								1	1
Professional				1					1
Air Lines, Aero Clubs etc. (Civil Aviation)			1	2					3
	16	8	37	42	25	6	7	5	146

TABLE 4

CLASSIFICATION GAINED AT TRADE TEST AT END OF
FLIGHT MECHANIC COURSE
GROUPED ACCORDING TO AGE AT ENLISTMENT

Age at Enlistment	AC2	AC1	LAC	TOTALS
18	35	137	31	203
19	36	131	40	207
20	21	91	38	150
21	31	101	43	175
22 to 25	24	151	82	257
26 to 35	25	161	90	276
36 and Over	1	7	3	11
	173	779	327	1279

Above totals expressed as percentages within each age group:

TABLE 4(a)

18	17	68	15	=	100% of 203
19	17.4	63.2	19.4	=	" 207
20	14	60.7	25.3	=	" 150
21	17.7	57.7	24.6	=	" 175
22 to 25	9.3	58.8	31.9	=	" 257
26 to 35	9	58.4	32.6	=	" 276
36 and Over	9.1	63.6	27.3	=	" 11
	13.5	60.9	25.6	=	" 1279

FIG 2 CIVILIAN OCCUPATIONS OF 12,790 HIGH SCHOOL GRADUATES
(SHADED AREA - QUALIFIED AS PILOTS)
(UNSHADED AREA - QUALIFIED AS OTHERS)

FIG. 2. CIVILIAN OCCUPATIONS OF 1270 FLIGHT MECHANICS.
[SHADED AREA SHOWS PROPORTION WHO ALSO LATER
QUALIFIED AS FITTERS II(E)].

FIG. 3. EDUCATIONAL STANDARDS OF 1944 FLIGHT MECHANICS (5-YR SEC. TAKEN AS EQUIV. TO 1 YR SEC. WHO LATER QUALIFIED AS PILOTS [1944]).

FIG. 3. EDUCATIONAL STANDARD OF 1164 FLIGHT MECHANICS. [SHADED AREA SHOWS PROPORTION WHO LATER QUALIFIED AS FITTERS II (E)].

(1) ALL AGES (1279 CASES)

(2) 18 YEARS (203 CASES)

(3) 19 YEARS (207 CASES)

(4) 20 YEARS (150 CASES)

(5) 21 YRS (175 CASES)

(6) 22 TO 25 YRS (257 CASES)

(7) 26 TO 35 YRS (276 CASES)

(8) 36 YRS & OVER (11 CASES)

FIG. 4 GRAPH REFLECTING INFLUENCE OF AGE UPON PASSING-OUT

(1) PASSING-OUT CLASSIFICATIONS GIVEN BY REG. FILE & ADJUTANT

(2) - (8) PASSING-OUT CLASSIFICATIONS - FOR ENLISTED WITHIN EACH AGE GROUP

AGES ARE AS AT DATE OF ENLISTMENT

(1) ALL AGES (1279 CASES)

(2) 18 YEARS
(203 CASES)

(3) 19 YEARS
(207 CASES)

(4) 20 YEARS
(150 CASES)

(5) 21 YRS.
(175 CASES)

(6) 22 TO 25 YRS.
(257 CASES)

(7) 26 TO 35 YRS.
(276 CASES)

(8) 36 YRS. & OVER
(11 CASES)

FIG. 4 GRAPH REFLECTING INFLUENCE OF AGE UPON ACHIEVEMENT.

(1) PASSING-OUT CLASSIFICATIONS GAINED BY 1279 FLIGHT MECHANICS.

(2)-(8) PASSING-OUT CLASSIFICATIONS - PERCENTAGES
WITHIN EACH AGE GROUP.

AGES ARE AS AT DATE OF ENLISTMENT.

FIG. 5A - GRAPH SHOWING (PRESENT) MARITAL STATUS OF 1272 FLIGHT MECHANICS. [SHADED AREA SHOWS PROPORTION WHO LATER QUALIFIED AS FITTER (F)]

FIG. 5B - PERCENTAGE OF MARRIED & SINGLE MECHANICS BY AC RATING. LAC STD ON COMPLETING FLIGHT MECHANIC COURSE

FIG. 5A - GRAPH SHOWING (PRESENT) MARITAL STATUS OF 1272 FLIGHT MECHANICS. [SHADED AREA SHOWS PROPORTION WHO LATER QUALIFIED AS FITTER II(E)].

FIG. 5. PERCENTAGE IN MARRIED & SINGLE GROUPS SCORING AC2, AC1 & LAC STD. ON COMPLETING FLIGHT MECHANIC COURSE.

100%
 50%
 0%

OTHER SKILLED TRADES
 OTHER UNK. SKILLED TRADES
 SEAF. UNK. SKILLED TRADES
 FARM UNK. SKILLED TRADES
 SHOP ASSISTANTS
 CLERICAL
 DRIVERS
 STUDENTS
 LABORERS
 FARMERS
 UNK. SKILLED TRADES
 TOTALS

10% 19% 3% 6% 13% 5% 7% 8% 29% 4% 1% 100%

PERCENTAGE IN EACH OCCUPATIONAL CATEGORY
 STANDARD ON COMPLETING FIRST GRADE

MOTOR MECHANICS & TURNERS OTHER SKILLED ENGRS OTHER SKILLED MANUAL TRADES SEMI-SKILLED MANUAL TRADES FARM-ING SHOP ASSISTANTS CLERICAL DRIVERS STUDENTS LABOURERS PROFESSIONAL GROUND STAFF AERO CLUBS ETC. TOTALS

454 100 192 82 65 135 50 70 36 29 32 8 17 1270

FIG. 6. PERCENTAGE IN EACH OCCUPATIONAL GROUP SCORING AC2, AC1 & LAC STANDARD ON COMPLETING FLIGHT MECHANIC COURSE.

CASES	227	119	297	314	135	58	14	1104
-------	-----	-----	-----	-----	-----	----	----	------

FIG. 7 PERCENTAGES IN EACH EDUCATIONAL GROUP SCORING AC2, AC1 & LAC BASED ON COMPLETING PLANT MECHANICAL COURSE

CASES : 227 119 297 314 135 58 14 1164

FIG. 7 PERCENTAGE IN EACH EDUCATIONAL GROUP SCORING AC2, AC1 & LAC STANDARD ON COMPLETING FLIGHT MECHANIC COURSE.

TABLE 5

CLASSIFICATION GAINED AT TIME TEST AT END OF
FLIGHT RESEARCH COURSE - GROUPS APPLICABLE TO
MILITARY SERVICE (WOMEN AIRBORNE FOR 1945)

(as of Aug. 15) Marital Status	1943	1944	1945	TOTAL
Married	40 9.37%	238 59.42%	133 31.19%	411 100%
Single	137 30.63%	517 61.19%	191 28.8%	845 100%
	177 40.0%	755 60.71%	324 25.18%	1256 100%

TABLE 5

CLASSIFICATION GAINED AT TRADE TEST AT END OF
FLIGHT MECHANIC COURSE - GROUPED ACCORDING TO
MARITAL STATUS (WHICH AFFECTS PAY RATE)

(as at Aug. 45) Marital Status	AC2	AC1	LAC	TOTAL
Married	40 9.37%	254 59.48%	133 31.15%	427 100%
Single	137 16.21%	517 61.19%	191 22.6 %	845 100%
	177 13.91%	771 60.61%	324 25.48%	1272 100%

CHAPTER 6

THE EXAMINATION SYSTEM IN THE R.N.Z.A.F.

The system of examinations to determine proficiency in the Air Force skilled trades is known as the Trade Test system. (the term "trade test" is taken from R.A.F. nomenclature).

2. The administration of this system is vested in the Central Trade Test Board. The Board is directly responsible to Air Department, and is independent of any other Air Force unit. The President of the Board is also the Director of Technical Training in the R.N.Z.A.F. In the latter capacity he is responsible for all aspects of the training given in the various schools of instruction, while in the former capacity he is responsible for the formulation of standards to be reached and for assessing the results of the training given.

3. The President of the Central Trade Test Board is assisted by an executive and examining staff. The Board as such does not meet. Examinations (or "trade tests") are held at the conclusion of every course of training, to determine whether or not the airmen have qualified to be employed in the trade concerned, and to determine the classification, or ranking as aircraftmen, in which the personnel will commence effective duty. Routine trade tests are carried out also twice yearly (in April and October) to give to those personnel who passed out from their course of training as aircraftmen second class (AC2) or aircraftmen first class (AC1) an opportunity to qualify for advancement to AC1 or to Leading Aircraftmen (LAC). Examinations are carried out almost wholly by members of the permanent examining staff, consisting of several technical officers and a number of senior non-commissioned officers of appropriate Air Force trades. End-of-course trade tests are held at the various schools concerned; routine trade tests are held at the Air Force stations, which are visited by the examiners according to an itinerary. Where necessary, assistance in examining is obtained by co-opting suitable officers or NCO's. from the staff of the station visited. Such assistance is rarely sought for end-of-course examinations; it is utilised to a moderate extent within New Zealand, but is the standard procedure for routine trade tests conducted at Pacific Islands units since late in 1943.

4. Trade tests are also held as required for special purposes; e.g., when an airman's trade efficiency is in question, despite having previously qualified in his trade. The incidence of such tests is small.

5. An indication of the volume of trade tests carried out is given in Appendix V (Table showing Total Trade Tests completed from Sept. 1939 to Aug. 1945). It is to be borne in mind that many personnel have been examined (for reclassification) several times after their initial trade test upon passing out from their school of training. The total given, (41,508) therefore does not represent so many different individuals, but simply so many examinations administered.

6. An airman will be trade tested by the Central Trade Test Board only if he is recommended by his school (if he has been under training) or by his unit (if he has been employed on trade duties) as being considered suitable for qualifying in the trade, or for advancement. This is an internal safeguard towards maintaining adequate standards, and is analogous to the requirement under which a university student is required to keep terms at his constituent college before he may be examined by the university as the examining body.

7. The general procedure observed in trade testing is laid down in Regulations for Promotion, Mustering and Trade Testing, promulgated by the Air Board (Air Publication 1112 (N.S.)). In this publication details are given in connection with each Air Force trade, regarding (i) the duties the airman will be called upon to perform and (ii) a general indication of the scope and nature of the trade tests. (These details, promulgated as applying to the trades of Flight Mechanic and Fitter II(E), are included hereunder as Appendix IX and Appendix X respectively). The Regulations prescribe the standard required for each classification, viz.

Aircraftmen, 2nd Class	..	..	..	40	per cent.
Aircraftmen, 1st Class	..	..	..	60	" "
Leading Aircraftmen	..	..	..	80	" "

8. The Regulations provide that each Trade Test is to be divided into a number of parts; this division varies slightly with some trades, but in the main it comprises the following:-

PART I - WRITTEN PAPER

For Flight Mechanics and Fitters II(E) passing out from courses, this is a three-hour paper, in which 10 questions are to be attempted, of 12 offered. Specimen papers are reproduced hereunder, as Appendix XI.

Marks allotted 100 marks.

PART II - PRACTICAL (MANUAL) TEST

For Flight Mechanics - simple filing.

Marks allotted 50 marks.

For Fitters II(E) - precision filing from
a drawing, within
specified limits.

Marks allotted 100 marks.

PART III - ORAL EXAMINATION - BASIC

Questions designed to test an airman's knowledge of the basic principles of his trade, e.g. the use and properties of tools and materials.

Marks allotted - Flight Mechanics - 50 marks.

- Fitters II(E) - 100 marks.

PART IV - ORAL EXAMINATION - TRADE KNOWLEDGE

Questions designed to show an airman's practical knowledge of the particular work upon which he will be engaged in his Air Force trade, e.g. Flight Mechanics and Fitters II(E) will be questioned on appropriate aspects of the maintenance, overhaul and repair of particular makes of aircraft engines and propellers, and their component parts.

Marks allotted - Flight Mechanics - 300 marks.

- Fitters II(E) - 200 marks.

In order to arrive at the assessment of an airman, the marks obtained by him in the various stages of the examination are added together and expressed as a percentage of the total. Thus the total marks allotted in the trade test for Flight Mechanics and Fitters II(E), as shown above, is 500; but the result is always published and recorded as a percentage.

9. In the prescription of the examination for most trades, the oral tests are usually shown as "starred" or qualifying portions of the test; notwithstanding that an airman may have received an aggregate percentage applicable, say, to LAC classification (80 percent), it is necessary that he obtain a minimum of 80 per cent in the starred part of the test before he can qualify for that classification. This requirement is designed to safeguard against an airman's being enabled to qualify for higher status by

FIG. 8. GRAPH SHOWING PROPORTION OF TOTAL MARKS GAINED
IN THE VARIOUS PARTS OF PASSING-OUT TRADE TEST.
FLIGHT MECHANICS - COURSE 44 - 1945.

FIG 9 GRAPH SHOWING PROPORTION OF TOTAL MARKS OBTAINED
IN THE VARIOUS PARTS OF PASSING-OUT TRADE TEST
FITTERS II (E) - COURSE N° 40 - 1945

FIG. 9 GRAPH SHOWING PROPORTION OF TOTAL MARKS GAINED
IN THE VARIOUS PARTS OF PASSING-OUT TRADE TEST.
FITTERS II(E) - COURSE N° 40 - 1945.

virtue of the assistance of a high marking gained through theoretical knowledge as expressed in the written paper and the "basic oral" section, while still unable to satisfy the examiner that he possesses to the same degree a practical knowledge of the trade.

10. In view of the importance placed upon the oral portion of the examination, as evidenced by the high proportion of marks allotted, the examining body uses a technique designed to be as objective as possible, along the following lines:-

Fitters II(E) passing out of "conversion" courses (i.e., converting from Flight Mechanics to Fitters II(E)) are questioned independently by three examiners, each examiner occupying about twenty minutes in questions on various aspects of up to say, 12 main topics. Each examiner confines his questions to one broad class of enquiry; between them they thus examine basic knowledge, knowledge of components, and engine knowledge. While questioning, the examiner records main headings covering the questions asked, and allots marks on a percentage basis according to the answers given. The marks given by the three examiners are then averaged, and this figure taken as the mark to be awarded for the oral portion of the trade test (after converting to the appropriate scale according to the possible marks allotted). An oral examination record sheet is retained by the examiner (and later filed at the Central Trade Test Board) recording, under main headings only, the marks awarded by the examiner to the answers given in reply to his questions.

With Flight Mechanics a similar marking system is used, but the test is given by one, or two, examiners only.

The Central Trade Test Board gives full discretion to its examiners as to the nature and content of the questions asked during the viva voce test. However, for his own guidance and convenience, each examiner is equipped with a list of the main range of topics with which the examinees are presumed to be acquainted. Copies of these lists are appended. (Appendix XII)

The chief criticism of this system of oral examining would appear to lie in the fact that there must inevitably be divergence of standards as between various examiners, and also probably divergence of standards in an individual examiner from time to time and as between different candidates. These theoretical disadvantages of the oral method, as compared with a more objective method, such as answering a written paper consisting of a limited number of standardised questions the answers to which must be either right or wrong, appear to have additional weight when it is seen that more is required than simply passing or failing a candidate. No doubt a pass or fail decision

could be reasonably accurately based upon an oral test if it were sufficiently exhaustive. But in addition it is required to know in due course whether the candidate emerges from the whole trade test with the classification of AC2, AC1, or LAC - over 40, over 60, or over 80 per cent respectively. This calls for an exact mark being given to the oral examination, since the marks for the various parts of the trade test are totalled and converted to a percentage.

The chief executive officer of the Central Trade Test Board, interviewed, reports that while it is recognised that any allocation of exact marks is always arbitrary to some degree, endeavours are made to avoid any injustices by the following methods:-

- (i) The employment of two or more examiners when practicable (and always with the more important tests such as that for Flight Mechanics converting to Fitters II(E), and the averaging of the marks awarded.
- (ii) The use of the oral examination record sheet, on which is recorded the main headings of questions asked, with marks awarded for each main question (a question on one principal topic might consist of a series of questions on minor divisions of that topic).
- (iii) The confining of questions to detailed subjects of the syllabus which have actually been taught during the course, in the case of a passing-out trade test (e.g. if it is intended to catechise on the function and attributes of various carburettors, questions are confined to those types of carburettors with which the syllabus has required the trainee to become familiar). Similarly, when the trade test is being given for reclassification of personnel effectively employed at the trade at Air Force units, questions are confined to those types of engines upon which the candidate has actually been working.
- (iv) The granting of an automatic reviewing to the cases of all candidates whose total trade test marks fall between 75 and 80 per cent. This is designed to overcome any injustices which might be incurred as a result of drawbacks inherent in any examination system. Detailed marks are made known to the candidate as soon as possible. There is no machinery for applying for reconsideration of the result promulgated (although any such request which may be received is always fully investigated) and under the system adopted, such applications are unnecessary. Personnel whose

marks on the initial count fall between 76 and 80 receive reconsideration without the need for special application; all aspects of their cases are inspected, (including their civil occupation, age, and educational standard) and a decision made accordingly by the executive officer of the Board in consultation with the examiners. In border-line cases, where it is considered that the airman if granted the status of LAC will be likely to carry his trade responsibilities effectively, the candidate is given the benefit of any reasonable doubt, and his marks are adjusted accordingly. (Of course, this procedure is observed with regard to all trades tested, not only the fitting trades). The incidence of such cases is referred to hereunder (paragraph 13).

11. The written examination papers are framed and prepared by the Central Trade Test Board, and are sent to the school or unit concerned under sealed cover and opened on the morning of the examination. If several units are being examined, at different places, written tests are held simultaneously. A standard answer book is used, bearing an index number, and not the name of the candidate. At the end of the time allotted, answer papers, question papers, and key to index numbers are forwarded under registered cover to the Central Trade Test Board for marking. The written work is done under the supervision of an officer or N.C.O. specially appointed as examination supervisor. These procedures accord with accepted practice in the conducting of written examinations by any educational authority.

In marking the written papers, marks are allotted as objectively as possible according to the factual nature of the answer given. A model answer is awarded 10 marks, and a mark is deducted for each inaccuracy or omission of an essential fact. No account is taken of the standard of English or spelling.

12. The practical or manual tests administered are designed to test manual dexterity and ability in the use of tools and the working of metals to fine limits. Candidates are not required to demonstrate their capabilities in the actual tasks demanded of them in the execution of their trade duties. A requirement of this nature is deemed impracticable, since one particular task of assembly cleaning or repair alone might take several hours to complete. The type of practical work required is indicated in the drawings reproduced at Appendix XIII. Each exercise shown consists of making a base plate and insert, to pattern, in mild steel, using hand tools only. Tolerances permitted are plus or minus one thousandth of an inch (fitters II(E)) or two thousandths of an inch (flight mechanics). Marks are awarded according to a scale which calls for deductions

for every variation from the stipulated measurements, after allowing for the tolerances permitted. (E.g., one per cent is deducted for a variation of one thousandth of an inch in a particular measurement). A small proportion of the total marks (20 per cent) is awarded for fit and finish, judged on a comparative basis. The greater proportion of the marks accordingly are allotted on a standardised basis. The task of marking the practical work is thus facilitated, and an objective method is secured of ascertaining an exact percentage marking.

13. The incidence of cases of review with consequent upward adjustment of the initial marking appears to be relatively high. Of a total of 1651 examination results perused, in respect to Flight Mechanics and Fitters II(E) who passed out from courses between April 1943 and August 1945, in 216 cases there had been an adjustment of this nature. This proportion equals approximately 13 per cent. It is thus obvious that the trade test system is not inflexible, but that regard is paid to the personal factors applicable to particular candidates as well as to their examination achievements. In this respect a parallel is seen in the arrangement whereby the University of New Zealand grants War Concession passes to certain of its students (serving with the Forces) whose university examination results fall somewhat short of the pass standard. Under both systems, necessary standards are still preserved, since the concession pass is granted only to those candidates whose initial mark falls close to the arbitrarily-established pass mark. Furthermore, the interests of the Service are safeguarded by legislation providing that if a Commanding Officer has reason to suspect that an airman's trade ability is below the standard of his classification, he can report him as inefficient, and the Central Trade Test Board will arrange a trade test upon the results of which the airman's disposal will depend.

14. The adjustment of marks in about 13 per cent of trade test results has an obvious effect upon the scattergram Figure 10, showing marks gained by 334 Fitters II(E) (selected at random) upon passing out of their Flight Mechanic course and their subsequent Fitter II(E) course. It will be seen that the number of cases scoring between 75 and 80 in each of the appropriate columns is much smaller than what might reasonably be expected in a distribution following an initial arbitrary scoring. If however, a theoretical adjustment is made allowing for the 13 per cent of LAC (80 per cent) markings awarded by review (as referred to in paragraph 13 above), the scattergram assumes a more normal appearance (as shown in Figure 11). It is nevertheless to be remembered that neither scattergram can be expected to reveal a normal distribution, since the Flight Mechanics who take a conversion course to become Fitters II(E) have usually attained LAC standard (though AC1's are also

accepted), but not necessarily on passing out of their Flight Mechanic course. If they entered the Fitter II(E) course as LAC's, they are required to gain LAC standard in order to remuster to the new trade (since entry to the new trade as AC1 would involve a loss of pay). LAC Flight Mechanics who did not reach LAC Fitter II(E) standard remained as Flight Mechanics, (until such time as they might reach 80 per cent in a Fitter II(E) Routine trade test). The omission of such cases accordingly has the effect of giving undue prominence in the scattergram to those cases in which the standard of 80 per cent was attained. The correlation between the two scores therefore is not given, since its value would be somewhat fictitious. It is considered however that inspection of the scattergram, both before and after adjusting, reveals reasonable consistency in the two scores of the various individuals. To this extent it could be held to have a certain value as an indication of the consistency and validity of the trade test system, particularly when it is noted that the passing-out Fitter II(E) trade test on the average is held about twelve months after the passing-out Flight Mechanic trade test.

15. The Central Trade Test Board is not empowered to authorise the changes of classification to which successful examinees would be entitled. Such instructions (e.g. to alter an airman's classification, pay, and badges of rank) can reach the airman's unit only from Air Department. Accordingly the Central Trade Test Board makes its recommendations to Air Department regarding the various individuals trade tested. Such recommendations are invariably acted upon.

16. It is desired to draw attention to the graphs shown at Figures 8 and 9. These serve to reveal the proportions of marks awarded for the various parts of the trade tests, as extracted from records of examinations administered to two particular courses, as under:-

Figure 8 - Flight Mechanics - Course No. 44.

Figure 9 - Fitters II(E) - Course No. 40.

The importance of the oral portion of the examination will be apparent from these graphs.

17. In maintaining records of passing-out trade test scores, the Central Trade Test Board (the examining authority) gives guidance to the Technical Training School as to the observed results of the instruction given from course to course. This is done in order to assist the School in deciding to what subjects special attention appears necessary from time to time. The procedure is simple and effective, and consists of -

(1) A Report on the results of the four portions of each Trade Test (as compared with the previous course). Comments are made on apparent weaknesses revealed by the trade test. Typical samples of these Reports are shown as Appendices.

(ii) A detailed Analysis of the written papers completed for each trade test, showing the number of attempts at each question, and the average marks awarded to each question. Typical samples of these Analyses are shown as Appendices.

The following table shows the results of the examination in the four portions of the trade test. The results are given in terms of the number of attempts at each question, and the average marks awarded to each question. The results are given in terms of the number of attempts at each question, and the average marks awarded to each question. The results are given in terms of the number of attempts at each question, and the average marks awarded to each question.

FIG 10 - SCATTERGRAM MARKS GAINED BY 334 ARMEN
ON PASSING OUT OF FLIGHT MECHANIC COURSE
& SUBSEQUENT FITTER II (P) COURSE

FITTER II(E) COURSE

40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85-89 90-94

FIG. II- SCATTERGRAM RESULTS SHOWN IN FIG. I, ADJUSTED AS DETAILED IN CHAPTER C PARAGRAPH 14.

FIG.11- SCATTERGRAM-RESULTS SHOWN IN FIG.10,
ADJUSTED AS DETAILED IN CHAPTER 6,
PARAGRAPH 14.

CHAPTER I INFLUENCE OF CIVILIAN OCCUPATION, AND EDUCATION, ON ADVANCEMENT IN AIR FORCE

In Chapter 3 it was shown that the progress of civilian occupation and education was an important factor in the advancement of air force personnel. It was also shown that the progress of civilian occupation and education was an important factor in the advancement of air force personnel.

Another important aspect of advancement in the Air Force is, of course, promotion to the rank of commissioned officer, which is obtained by the specially selected minority, by appointment to a commission. Included with the flight mechanics and pilots were those who were examined for this step, were 347 E.C.O's. and 17 engineer officers.

NOTE:

1. Once an officer is commissioned, he is no longer referred to as a Pilot II(2), but there are officers who have formerly been Pilots II(2) and are therefore included for the present purpose.
2. A flight mechanic cannot advance beyond Sergeant without first qualifying as a Pilot II(2). This represents one of the obvious incentives for qualifying in the more advanced trade.
3. The civilian occupations of the 324 E.C.O's. and officers was ascertained. These are shown in Table 5. It will be seen that more than half of the E.C.O's. were motor mechanics in civil life. The comparative figure (proportion of all flight mechanics who were motor mechanics in civil life) is nearly 36 per cent (see Table 1). Twenty-two per cent of the E.C.O's. came from "other skilled engineering and metal working trades", whereas the over-all proportion for this occupational group is 45 per cent. Some of the E.C.O's. were fitters and turners, or came from "other skilled manual trades" or from the civil aviation field; but the number coming from any of the other occupational groups is negligible.
4. On the other hand, reference to Table 7, and comparison with the relative details of Table 3, show that the pre-service educational standard of the individuals does not seem to have any particular influence in deciding who shall become an E.C.O. The only comparison which appears to have possible but slight significance lies in the fact that 43 per cent of all flight mechanics had no secondary education, whereas only 14 per cent of E.C.O's. were drawn from those who had no secondary education.

CHAPTER 7

INFLUENCE OF CIVILIAN OCCUPATION, AND EDUCATION, UPON ADVANCEMENT IN RANK

In Chapter 5 it was shown that the factors of civilian occupation and educational standard have an effect upon achievement as shown by examination results on passing out of flight mechanic courses, and also upon progression from flight mechanic to fitter II(E).

Another important aspect of advancement in the Air Force is, of course, promotion to the rank of non-commissioned officer, which may be followed, for the specially selected minority, by appointment to a commission. Included with the flight mechanics and fitters II(E) whose records were examined for this study, were 317 N.C.O's. and 17 engineer officers.

NOTE:

1. Once an airman is commissioned, he is no longer referred to as a fitter II(E), but these 17 officers had formerly been fitters II(E) and are therefore included for the present purpose.
2. A flight mechanic cannot advance beyond Corporal without first qualifying as a fitter II(E). This represents one of the obvious incentives for qualifying in the more advanced trade.
2. The civilian occupations of the 324 N.C.O's. and officers were ascertained. These are shown in Table 6. It will be seen that more than half of the N.C.O's. were motor mechanics in civil life. The comparative figure (proportion of all flight mechanics who were motor mechanics in civil life) is nearly 36 per cent (see Table 1). Twenty-two per cent of the N.C.O's. came from "other skilled engineering and metal working trades", whereas the over-all proportion for this occupational group is 15 per cent. Some of the N.C.O's. were fitters and turners, or came from "other skilled manual trades" or from the civil aviation field; but the number coming from any of the other occupational groups is negligible.
3. On the other hand, reference to Table 7, and comparison with the relative details of Table 3, show that the pre-Service educational standard of the individuals does not seem to have any particular influence in deciding who shall become an N.C.O. The only comparison which appears to have possible but slight significance lies in the fact that 19 per cent of all flight mechanic graduates had no secondary education, whereas only 14 per cent of N.C.O's. were drawn from those who had no secondary education.

4. As in most military units, the non-commissioned officer is a key man in the R.N.Z.A.F. ground staff system. He cannot seek N.C.O. rank by examination, but is selected and appointed on a basis of ability plus considerations of seniority. He must be of LAC status before he can be promoted to the lowest rank, that of Corporal. He is usually selected for his powers of leadership and administration as well as for his trade knowledge. It would appear that a definite advantage lies with motor mechanics in this respect. Not only does their pre-service occupational experience give them added trade knowledge (which as we have seen is reflected in their ability to register good results on being trade tested after Air Force training), but it is possible that it gives to many of them a confidence which has its outcome in an ability to assume command over those whose civilian experience was outside of the mechanical field. In any case it is considered that the facts shown afford further justification for the selection of motor mechanics to undergo training for the Air Force "fitting" trades.

Other Trades							
General Trades	10	4	1	1	17		33
Special Trades							
General Trades	2	1			3		4
Special Trades							
Engineering	2	1			3		4
Other Trades	1	1			2		4
Chemical Trades							
Electrical Trades							
Mechanical Trades							
Other Trades							
Professional							
Other							
Unemployed							
Unemployed Air Force & Ground Staff							
Unemployed (Civilian)							
Unemployed (Aviation)	7	9	1	2	19		38
	101	53	12	13	17	34	210

TABLE 6

**CIVILIAN OCCUPATION OF FITTERS II(E)
REACHING N.C.O. (AND COMMISSIONED) RANK**

Civilian Occupation	Cpl	Sgt	F/S	W/O	Eng. Officer	Total	Percentage of total represented by each occupational group.
M. Mechanics	103	31	23	4	6	167	51.5
Fitters & Turners	13	7	3	4	1	28	8.7
Other Skilled Eng. & Metal Working trades	39	12	14	2	6	73	22.6
Other Skilled Manual Trades	10	4	2	1		17	5.3
Semi-skilled Manual Trades	3	1				4	1.2
Farming	3		2			5	1.5
Shop Assistants	1	4				5	1.5
Clerical Wkrs.		1	1	2		4	1.2
Drivers	1						.3
Students							-
Labourers	1					1	.3
Professional etc.							-
Permanent Air Force & Ground Staff Aero Clubs (Civil Aviation)	7	5	1	2	4	19	5.9
	181	65	46	15	17	324	100%

TABLE 7

**EDUCATIONAL STANDARD OF FITTERS II(E)
REACHING N.C.O. RANK**

{Note: Two years Night School taken as equal to
one year Day Secondary.}

	Cpl.	Sgt.	F/S	W/O	Totals	Percentage of total represented by each educational class
No Sec.	23	9	7	3	42	14.5
1 yr. Sec.	22	7	5	2	36	12.4
2 yrs. Sec.	46	6	11	1	64	22.1
3 " "	52	18	11	3	84	29
4 " "	19	9	6	3	37	12.7
5 " "	8	5	3		16	5.5
Univ. or Equiv.	4	5	2		11	3.8
	174	59	45	12	290	100%

CHAPTER 8

INFLUENCE OF TRADE TRAINING UPON OCCUPATION AFTER DISCHARGE

The writer was of the opinion that the training and experience gained in the Air Force would possibly influence numbers of men towards adopting a post-war occupation differing from their pre-service occupation. It was considered possible, for example, that men who previously had been employed as drivers, storemen, and in other relatively unskilled vocations, having become proficient as flight mechanics and aircraft engine fitters, might seek retention on aircraft duties in the field of civil aviation or in the permanent Air Force, or might seek employment as motor mechanics in the allied field of the motor industry. In addition, a proportion of the men who were skilled motor mechanics in pre-service life might similarly desire to continue their work on aircraft engines rather than return to the automobile industry. This possibility would seem to be indicated with particular force when it is recalled that enlistment in the Air Force was voluntary, and that entry into particular Air Force trades largely depended upon the choice of the recruit; and it is probable that the majority of men would elect an Air Force trade in which they had a more or less keen interest - an interest which one might reasonably suppose likely to be later carried over into civilian life.

2. Granted that there could be held to be some grounds for the belief that Air Force training might have an effect upon choice of post-war employment, it was realised that there are difficulties in securing any objective evidence upon the matter. One obvious enquiry which could be made about demobilised personnel was, "At what are they now employed?". An answer to this question was not readily available. Air Department maintains the addresses of demobilised personnel, but does not record their present employment (there is a record of course of the pre-war occupation).

3. It was decided therefore to enquire, by means of a brief questionnaire, the present employment of 250 flight mechanics and fitters two (engine), selected at random from the lists of demobilised personnel. A copy of the questionnaire is shown as Appendix XXIII. In sending the questionnaire, the primary purpose was to seek an objective reply to the enquiry as to the nature of the present employment; but opportunity was taken also to ask three questions relating to apprenticeships, as well as two questions of a subjective nature (questions Nos. 10 and 11). Question No. 10 "If you intend later to change your occupation, what would you change to?" was included since

it was recognised that the choice of occupation immediately following demobilisation was not always free, but that in some cases there had been direction by the National Service Department to employment which was not identical with the individual's preferred permanent occupation. Question No. 11 (regarding help gained towards future occupation) was inserted largely to satisfy the writer's curiosity as to the attitude which would be expressed by the individuals who might answer it. It was recognised that answers to such a question would be coloured by many varying factors, but it was considered of interest to ascertain whether there was any consensus of opinion held by the personnel themselves that might agree with the view maintained (with reserve) by the writer, that the training given in the Air Force must surely make some contribution towards the general equipment of the individuals for their post-war employment.

4. The questionnaire was worded as carefully as possible in order to encourage replies. The covering letter was phrased in an unofficial way and sent from a private address. First-class postage was paid, and a stamped envelope enclosed. 250 questionnaires were despatched, and 91 replies received. This was considered quite a satisfactory return, and somewhat above the usual percentage of replies to questionnaires. An analysis of the completed questionnaires received is as follows:-

Answers to questions 2, 3, and 9:-

No. who have returned to substantially their pre-service occupation	77
No. still awaiting employment	2
No. who have changed their occupation, but apparently not as result of R.N.Z.A.F. training	8

Former Occupation

Present Occupation

Motor engineer (4 years)	Insurance Agent
Truck Driver (6 years)	Dairy farmer
Poultry farmer (11 years)	Sexton
General engineer (6 years)	Storekeeper
Shop assistant (2 years)	Cheesemaker
Motor mechanic (6 years)	Cabinet maker
Teacher (1 year)	Farmer
Storeman (7 years)	Crane driver

No. who have changed their occupation showing obvious effect of R.N.Z.A.F. training	4
--	---

<u>Former Occupation</u>	<u>Present Occupation</u>
Motor mechanic (4 years)	Aircraft engine fitter (Civil Aviation)
Student (5 years)	Motor mechanic
Motor engineer (19 years)	Aircraft engineer (Civil Aviation)
Fitter and Welder (9 years)	Aircraft engineer (Civil Aviation)
	<hr/>
	TOTAL 91
	<hr/>

(NOTE: Answers to questions 4, 5 and 6, regarding apprenticeships, were referred to in Chapter 2. Answers to questions 10 and 11 are dealt with hereunder, in paragraph Questions 7 and 8 requested trade details only).

5. In addition to sending out a questionnaire, the writer interviewed 50 other flight mechanics and fitters II(E) at the time of their demobilisation. With four exceptions, all of these intended to return to their pre-war occupations. Of the four exceptions, one, a fitter and turner, had decided to enter Civil Aviation as an engine fitter; a bus driver intended to become a bus mechanic; a clerk intended to be a school teacher; and a manufacturing jeweller was still quite undecided. The first two of these instances were strongly influenced by their Air Force experience.

6. Taking together the 91 completed questionnaires and the 50 interview records, it is seen that of 141 samples considered, in 6 cases changes of occupation are indicated which prima facie can fairly be attributed to the influence of the trade training given in the Air Force. The number examined, 141, is of course only a very small proportion of the total (in excess of 2,000) who were trained as flight mechanics. However, it is submitted that the tendency noted can be regarded as a positive, though slight, indication in favour of the proposition referred to in the opening sentence of this chapter, particularly when considered in conjunction with the replies to question 10 (set out in next paragraph).

7. Question 10 "If you intend later to change your occupation, what would you change to?" was answered in 44 cases. This was regarded as a surprisingly high proportion of the 91 returns received. Some of the individuals doubtless were employed (by Manpower Direction) on work distasteful to them; on the other hand, as shown in paragraph 4 above, 85 per cent of the 91 who replied were engaged upon work substantially equivalent to their pre-service occupation. Indications as to choice of

future occupation showed the influence of Air Force training in 9 cases out of the 44, as shown hereunder:-

- (i) Intended changes in occupation, showing influence of Air Force training 10

<u>Present Occupation</u>	<u>Pre-service Experience</u>	<u>Intended Occupation</u>
Dairy Farmer	-	Fitter and Turner
Upholsterer	4 years	Aero engineer, Civil Aviation
Motor mechanic	3 "	do do
Clerk	5 "	do do
Fitter & Turner	11 "	do do
Motor engineer	16 "	do do
Clergyman	6 "	Mechanic
Driver	1 "	Mechanic
Driver	9 "	Motor mechanic
Farmer	14 "	Motor engineer

- (ii) Intended changes in occupation, apparently not influenced by Air Force training / . . . 27

<u>Examples: Present Occupation</u>	<u>Pre-service Experience</u>	<u>Intended Occupation</u>
Driver	3 years	Farming
Motor mechanic	18 "	Farming
Farming	1 "	Navy
Motor mechanic	6 "	Plastics manufacture

- (iii) Intended changes in occupation, but undecided or indefinite 7

8. Further information on the intentions of airmen of the fitting trades with regard to post-war employment is given in figures made available by the Director of Manning in July, 1945, from records of airmen who had completed an official return showing that they did not desire immediate demobilisation at the cessation of hostilities. It is seen that the following preferences were stated:-

	<u>A Volunteering to join Permanent Air Force</u>	<u>B Desirous of employment in Civil Aviation</u>
Flight Mechanics	44	89
Fitters II(E)	40	87

Many individuals are included under "B" as well as "A". It is possible that more interest in joining the permanent Air Force might have been shown if Air Department had been

able to announce the conditions which would apply regarding rates of pay, term of service, provision of married quarters, and similar matters. At the time of writing, such an announcement had not yet been made.

9. In answer to the questions (No.11.) "Do you feel that your Air Force Training has helped to improve your knowledge and ability in your present or future occupation?" (underline the appropriate reply) the following answers were received:-

A large amount	21
To a fair extent	34
To a small extent	24
Not at all	8

There is no reason to suppose that the writers would state anything other than their actual attitude on the matter at the time of writing. It is indicated therefore that a substantial proportion of the men trained as fitters feel that they have gained at least a little further qualification towards their civil employment, as a result of their Air Force Trade training. It would be difficult to attempt to reach a conclusion along lines more definite than this, since such a question does not lend itself to an objective or standardised reply.

10. A great deal of interest attached however to the unsolicited comments which accompanied some of the completed questionnaires. Each comment reveals an individual outlook only, of course, and may be coloured by various circumstances not stated; but insofar as they represent expressions of opinion from the individuals who were trained as Flight mechanics and Fitters II(E), it is probably not without value to record some of the comments hereunder.

(i) Pre-service occupation: Driving Instructor, Car Sales

"On my discharge, hearing (a Government Department) required a mechanic, I applied. The foreman was very enthusiastic, especially as I was recommended by one of his own mechanics, until I mentioned Air Force training, and that I had not served my time as a Motor mechanic." (He was not engaged). "This is rather unsatisfactory especially when one realises that the average apprentice spends the first two years sweeping shop and doing messages."

(ii) Pre-service occupation: Motor mechanic (10 years).

"(The Air Force) calls for more gear and slower work, but a better job."

- (iii) Pre-Service occupation: farming (6 years).
(Now farming again).

"With the present day farm mechanised to such a large extent, handiness with tools and a knowledge of motors is a decided advantage. Also with the time, money and weather involved, the need for a well equipped home workshop is greater than before; in this respect Air Force training is a great help."

- (iv) Pre-Service occupation: Motor engineer (5 years).
(Intends to study for Ministry).

"My greatest gain has been theoretical (i.e. the understanding of principles behind mechanisms and their operation) and increase in method or organisation rather than in actual knowledge of the job and ability to carry it out."

- (v) Pre-Service occupation: Sheep farm manager.
(17 years).

"The training I received will greatly assist me in the mechanical side of farming."

- (vi) Pre-Service occupation: Motor mechanic (3 years).
(P.Sgt. in R.N.Z.A.F.).

"I consider that the later entrants into the R.N.Z.A.F. who had served no time at the trade, and whose ability was based on the Technical Training School instruction, were definitely not up to standard."

- (vii) Pre-Service occupation: Telegraph linesman.
(15 years).

"It was a great educational refresher course which in all probability would not otherwise have been undertaken."

- (viii) Pre-Service occupation: Apprentice Motor engineer.
(4 years).

"distinct disadvantage specialising in Air Force tends to undo all other training tradesmen become very slow in Air Force owing to the responsibilities they carry my service was counted towards apprenticeship (unfortunately); I received "A" Grade (motor mechanic's Certificate) which I should never have done as I lacked experience A motor mechanic would make a really good Aero engine fitter but the reverse is not applicable, and the motor trade are well awake to this."

- (ix) Pre-Service occupation: Motor mechanic (18 years).

"To a person knowing nothing of motor engineering these courses are most valuable, but to a mechanic little is gained."

- (x) Pre-Service Occupation: Farming (10 years).

"..... habits of careful and accurate work remain

with one after demobilisation and I find myself taking a lot more pains, and making a much better job of the various mechanical and carpentering jobs that keep arising on the farm.

11. On the whole these comments indicate that the men reporting are of the opinion that their Air Force experience has been of value to them. Men interviewed expressed similar views, usually stressing more particularly the theoretical knowledge gained, which they were practically unanimous in affirming as superior to the technical (usually night school) education acquired by apprentices. These comments are from a few men only, in one pair of allied trades; it would be of interest to examine the attitude of men trained in other Air Force trades, but this is not possible in a brief study of the present kind. One thinks, for example, of the 900 men usually selected as being of superior educational standard but frequently with no previous radio training beyond an amateur interest, who were given instruction in all phases of radio theory and practice, and became wireless mechanics. With the increase in the use of radio which would seem possible in the post-war years, it is likely that a large proportion of these ultimately may be employed in the radio industry. Even if such a development should never eventuate, it would seem that these men have received an addition to their general education which would have its outcome in an increased interest in amateur Wireless, radio club activity, facility to repair and maintain their own and neighbours broadcast receivers, ability to instruct their friends or their children on radio matters, and in various similar aspects. Similarly one is reminded of the 430 men who qualified as cooks. Cooking is possibly one of the most useful skills which one can acquire, and a valuable asset to any man, even if his knowledge is used only occasionally to meet home emergencies. Of course a proportion of the men who underwent the Air Force cooking course (to gain experience of Air Force methods, dietary, dehydrated foods, open air cooking etc.) were previously employed as cooks in civil life; on the other hand a large number had no such back-ground, but were selected (many of them by the writer) on the basis of their interest in cooking after they had been employed in Service messes as kitchen-hands and as waiters. Other trades in which the training given is likely to have later outcome either in vocation or recreation are many; they include such widely differing functions as motor-boat crew, meteorologist, physical training instructor, photographer, teleprinter operator, shorthand typist, medical orderly and motor mechanic (for vehicles).

12. To revert to consideration of the trades which are under particular study (flight mechanic and fitter II(E)), it is obvious that there will be greater residuary benefit felt, to the community and to the individuals, as a result of their training, if and when Air Services within and from New Zealand should expand. As seen at present, it would seem

that Air Force training has influenced a small proportion towards changing their occupation, and in any case is regarded by most of the individuals as having made a contribution to their education; a contribution which, as is to be expected, consists largely of an addition to the theoretical knowledge of men who previously were motor mechanics, and an addition to the practical ability of men who previously were not motor mechanics.

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APPENDIX ITABLE OF R.N.Z.A.F. TRADES

(x indicates trades in which courses of training were given).

GROUP I

- X Airfield Controller
- Blacksmith and Welder
- Carpenter
- X Coppersmith and Metal Worker
- Diesel Mechanic
- Draughtsman (Mechanical)
- Draughtsman (Works)
- X Electrician
- X Fitter Armourer
- X Fitter II (Airframe)
- X Fitter II (Engine)
- Fitter General
- X Fitter (Internal Combustion)
- Fitter (Works)
- Foreman (Works)
- Instrumentman
- X Instrument Repairer
- X Link Trainer Instructor
- X Machine Tool Setter and Operator
- X Radar Mechanic (Air)
- X Radar Mechanic (Ground)
- X Wireless Mechanic

GROUP II

- X Armourer
- Bandsman
- Blacksmith
- Carpenter (Works)
- X D/F Operator
- Electrician (Station)
- X Firecrew
- X Flight Mechanic
- X Flight Rigger
- X Instrument Mechanic
- X Mechanic (Internal Combustion)
- X Mechanic (Mechanical Transport)
- X Meteorologist
- X Photographer
- Plumber
- X Radar Operator
- X Safety Equipment Worker
- Telegraphist
- X Telephone Mechanic
- X Teleprinter Operator
- Welder
- X Wireless Operator

GROUP III

- Barrack Warden
 - Boiler Attendant
 - Bushman
 - Butcher
 - Chainman
 - X Clerk Cypher
 - Clerk Medical
 - X Clerk Shorthand-Typist
 - X Clerk Signals
 - X Clerk Special Duties
 - X Cook
 - Drainlayer
 - X Fabric Worker
 - Groundsman
 - X Hygiene and Sanitation Orderly
 - X Medical Orderly (General Duties)
 - Medical Orderly, Special Duties
 - X Motor Boat Crew
 - Painter
 - Plant Operator
 - X Radio Telephone Operator
 - Shoemaker
 - Tailor
 - X Telephone Operator
-

GROUP IV

- X Clerk General Duties
 - X Clerk Pay Accounting
 - X Clerk Stores Accounting
 - X Equipment Assistant
 - X Equipment Assistant (Petrol)
-

GROUP V

- Aircraft-hand
- Aircraft-hand (Aircrew Training)
- Aircraft-hand (Canteen)
- Aircraft-hand (General Duties)
- Aircraft-hand (Mess)
- Aircraft-hand (Patrolman)
- Aircraft-hand (Works)
- Disciplinarian
- Driver Petrol
- Instructor
- This trade may be annotated as follows:-
 - (Aircraft Recognition) (Air Training Corps)
 - X (Drill & Weapon Training) X (Gas)
 - X (Physical Education & Recreational Training)
 - (Signals) (Skeet Shooting)
 - (Technical)
- X Safety Equipment Assistant

GROUP V (Contd.)

- X Towed Target Packer and Operator
YMCA

WAAF TRADES

- A.M.L. Instructor
X Cook
X Clerk General Duties
X Clerk Librarian
X Clerk Pay Accounting
X Clerk Stores Accounting
X Clerk Shorthand-Typiste
Clerk Special Duties
X Clerk Signals
X Clerk Medical
X Dental Clerk Orderly
X Dental Mechanic
Driver Petrol
X Equipment Assistant
Fabric Worker
X Instrument Repairer
X Link Trainer Mechanic
X Medical Orderly (General Duties)
Medical Orderly, Special Duties
X Meteorologist
X Motor Boat Crew
X Photographer
X Radar Operator
X Radio Telephone Operator
X Safety Equipment Worker
X Safety Equipment Assistant
Tailoress
Telegraphist
X Telephone Operator
Tracer
X Wireless Operator
Aircraft-hand
Aircraft-hand (Canteen)
Aircraft-hand (General Duties)
Aircraft-hand (Mess)
X Aircraft-hand (Physical Education and Recreational Training)
Aircraft-hand (Shoe Fitter)
YMCA

Sp. II.

Sp. III.

Sp. IV.

Sp. V.

Warrant Officer

W.O.

1st yr.

II.

2nd yr.

I.

3rd yr.

4th yr.

274

282

313

282

310

338

310

329

356

APPENDIX IISCALE OF RATES OF PAY

(as from 1.11.1942)

Air Force Rank	Equiv. Army Rank	Single	Married		
			No Child.	1 Child.	2 Child.
AIRMEN					
Aircraftman		£	£	£	£
2nd Class 1st yr.	Private	137	201	219	246
Gps. I-V.					
Aircraftman					
2nd Class 2nd yr.	"	141	201	219	246
Gps. II, III, V.	"	145	201	219	246
Gps. I, IV.					
Aircraftman					
1st Class					
Gp. I.	"	175	201	219	246
Gp. II.	"	170			
Gp. III.	"	165			
Gp. IV.	"	175			
Gp. V.	"	145			
Leading Aircraftman	Lance Cpl.				
Gp. I.		225	210	228	256
Gp. II.		220			
Gp. III.		215			
Gp. IV.		225			
Gp. V.		175			
Corporal	Cpl.				
Gp. I.		240	228	246	274
Gp. II.		236			
Gp. III.		230			
Gp. IV.		240			
Gp. V.		200			
Sergeant	Sgt.				
Gp. I.		260	246	265	292
Gp. II.		255			
Gp. III.		250			
Gp. IV.		260			
Gp. V.		220			
Flight Sergeant	Staff Sgt.				
Gp. I.		270	274	292	319
Gp. II.		265			
Gp. III.		260			
Gp. IV.		270			
Gp. V.		235			
Warrant Officer	W.O.				
1st yr.	II.	285	292	310	338
2nd yr.	I.	295			
3rd yr.		305			
4th yr.		315			

Plus £26 per annum for each additional child.

Plus £26 per annum for each additional child.

APPENDIX III

TABLE SHOWING THE NUMBER OF PERSONNEL EMPLOYED
IN THE FITTING TRADES, AT SIX-MONTHLY INTERVALS
FROM AUGUST 1939 to JULY 1945

	Trained Flight Mechanics	Trained Fitters II(E)
August, 1939	56	36
February, 1940	372	65
August, 1940	342	65
February, 1941	596	114
August, 1941	784	145
February, 1942	770	309
August, 1942	899	424
February, 1943	894	611
August, 1943	954	729
February, 1944	1183	897
August, 1944	1168	876
February, 1945	1016	952
July, 1945	1022	939

1 - Selected by Training Officer, Department of
Aeronautics for Technical Training.

2 - Selected as "Apprentice".

3 - Interview by Recruiting Officer and Office of
Personnel at Air Force Base. Classes of selection
specifically are:
CIVILIAN CREW

APPENDIX IV - COMPARISON OF PERSONNEL EMPLOYED IN
FLIGHT MECHANICS AND FITTERS II(E) - 1939-1945
(1945 TRAINING)

MONTHS

After minimum total service of say 60 months, senior NCO's. may be selected to become Engineer Officers.

DUTY AS FITTER II(E).

LAC Fitters II(E) may advance in rank as far as Warrant Officer, by recommendation of C.O., and according to seniority.

AC2s and AC1s may advance to LAC by Trade Test. LACs and higher may qualify as Flight Engineers (rank of SGT) thus entering Air Crew.

25 - Trade Test; passing out as Fitter II(E) or remaining Flight Mechanic, according to Trade Test.

24 - TECHNICAL TRAINING SCHOOL.

22 - Entry to Fitter II(E) "Conversion" Course.

DUTY AS A FLIGHT MECHANIC.

- During this period AC2s and AC1s may advance to LAC by Trade Test.

16 - LACs may advance to CPL. No further promotion possible to F/Mechs. excepting as F/Mech-Air Gunners.

14 - After duty approx. 8 to 14 months, F/Mechs. (AC1 or higher) are selected (from Air Department records) for entry to Fitter II(E) course.

12 - A small proportion of LAC F/Mechs. may take an Air Gunner's Course and qualify as F/Mech-Air Gunners (rank of SGT) thus entering Air Crew.

10 -

9 - Trade Test; passing out as "Flight Mechanic" (AC2, AC1 or LAC according to Trade Test).

8 - TECHNICAL TRAINING SCHOOL.

6 -

Selection at E.B.S.; remustering to "Flight Mechanic Under Training".

4 -

ELEMENTARY BASIC SCHOOL.

2 - Selection by Manning Guidance Officer; remustering to "Aircrafthand for Technical Training".

GROUND TRAINING DEPOT.

0 - Enlistment as "Aircrafthand".

- Interview by Recruiting Officer and advice of acceptance as Aircrafthand. Element of selection practically nil.

CIVILIAN OCCUPATION.

APPENDIX IV - Scheme of Selection, Training, and Advancement; Flight Mechanics and Fitters II(E) - 1945.
(READ UPWARDS)

APPENDIX VTABLE SHOWING TOTAL TRADE TESTS COMPLETED -
SEPT. 1939 to SEPT. 1945

(SUMMARISED)

(NOTE: This table is maintained by the Central Trade Test Board, and records in detail the number of trade tests conducted in each trade on passing out of courses, and also at the Routine Trade Tests conducted twice yearly for advancement of personnel already qualified as AC2 or AC1. The complete table is too voluminous to reproduce here, but the more important features are summarised).

	Passing-out Trade Tests	Passing-out Trade Tests, F/Mechs. (included in A)	Passing-out Trade Tests, F.I.Es. (included in A)	D Routine Trade Tests	E Routine Trade Tests, F/Mechs. (included in B)	F Routine Trade Tests, F.I.Es. (included in D)	Total Trade Tests (Cols. A & D)
1939 (includes small total from 1938)				617	110		617
Jan-Oct. 1940	2192	380	58	831	241	21	3023
to Oct. 1941	2754	693	158	2420	721	80	5173
to Oct. 1942	3462	399	415	2742	498	223	6204
to Oct. 1943	5006	479	334	5233	316	266	10239
to Oct. 1944	5292	585	367	6119	774	82	11411
to 30 Sept. 1945	2761	212	216	2080	304	34	4841
TOTALS:	21466	2748	1548	20042	2964	706	41508

APPENDIX VI
SYLLABUS OF TRAINING

FLIGHT MECHANIC

Duration of Course	- 18 weeks.
Technical Instruction	- 17 weeks.
Trade Test Board & Disposal	- 1 week.

I TITLE	Syllabus of Training for Flight Mechanics.
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II AIM OF COURSE	To train airmen for the Maintenance, Inspection, starting, running-up and testing of all types of power plant installed in aircraft in the R.N.Z.A.F.
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III DURATION OF COURSE	18 weeks.
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IV EXAMINATION AND TESTS	Progress examination as necessary. C.T.T.B. Passing out examination.
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V SOURCE AND CLASSIFICATION	Selected airmen of the trade of ACH/Tech selected after training in E.B.S. classification AC2.
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FLIGHT MECHANIC

SUMMARISED SYLLABUS

PHASE	DETAIL	DURATION
A	Basic fitting.	3 weeks.
B	Preliminary engines and magnetos.	3 weeks.
C	Air Cooled engines.	2 weeks.
D	Carburettors.	2 weeks.
E	Components.	2 weeks.
F	In-line liquid cooled engines (Allison)	1 week.
G	Installation.	1 week.
H	Maintenance and General.	2 weeks.
I	Physical Education and Recreational training.	
J	Revision. Central Trade Test Board and Disposal.	2 weeks.

FLIGHT MECHANICDETAILED SYLLABUS

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
A1	<p><u>PHASE A - BASIC FITTING:</u></p> <p>Care and maintenance of tools. Simple marking out - Drills and drilling cutting angles - Screw threads, use of taps and dies - Fitting and removing studs. Identification of A.G.S. and A.N. parts. Locking devices - Metal joints - Identification of metals - Detection, prevention and treatment of corrosion. Use of Micrometer, and Vernier gauge. Practical Trade Test exercise.</p>	3 weeks.
B1	<p><u>PHASE B - PRELIMINARY ENGINES:</u></p> <p>Classification of engines. Theory of Internal combustion engine. Four stroke cycle. Valve lead, lag and overlap - Definition of terms.</p>	
B2	Dismantling Gipsy Major Engine. Cleaning, checks, precautions.	
B3	Theory and practical valve timing. Assembly of engine with checks and precautions - lubrication system. Filters. Oil pumps.	
B4	Electricity and magnetism - Elementary magneto. Explanation of simple induction - Electro magnetism and Electro magnetic Induction - Construction of Rotating armature Magneto. Operation. Condenser, Contact breaker. Safety Gap. Switches. Impulse starter. Simms coupling. Timing. Synchronisation - Construction of Rotating Magnet magneto. Operation. Adjustments to Contact Breaker points. Booster coil operation. Why fitted. Dual control wiring. Testing of circuit.	
B5	Fuels: Octane rating and how obtained. Effect of Tetra Ethyl head. Identification of fuels. Refuelling precautions.	

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
B6	Running Gipsy Major Engine. Checking and testing. Running faults. Starting. Hand swinging. Cockpit drill and starting procedure.	3 weeks.
C1	<p><u>PHASE C - AIR COOLED ENGINES:</u></p> <p>Explanation and leading particulars of single row Wasp Engine. Notes on dismantling with particular reference to sequence, tools and general precautions. Master rod Angularity - Construction of crankcase, Main bearings, Crankshaft. Assembly of Master and Articulated rods. Dampening weights. Description of front cover, supercharger casing and rear cover.</p>	
C2	Practical Dismantling of Engine. Precautions. Method - Explanation of Ancillary drives - Lubrication system - Path of oil to V.P. Governor - Description of pressure pump, scavenge pump and scavenge system.	
C3	Reasons for supercharging. Description of types - Construction of Wasp Supercharger. Description of drive.	
C4	Tappet operation - General construction - Cam drum theory - Reason for uneven number of cylinders - Piston position.	
C5	Reduction gear operation - Reasons for fitting - Different types of reduction gears.	
C6	Construction of Wasp cylinder and pistons, Valves and springs. Gudgeon Pins. Viewing, checks. Fitting of rings - Valve and Valve seat reconditioning. Replacement, checks, maintenance.	
C7	Assembly of Engine. Valve Timing. Tappet adjusting. Magneto timing and synchronising. Fitting lock nuts. Use of lock wire. Checks. Inspections.	2 weeks

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
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PHASE D - CARBURETTORS:

- D1 Carburettor principles. Properties of a Venturi. Operation of a simple carburettor. Compensation. Diffuser. Power jets. Pressure balance. Mixture control. Requirements of aero engine carb.
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- D2 Explanation and operation of AV-70M carburettor - Mixture control.
-
- D3 Introduction to NAY-9-H Stromberg carburettor. Float chamber design. Float level - Slow running system. Adjustment - jet system. Setting for economy. Accelerator, pump, description and operation - Mixture control - Precautions to be observed during overhaul of carburettors.
-
- D4 Stromberg Injection System. Simplified system. Action of carburettor. Action of Impact tubes. Boost venturis. Construction of throttle body. Action of chambers, construction, explanation - Construction and layout of jets and manual mixture control, clover leaf valve. Setting of slow running, R.P.M., and mixture strength.
-
- D5 Deleo Remy Induction Manifold pressure regulator. Explanation and action - Supercharging, effect of altitude - Variable Datum cam and its effect. Layout of link-work, adjustments.

2 weeks.

PHASE E - COMPONENTS:

- E1 Starters, Hand and Electric, Construction and operation. Testing. Checks when fitting to engine. Drive for feathering pump. Testing clutches and methods of adjustment.
-
- E2 Engine Instruments, Boost gauge, Oil pressure and temperature, cylinder temperature. Fuel air ratio. R.P.M. Indicator. Construction and action, Calibration of English and American Gauges.

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
E3	Theory of propellers. Aerofoil section. Angle of attack - Advantages of two-position V.P. propeller. Description and construction of Bracket type propeller. Dismantling and assembly. Basic setting. Pitch range. Repairing blades. Check for cracks. General maintenance of propellers.	
E4	Constant speed Governor. Positive coarse position. Order of Movement of control levers. Practical fitting of bracket type prop. to aircraft. Checks.)	
E5	Hydromatic propellers. Hamilton 23E50 - Explanation and Operation. Checks. Governor Control. Oil seals. Feathering and un-feathering procedure - Practical removal and fitting of propeller to aircraft. Checks. Inspections.	
E6	General construction and operation of Curtiss Electric propeller. Checks. Inspections.	
E7	Fuel pumps. Construction and Operation. Pesco fuel pump. U.A.P. Wobble pump. Checks. Inspections.	
E8	Construction and Operation of Oil coolers Serk and Harrison. V.A.P. oil regulator control. Bellows type thermostatic control valve.	2 weeks.
<u>PHASE F - IN LINE LIQUID COOLED ENGINES:</u>		
F1	General description of Allison Engine. Leading particulars. Brief description of oil system. Oil pump. Pre-oiling procedure.	
F2	Cylinder Block construction. Coolant system and coolant used. Cooling system. Sniffler valve, relief valve. Coolant pump. Leakage points. Refilling system. How to check for oil in coolant.	

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
F3	Theory of Valve timing - Practical valve timing. Mag. timing and contact breaker point setting. Distributor timing.	
F4	Running faults. Kittyhawk. Changing mags. Checks after using excessive boost. Nose over checks.	1 week.
<u>PHASE G - INSTALLATION:</u>		
G1	Precautions to be observed before removing an Engine from airframe. Checks on engine mount. Methods of locking. Inspection of lifting gear. Quick change methods. Pipe disconnection.	
G2	Control setting and checking of control rods for safety. Bonding and Testing. Fitting rubber noses. Hose clips.	
G3	Spark plugs. Brief description on the construction of spark plugs. Different procedure adopted when cleaning Mica and Ceramic spark plugs. Various cleaning devices. Tightening plugs. Pressure testing. Fitting and testing H.T. leads.	
G4	Hot priming procedure for Wasp. How to deal with Engine fires. Starting procedure. Warm up. Run up. Checks. Stopping procedure.	
G5	Adjustment of oil and fuel pressure. Setting of slow running R.P.M. Mixture strength. Setting Maximum R.P.M. screw on governors. Trouble shooting.	1 week.
<u>PHASE H - MAINTENANCE AND GENERAL:</u>		
H1	Description of RNZAF inspection system. Forms and Publications. Form 700. Its use. Periodical Inspection certificate. Maintenance. Record Cards. NCO's percentage checks. Mayfly certificate. Technical Orders. Flight Desk. Log Books.	

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
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H2	D.1 and 40 hr. inspections on engines fitted to aircraft. Refuelling operations Precautions. Starting and running-up.	
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H3	Picketing aircraft. Night flying procedure with description of flare path. Storage of Aero Engines. Action after immersion in Seawater. Signals, Taxying signals. Hand swinging, Cockpit Drill.	
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2 weeks.

PHASE I:

I	Physical Training under P.E. & R.T. Instructor.	
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PHASE J:

J	Revisions. Central Trade Test Board and Disposal.	
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2 weeks.

APPENDIX VII

SYLLABUS OF TRAINING FOR FITTERS IIE

DURATION OF COURSE	- 13 weeks.
Technical Instruction	- 12 weeks.
Central Trade Test Board	- 1 week.

I TITLE	Syllabus of Training Fitters IIE
II AIM OF COURSE	To convert Flight Mechanics to undertake the installation, maintenance, repair and testing of all types of aero-engines, used in the R.N.Z.A.F.
III DURATION OF COURSE	13 weeks.
IV EXAMINATIONS AND TESTS	Progressive examinations as required. Passing out Central Trade Test Board.
V SOURCE AND CLASSIFICATION OF TRAINEES	Flight Mechanics recommended by Station Engineer Officers and selected by Air Dept. Classification AC1, LAC or NCO's.

SUMMARISED SYLLABUSFITTERS IIE - GROUP I

PHASE	DETAIL	DURATION
A	Basic Fitting.	2 weeks
B	Overhaul of Radial engines.	2 weeks
C	Overhaul of Inline Liquid cooled engines.	2 weeks
D	Components.	2 weeks
E	Carburettors.	1 week
F	Magnetos.	1 week
G	Installation of Maintenance.	2 weeks
H	Physical Education and Recreational training.	
I	Central Trade Test Board and disposal.	1 week

01 Disassembling and cleaning of engine.
Use of MAP. 110. Viewing of parts.

02 Viewing of cylinder block. Removal and
testing of coolant jackets. Method of
checking and replacing of cylinder barrels
and valve inserts. Valve guide and spark
plug insert replacement. Inspection of
valve gear. Viewing and checking camshaft
and rocker assemblies.

2 weeks

DETAILED SYLLABUSFITTER IIE

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
A	<u>PHASE A - BASIC FITTING:</u> Description, handling and care of tools. Methods of marking out. Chipping, Filing, Sawing, Tapping, Cutting, Lubricants. Reading of working drawings and blueprints. Soldering.	2 weeks
	<u>PHASE B - OVERHAUL OF RADIAL ENGINES:</u>	
B1	General layout of American Radial Air Cooled engines and relevant publications. Stripping and cleaning of engine. Measurement of end float and back lash. Viewing of pistons and rings. Gears. Measurement of cylinders. Fitting rings, and pistons. Viewing valves and pushrods.	
B2	Removal and inspection of Reduction gear, and scavenge pumps. Oil pressure system. Removal and inspection of rear cover.	2 weeks
B3	Ignition systems. Magneto and distributor timing.	
B4	Assembly of engine. Tappet setting. Inspections.	
	<u>PHASE C - OVERHAUL OF INLINE LIQUID COOLED ENGINES:</u>	
C1	Dismantling and cleaning of engine. Use of NZAP.110. Viewing of parts.	
C2	Viewing of cylinder block. Removal and testing of coolant jackets. Method of checking and replacing of cylinder barrels and valve inserts. Valve guide and spark plug insert replacement. Inspection of valve gear. Viewing and checking camshaft and rocker assemblies.	2 weeks

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
C3	Viewing of parts in Accessory Housing. Viewing, checking and re-assembly of supercharger and hydraulic damper. Viewing and checking of oil pumps and coolant pump.	
C4	Stripping reduction gear. Precautions. Viewing and checking of parts.	
C5	Checks for wear and condition of crankshaft, pistons, and connecting rods. Assembly.	
C6	Assembly of complete engine. Checks on crankcase and method of tightening down cylinder blocks. Valve timing. Magneto and distributor timing. Hot priming.	
<u>PHASE D - COMPONENTS:</u>		
D1	Construction and theory of Pesco fuel pumps. Vacuum pump, Hydraulic Pump, Overhaul, assembly and tests.	
D2	Construction, dismantling, assembly and testing of Jack and Heintz Starters.	
D3	Harrison oil coolers. Rotary valve oil temperature regulator. Construction and operation. Cleaning, temporary and permanent repairs. Testing Radiators.	2 weeks
D4	Theory of Constant Speed Propellers. Hamilton 23E50 Hydromatic. Removal, construction, operation - checking gear pre-load. Use of gear pre-load dimensions. Re-indexing of stop rings. Hydromatic Governors. Testing for feathering, operation and pre-flight checks.	
D5	Curtiss C532D Propellers - Overhaul, Construction and operation. Dismantling. Visual inspection of parts. Minor blade repairs. Assembly and checks of Speed Reducer and Pitch change motor. Assembly	

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
	OF hub and precision checks for gear pre-load. Mechanical stop. Curtiss 10008 Governor, theory of operation. Dismantling, inspection, assembly and tests. Fitting propeller to aircraft. Fault finding.	
<hr/>		
<u>PHASE E - CARBURETTORS:</u>		
E1	Stripping of P.D. 12K6 Stromberg Injection. Carburettor into units. Viewing parts. Operation and A.B.G.P. Chambers. Mixture control. Jets and Clover Leaf valve. RPM. and slow running adjustments. Full rich and moisture bleeds. Assembly. Stripping of Sprayer nozzle, double diaphragm accelerator pump (Hudson) - Automatic mixture control. Assembly and checks. Running faults.	
E2	Explanation of Delco Remy Automatic manifold pressure control.	1 week
E3	Explanation of PT 13D6 Carb. (Corsair) - difference of pressure different types - Piston type Accelerator pump. Operation - General faults - Corsair P.W.18 Sprayer Valve. Checks.	
<hr/>		
<u>PHASE F - MAGNETOS:</u>		
F1	Scintilla S.F. 9LN-4 magneto - Contact breaker. Stripping coils, condenser - Operation of Mag. - Dismantling. Bearing construction and adjustments. Gear adjustments. Oil seals - Explanation why Mag. must not be dismantled.	
F2	Use of Jigs - Adjustments.	1 week
F3	Stripping of 9 lobe Cam, Ratchet. Reasons for E gap. Internal timing of Mag. Assembly of cams to ratchet. Adjusting, Contact Breaker - Test Bench.	
F4	Scintilla D.F.N. (Allison) - Setting points with staggered spark. Stripping coil and condenser. Test Bench.	

PHASE	WORK CARRIED OUT BY TRAINEES	DURATION
F5	Bosch Magneto (Corsair) - Dismantling - Operation - Maintenance - Adjustments, checks for oil leaks from coils. Faults and causes. Testing.	
F6	Testing H.T. Wiring - Distributor Rotors and Blocks.	
<u>PHASE G - INSTALLATION AND MAINTENANCE:</u>		
G1	Revision of 1574, F.700. Making out of new F.700 - Daily inspections - Change of serviceability - Periodical inspections - NCO's percentage checks - Maintenance, exchange of Aero Engines - Operation of Fire Extinguishers.	
G2	Installation of reconditioned engine in airframe. Fitting propeller - Pre-starting checks - Running - Testing.	
G3	Publications - Mayfly certificate - Storage of Aero-engines - Storage of Carbs. - Treatment after storage. Pre-oiling.	2 weeks
G4	Test Bench running checks and operation of Cyclone Engine. Starting and running checks on Ventura, Corsair and Hudson aircraft.	
G5	Cleaning of spark plugs - Construction and points on Ignition Harness.	
G6	80-hour Inspections on Corsair and Ventura.	
<u>PHASE H</u>		
H	Physical Education and Recreational Training.	
<u>PHASE I</u>		
I	Central Trade Test Board and disposal.	1 week

APPENDIX VIII

AEROPLANE MAINTENANCE FORM

(For convenience in binding, Appendix VIII is placed at the rear of the volume).

APPENDIX 1XFLIGHT MECHANIC - GROUP 11

1. Nature of Duties. 2. Nature of Trade Examination.
(Air Publication 1112 NZ).

1. Flight Mechanics are required for the maintenance, inspection, starting, running up and testing of all types of power plant installed in aircraft. They require an elementary knowledge of repair by replacement.

2. Tests are as follows:-

PART 1 - SIMPLE FILING.

PART 11 - BASIC KNOWLEDGE. - Care and maintenance of tools. Simple marking out. Drills and drilling, cutting angles, etc. Screw threads use of taps and dies. Fitting and removing studs. Methods used by R.A.F. for marking nuts and bolts. Identification of A.G.S. and A.N. parts. Locking devices. Metal joints. Identification of metals. Detection, prevention and treatment of corrosion. Soft soldering.

PART 111 - AERO ENGINE KNOWLEDGE - Dismantling and assembly of engines in so far as it affects repair by replacement. Principles of operation of an internal combustion engine. Broad principles of supercharging. Function of a carburettor and principles of operation. Maintenance of ignition, fuel and lubricating systems. Starting devices. Starting and running engines in aircraft with particular knowledge of R.N.Z.A.F. regulations relating thereto. Precautions against damage to engines and airframe by climatic conditions. Maintenance of V.P. airscrew. Elementary knowledge of engine installation. Care and maintenance of magnetos. Diagnosing running faults and testing engines in aircraft. Thorough knowledge of use of R.N.Z.A.F. aircraft maintenance schedules and records. Handling of aircraft. Picketing out, Knowledge of dismantling, cleaning and overhaul of all types of sparking plugs.

NOTE: A Flight Mechanic passing out from the Technical Training School will be allotted marks from the following table:-

Part 1	(a) Written (one three-hour paper)	100 Marks.
	(b) Practical	50 Marks.
Part 11	Basic Oral Test	50 Marks.
Part 111	Trade Oral	300 Marks.

1. Nature of Duties. 2. Nature of Trade Examination.
(Air Publication 1112 NZ)

2. Tests are as follows:-

PART 11 - MANUAL - This will be a precision filing test done from a drawing, and finished sizes will be within the limits specified on the drawings. Examples are:- Make and fit a male and female hexagon or dovetail in a given time. Make and fit a cube, etc.

PART IV - AERO ENGINE KNOWLEDGE - Principles of operation of an internal combustion engine. Principles of supercharging. Functions of a carburettor and principles of operation. Maintenance of ignition, fuel and lubricating systems. Starting devices. Starting and running engines in aircraft with particular knowledge of R.N.Z.A.F. regulations relating thereto. Precautions against damage to engines and airframes by climatic conditions. Engine installation. Diagnosing running faults and testing engines in aircraft. Dismantle, overhaul and erect complete aero-engines and their components, correctly using any special jigs and tools. Calibration of carburettors. Fuel and oil consumption tests. Tuning and testing engines on test bench including brake tests. Fitting of instruments. Adjustment of controls. Overhaul, repair and maintenance of hydraulic systems in aircraft from the engine to the main pressure gauge inclusive. Overhaul, operation and maintenance of V.P. airscrews. Minor magneto adjustments. Knowledge of fuels and lubricants. Maintenance schedules and records.

3. Allocation of marks will be as follows:-

[illegible]

APPENDIX XI(a) - EXAMINATION PAPER

FLIGHT MECHANICS - COURSE 30

Note: Ten questions only to be attempted.
 Ten marks allotted to each question.
 Examination papers must be returned
 with answer books.
 TIME ALLOWED 3 HOURS.

1. Explain the effect on the A.M.C. and the mixture strength when the pilots mixture control lever is moved:-
 - (a) From normal to lean.
 - (b) From normal to take off. (70 M Carburettor).
2. (a) A magneto is driven at $1\frac{1}{2}$ engine speed and there are 150 serrations on the automatic advance and retard coupling. By how much is the ignition timing advanced when the coupling is altered by one serration (show working).
 (b) How would an error of 9.84° early be corrected in the valve timing of a Pegasus II M 3 engine?
3. (a) Give a short description of the construction and operation of the bracket type two blade V.P. propeller.
 (b) How would you test a constant speed governor unit for constant speeding after it had been installed in the aircraft? (ground test).
4. Give a diagrammatic sketch showing the position of the pistons and valves of a 6 cylinder inverted aero engine when No. 3 inlet valve has just closed. State firing order and direction of rotation of engine chosen.
5. Describe fully the operation of reconditioning the valve seats of a Pegasus II M3 cylinder. (N.C.M. seats).
6. What effect would the following have on the performance of an engine fitted with an A.V. 70M Carburettor?

(a) Venturi too small	(b) Float level too low
(c) Fuel logged float	(d) Leaking mixture control cock.
(e) Blocked power jet.	
7. (a) What steels are used for the manufacture of the following:- Bearing scraper; gudgeon pin (case hardened); cylinder barrel (Nitrided).
 (b) What are correct tempering colours for the following:- Cold chisel (for brass); Bearing scraper; Wood chisel; Center Punch.

8. (a) Sketch an oil temperature gauge. Name the parts and fluid used.
 (b) How is the calibration of boost gauges checked?
 (c) How would you convert a Barometric reading of 28.4" Hg. to lbs per square inch?
9. (a) Sketch a wiring diagram for a P.I. Magneto?
 (b) Why are armature cores laminated?
 (c) Why is a safety spark gap fitted to some magnetos and not to others?
10. (a) Explain the purposes of the supercharger spring drive and the intermediate Gear clutches.
 (b) What types of gears are found in the Pegasus Rear Cover and what are their uses?
11. Give three reasons for each of the following engine faults:-
 (a) Excessive vibration (b) Intermittent mis-firing
 (c) Overheating (d) Low oil pressure
 (e) Boost surge.
12. (a) Tabulate the order of installation for a Pegasus engine in a Vincent airframe.
 (b) Describe the checks carried out to ensure the correct functioning of the controls.

APPENDIX XI(b) - EXAMINATION PAPER
FLIGHT MECHANIC - COURSE 44

Note: TEN questions to be attempted.
 ALL questions carry equal marks.
 Examination papers to be returned with answer books.
 TIME ALLOWED 3 HOURS.
 MARKS ALLOTTED 100

1. A piece of Steel, specific gravity 7.8 weighs 50 lbs. in air. When totally submerged in a solution it weighs 43 lbs. What is the specific gravity of the solution in which it is submerged. Temperature 60° Fah.
2. You are required to instal an Allison V1710 Engine in an Airframe. State how you would do this and explain, or sketch in detail where the sling is attached to Engine. After installation state how you would fill the cooling system and pre-oil engine.
3. Using sketches show how the following bolts are identified, and state whether British or American:-

(a) 2330 Nickel steel	(b) A.G.S. Mild steel
(c) 24S. Light Alloy	(d) A.G.S. B.A. sizes
(e) High tensile stainless steel (A.G.S.)	
4. You are doing check runs on a newly installed Wasp H.I. Engine. Checks reveal airscrew inoperative. List most probable causes, and how you would determine which was the cause of the trouble.
5. You are a Flight Mechanic employed on the Test Bench. What would be the indications of the following assembly or reconditioning faults:-

(a) Valve timing one (1) tooth out Wasp H.I. (Give indications both ways).
(b) Grease or insulating material left in Bronze pick-up spring in Contact Breaker Housing Wasp H.I.
(c) Regurgitation tube, blocked. Allison V1710.
(d) Supercharger vent blocked. Allison V1710.
(e) One (1) exhaust valve not seating correctly. Allison V1710.
6.

(a) What records and checks are there for main periodical inspections?
(b) You are detailed to do a 40 hour inspection on an aircraft. Give the Forms, A.P. Orders you would use and the entries you would make in Form 700 from the time you were detailed to the completion of the inspection.
7.

(a) Show with sketch how you would tighten down the Allison V1710 cylinder blocks.
(b) Detail the work necessary in replacing a Coolant Pump seal on an Allison V1710. <u>Note:</u> Pump removed from Engine.

7. (c) State the reasons for fitting Coolant sleeves round cylinder liners Allison V1710.
8. Stromberg Injection Carburettor. Give reasons for fitting the following and describe briefly how they operate.
 - (a) The Regulator fill valve.
 - (b) Double Diaphragm Accelerator pump.
 - (c) Vapour separator (double type).
 - (d) Sprayer nozzle.
 - (e) Idle Spring.
9. Harvard Aircraft.
 - (a) Does this aircraft carry a reserve supply of fuel, if so, where and how is it operated on? (Sketch not required).
 - (b) Should the fuel pressure need to be increased by 2 lbs. how is this done? Explain in detail how this adjustment will affect the resultant pressure. (Sketch not required).
10. (a) When doing a 90 hour inspection on a Harvard aircraft fitted with a Wasp H.I. Engine, it is necessary to check the compressions. How is this done? Your check reveals a weak compression on No. 5 cylinder. What further checks are necessary on this cylinder before removal?
 - (b) After replacing cylinder, how would you adjust the Tappets on this cylinder only, and what other checks would you carry out to Rocker Gear.
11. When running up an aircraft it is necessary to check "Rev-drop". Checks reveal one Mag dropping too many R.P.M. List checks you would make to remedy this fault, how you would make them and give the sequence of doing them. State aircraft and engine. Note: Pay particular attention to sequence.
12. State the position the various Engine controls in the cockpit of a Harvard Aircraft would be placed in when doing the following checks. Give reasons for each setting.
 - (a) Constant speed test.
 - (b) Maximum R.P.M.
 - (c) Compression test.
 - (d) Checking "Mag-drop".

APPENDIX XI(c) - EXAMINATION PAPER

FITTER IIE - COURSE 30

Note: Ten questions only to be answered.
 Ten marks allotted to each question.
 Examination papers must be returned
 with answer books.
 Time Allowed THREE HOURS.

1. (a) What are the effects on steel of increasing the carbon content?
 (b) Explain the sealed box method of case-hardening and state constituents of carburizing material used.
 (c) What steels are most suitable for the carburizing process?
2. (a) Tabulate the process of removing a "Curtiss Electric Airscrew" from a Kittyhawk aircraft.
 (b) Sketch and describe a Curtiss Electric Constant Speed Gov. Unit.
3. (a) How would you fit a new Economiser Needle to an NY.9 H. Carburettor during overhaul?
 (b) Describe fully the operation of the accelerator pump on the same carburettor.
4. (a) What test runs are given to a Rotary Armature type magneto when a new Armature has been fitted during overhaul?
 (b) What is a Solenoid?
 (c) What checks are made on a new Booster coil before fitting?
5. (a) Sketch and name three types of joints used in aircraft fuel lines.
 (b) What pressure is used to test fuel lines and how is it applied?
 (c) How would you test the bonding on a fuel line?
6. Describe the viewing procedure on the following parts:
 (a) Kestrel V Crankshaft (b) Supercharger Rotor.
 (c) Main Roller Bearing Pegesus
 (d) Master Rod.
7. Tabulate the valve timing and the magneto timing on a Rolls Royce Kestrel V Engine.
8. Describe the first and proof tests of any supercharged aero engine after complete overhaul. Full test equipment is available.

9. Enumerate the five unit assemblies which comprise the Stromberg Injection Carburettor and state the purpose of each assembly.
 10. Describe the overhaul and tests carried out on the following components:
 - (a) Constant Speed Gov Unit (Harvard type).
 - (b) B.T.H. Air Compressor.
 11. Describe the fitting of a new set of clutch plates and springs to an Eclipse Inertia Starter and the subsequent adjustment and testing for correct loading.
 12. An aero engine on full power test uses 50 gallons per hour of fuel of a specific gravity of .75 and a calorific value of 18700 BTUs per lb. The engine has a thermal efficiency of 30% and a mechanical efficiency of 75%.
What is - (a) The B.H.P.? (b) The T.H.P.?
- (NOTE: 1 BTU = 778 ft lbs. 1 gallon of water = 10 lbs.)

APPENDIX XI(d) - EXAMINATION PAPER

FITTER IIE - COURSE 40

Note: Ten questions only to be attempted.
 Ten marks allotted to each question.
 Time allowed THREE HOURS.

1. When checking the following parts with a micrometer they measure as indicated:-
 Valve stem) .005" oversize on $5/8$ ".
 Valve guide outside diameter) .008" oversize on $7/8$ ".
 Oil pump-shaft) .003" undersize on $5/16$ ".
 Crank shaft) .007" undersize on $2\ 3/16$ ".
 Cylinder Bore) .011 oversize on $5\ 7/16$ ".
 Give sketches showing micrometer reading in each case.
2. You have to replace a Magneto (Bosch) on a 2800 - 8W. and some person moves the motor after the old magneto has been removed.
 Give the correct timing and checking for the magneto.
3. (a) Give in complete detail the viewing of a ball race.
 (b) With the aid of a sketch show what you consider would be a reasonable bearing area on the teeth of a spur gear:
 1. Correctly engaged.
 2. Not sufficiently engaged.
 3. Too deeply engaged.
4. (a) You are working on a P. & W. 2800 - 8W, and have to carry out the following work:-
 - (a) Remove a master rod cylinder.
 - (b) Fit push rods and covers.
 Detail the precautions taken when carrying out these jobs.
 (b) Are the cylinders of the P. & W. 2800 - 8W interchangeable? If not what are the major differences?
5. (a) You are viewing an Allison crank-shaft. How would you check the following:-
 - (a) 120° relation of throws.
 - (b) Run out.
 (b) Detail the black in (blueing) of a new set of bearings to a crankcase.
6. An engine equipped with a Stromberg Injection carb. develops the following troubles:-
 - (a) Motor is being flooded or overprimed by carb.
 - (b) Motor fires on priming charge but will not pick up.
 - (c) Motor continues to fire in "idle cut off".

What would be the cause of these defects?
State your remedy in each case.

7. What effect will the following faults have upon the operation of a Hamilton 23E50 Hydromatic Propellor:-
 - (a) Dome pressure relief valve stuck in the open position.
 - (b) Short circuit in pressure cut-out switch causing switch to remain inoperative.
 - (c) Small particle of carbon causing delay in action of oil transfer valve.
 8. During the assembly of a Curtiss Propellor how are the following checked and adjusted:-
 1. Pitch change motor brake clearance.
 2. Oil level in speed reducer.
 3. Slip ring concentricity.
 4. Blade torque loading.
 5. Gear preload.
 9. The following symptoms develop on a Corsair Aircraft during a run up. What are the possible causes and what checks would you carry out to determine same? (Tabulate)
 1. Oil temp. above normal.
 2. Oil pressure drops below normal.
 3. Motor rolling badly at 600 R.P.M.
 4. Take off R.P.M. too high.
 10. The flanged bushes on a Pesco Hydraulic Pump have become scored.
 - (a) How may they be restored to a serviceable condition.
 - (b) How, after this operation, may the correct gear end float be determined, and adjusted.
 - (c) What is the function of the low pressure ball valve in the hollow drive gear shaft.
 11.
 - (a) Detail how you would pre-oil an American type of aero engine (radial).
 - (b) Having set tappets on the 8W what are the next checks?
 - (c) During these checks some errors are revealed; what are the remedies?
-

APPENDIX XI(e)
CENTRAL TRADE TEST BOARD - RNZAF.

ANALYSIS OF WRITTEN PAPER

Date of Exam. 18.12.43

Trade: FLIGHT MECHANIC. - COURSE 30.

No. of Candidates: 76

Question	Subject	Attempts	Average Result
1	A.M.C. & A.V. 70M Carb.	53	5.2
2	Magneto & Valve Timing	53	4.3
3	Constant Speed Airscrews	62	6.7
4	I.C.E. Principles	34	3.8
5	Reconditioning Valve Seats	76	7.25
6	Running Faults 70M Carb.	76	7.0
7	Uses of Steels and Tempering	52	5.5
8	Oil Temperature & Boost Gauges	59	6.4
9	Magneto Principles	74	7.9
10	Supercharger & Rear Cover	67	5.1
11	Engine Running Faults	76	9.2
12	Pecusus Installation	65	7.9

Total average: 66.3%

APPENDIX XI(f)
CENTRAL TRADE TEST BOARD - RNZAF
ANALYSIS OF WRITTEN PAPER

Date of Exam. 14.8.45

Trade: FLIGHT MECHANICS - 44th ENTRY.

No. of Candidates: 32

Question	Subject	Attempts	Average Result
1	Educational Problem Specific Gravity	6	3.0
2	Wasp H.I. Engine Installation	26	6.03
3	Basic Identification of Bolts	24	6.07
4	Prop. Checks 12D40	22	6.0
5	Test Bench Engine Faults	23	5.01
6	Forms, Publications	24	5.08
7	Allison Cyl. Blocks	31	6.9
8	Stromberg Inj. Carb.	29	6.7
9	Harvard fuel system	31	5.6
10	Wasp H.I. Compression Tests & Tappet Adjust.	30	6.05
11	Running faults	28	5.02
12	Run up Checks	29	5.07

Total Average: 54.8%

APPENDIX XI(g)

CENTRAL TRADE TEST BOARD - RNZAF

ANALYSIS OF WRITTEN PAPER

Date of exam. 10.1.44
 Trade: FITTER IIE. - COURSE 30.
 No. of Candidates: 43

Question	Subject	Attempts	Average Result
1	Basic	38	7.6
2	Curtiss Electric A/C	36	6.9
3	N A-Y9H Carburetors	34	7.1
4	Magnetos	40	7.4
5	Fuel Pipes; Joints & Tests	29	6.1
6	Viewing	42	9.0
7	Valve & Magneto timing	39	9.0
8	Test Bench procedure	41	7.3
9	Stromberg Inject. Carb.	36	7.4
10	Components	35	8.4
11	Inertia Starter	38	6.3
12	Problem on Definitions	10	4.6

Total Average: 72.3%

APPENDIX XI(h)CENTRAL TRADE TEST BOARD - RNZAFANALYSIS OF WRITTEN PAPER

Date of exam. 8.5.45.

Trade: FIT. IIE - 40th ENTRY.

No. of candidates: 24

Question	Subject	Attempts	Average Result
1	Basic (Micro readings)	21	8.3
2	Fitting Magneto (Cyclone)	23	8.3
3	Viewing Cyclone Parts	23	6.5
4	Cyclone Top Overhaul	22	7.2
5	Inline C/shaft Viewing	19	6.7
6	Stromberg Injection Carb.	23	4.9
7	Hydromatic Props	14	5.6
8	Curtiss Props.	23	7.7
9	Running up faults	21	6.9
10	Pesco Hydraulic pumps	19	6.3
11	Pre-Oiling	19	7.0
12	Hydromatic Prop Faults	12	6.2

Total Average: 68.2%

APPENDIX XI(1)

REPORT ON PASSING OUT EXAMINATION - NO. 30 WAR COURSE -
FITTERS IIE

PART I - WRITTEN (Good)

This part of the test shows a general improvement over the previous entry. It will be noticed that carburettors and components are still the weakest subjects. An analysis of the paper is attached herewith.

AVERAGE: 72.3% PREVIOUS COURSE: 64.5%

PART II - MANUAL (Good)

AVERAGE: 76.1% PREVIOUS COURSE: 76.1%

PART III - BASIC (Good)

An improvement in marking out procedure was noted. Knowledge of simple metallurgy was the weakest feature of this section.

AVERAGE: 75.6% PREVIOUS COURSE: 76.1%

PART IV - AERO ENGINE KNOWLEDGE (Good)

A general weakness on carburettors and components was noted. The knowledge of engines and magnetos was generally sound.

AVERAGE: 71.4% PREVIOUS COURSE: 71.1%

RESULTS of Course:

LAC F/MECH. remustered	LAC FITT.IIE	-	15
AC1 " "	LAC "	-	1
AC1 " "	AC1 "	-	10
Failed to Remuster		-	17

APPENDIX XI(j)

REPORT ON PASSING-OUT EXAMINATION - NO. 40 WAR COURSE -
FITTER IIEPART I - WRITTEN (Satisfactory)

An analysis of this part of the test is attached hereto.

AVERAGE: 68.2%. PREVIOUS COURSE: 50.5%.

PART II - MANUAL (Good)

AVERAGE: 79.9%. PREVIOUS COURSE: 78.3%.

PART III - BASIC (Good)

An improvement in this section, but elementary heat treatment is still a definite weakness.

AVERAGE: 76.2%. PREVIOUS COURSE: 71.4%.

PART IV - AERO ENGINE KNOWLEDGE (Good)

A general all round improvement in this section was noted with this entry.

AVERAGE: 74.5%. PREVIOUS COURSE: 62.2%.

RESULTS were as follows:

LAC F/MECH. to LAC FITT.IIE	-	8
AC1 F/MECH. to LAC FITT.IIE	-	1
AC1 F/MECH. to AC1 FITT.IIE	-	2
FITT.IIA AG.	-	2 F/ENG. (A)
F/MECH. AG. to LAC FITT.IIE	-	1
FAILED TO REMUSTER	-	10

Plus Limit : Feeler Gauge TOTAL - 24
Uses : Core and Maintenance.

A.G.S. and A.N. SIZES

Recognition of Parts : Checking serviceability of Parts : Threads relative to uses : Uses of Parts, such as Pin nuts, Elastic stop, nuts, Single and Double ender washers etc.

H.T. and L.T. Steel Bolts

Types of taper pins and how locked : All methods of locking : Anti-corrosive treatments found on A.G.S. and A.N. Parts and how it is applied.

APPENDIX XII(a)ORAL EXAMINATION GUIDE - FLIGHT MECHANICS - BASICTools:Micrometers:

Principles : Readings : Care and Maintenance.

Vernier:

Principles : Readings : Care and Maintenance.

Subeto Gauge:

Principles : Setting up and Reading :
Care and Maintenance.

Torsion Wrench:

Uses : Precautions when Using : Testing and Checking.

Tap and Dies:

Types : Threads : How to Use : Precautions :
Care and Maintenance.

Reamers:

Types : Uses : Care and Maintenance.

Drills:

Types : Uses : Care and Maintenance.

Gauges:

Plug Limit : Feeler Gauges : Thread Gauges :
Uses : Care and Maintenance.

A.G.S. and A.N. Spares:

Recognition of Parts : Checking serviceability of
Parts : Threads relative to each : Uses of Parts,
such as Pal nuts, Elastic stop. nuts, Single and
double anchor Simmonds nuts.

H.T. and L.T. Steel Bolts

Types of taper pins and how locked : All methods
of locking : Anti-corrosive treatments found on
A.G.S. and A.N. Parts and how it is applied.

Threads:

Types : Angles : Forms : Nationalities and Uses.

HEAT TREATMENTS STEELS:

Low Carbon: Case hardening by box process, open hearth and nitriding methods.

High Carbon: Harden, temper.

General Knowledge: Refine, normalize, anneal.

Tool Steels: Relative cutting speeds of, high speed (Tungsten), Steels against high carbon, Steels, lubrications. used when drilling, Making such articles as pin and centre punches, Chisels and scrapers from old files.

Copper: How to anneal, harden: Methods of preventing fracture due to vibration, swaging of ends.

Aluminium Alloys: Anneal, Age harden, Anti-corrosive treatments.

Soldering: Fluxes and why they are used.
Tinning of soldering bolts and the reason for doing so.
Types of solders and their uses.

Identification of materials by test (E.G.) Dual, stainless steel, etc.

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ENGINES AND MAINTENANCE:

Starting Procedure:-

Checks prior to starting:

Hydraulic locking : Switches : Fuel cocks :
Chocks, etc. : Setting of controls to start engine and reasons for these settings.

Example:

Air shutters : Propellor governor control and mixture control.

Failure to Start:

Method of tracking down faults and the elimination of them. The ability of the candidate to decide if the fault is ignition or carburation and give the indications of each.

INSPECTIONS

Maintenance Regulations and Form 700.

Checking Compressions of both inline radial engines. In the event of finding a weak compression what checks would be made prior to removing the cylinder.

Top Overhaul:

Fitting New Cylinder	All measurements and checks.
Fitting New Piston	All measurements and checks.
Fitting New Rings	All measurements and checks.
Fitting New Valves	All measurements and checks.
New Valve Guides	All measurements and Checks.
Replacements of Studs by oversize.	
Adjustments of Tappets.	
Cleaning and <u>Adjusting Sparking Plugs.</u>	

Fuel Systems:

Lay out of Systems, Types of fuel pumps and operating pressures and where adjustments can be made. Faults to look for and their remedy.

Carburettors:

Type familiar to Candidate.
 Slow running system : Difuser and compensation : Full power ranges.
 Mixture Controls all types.
 Flight Adjustments: The effect of high and low float levels: Flooding.

Airscrews:

Types, operations : Minor repairs, such as removing nicks from blades and checking for cracks on blades : Oil leaks and checking track : Anti-corrosive treatment of blades : Fitting airscrews to engine.

Airscrew Governors:

Fitting and adjusting of Governor unit including Max. RPM. stop: Causes for A/S surge and remedy :
 Test for constant speeding : Test for correct pit change.

MAGNETOS AND IGNITION HARNESS:

Fitting and timing : Running faults and indications :
Checking and fitting new points : Checking distributors :
Condensers : Testing Harness : Insulation and continuity :
Testing switch circuits : Checking RPM. drop with both
fixed pitch and V/P airscrews.

INSTALLATION:

Hot oil priming of engines : Setting of controls :
Checks prior to starting and after starting checks :
Entries into Log Book and F.700.

COMPONENTS:

Booster Coils : Hydraulic pumps : Vacuum Pumps : Air
Compressors : Constant speed governor : Fuel pumps.

RUNNING FAULTS:

Excessive Vibration : Cylinder Temperature too high :
Oil temperature too high : Oil pressure too low : Steady
miss fire : Intermittent miss fire : Engine "rolling" at
600 RPM. : Unable to obtain Max. RPM. : Too many Revs. :
High oil consumption : High fuel consumption : Hydraulic
oil leaking into engine.

APPENDIX XII(b)ORAL EXAMINATION GUIDE - FITTER 11EBASICTools, Precision:

Principles : Reading : Care & Maintenance :
Adjusting Micrometers : Vernier : Subeto Gauge :
Plug limit gauges : Thread gauges : V Blocks.

Tools, General:

Uses : Precautions when using : Care & Maintenance :
Torsion Wrench taps and dies : Reamers : Grinding
wheels.

Drilling:

Types : Speed : Lubricants : Precautions.

Marking out Procedure:

Reading of drawings : Testing materials.

Threads:

Types and uses.

Solders & Soldering:

Types and Uses : Fluxes.

Heat Treatments of Steels:

Case hardening : Hardening : Tempering :
Normalizing : Refining : Annealing : Nite-
riding : Manufacture of simple tools, e.g.
Chisel, Pin Punch.

Properties of Steels:

Effect of carbon : Alloys, e.g. Tungsten.

Light Alloys and Copper:

Head and anti-corrosive treatments.

Locking Devices:

Types and Uses.
Removal of broken studs, methods used.

A.G.S. & A.N. Spares:

Recognition : Uses : Types.

Viewing of Parts:

Publications : Limit Schedules : Crack detection :
Measurements : Methods of checking crankshafts,
master ~~xxxx~~ rods, etc.

Engines:

Type familiar to candidate : General description,
lay out and operation.

Practical Maintenance Work:

Run up procedure, storage, installation :
Running faults : Ignition and valve timing:
Periodical inspections.

Components:

Vacuum, Hydraulic and Fuel Pumps : Starters :
Coolers : Types familiar to candidate : Construction :
Operation : Care & Maintenance : Running faults and
rectification.

Propellers and Governor Units:

Hamilton Hydraulics C.S.V.P. and Curtiss Electric :
Removal and replacements : General Principles :
Constructions and operation : Running faults and
rectification : Block repairs and crack detection :
Pre flight checks.

Carburettor:

Type familiar to candidate : Construction : Theory
and Operation : Adjustments : Storage : Procedure :
Running faults and rectification : Boost and
mixture controls.

Magnetos:

Type familiar to candidate : Construction and
Operation : Timing : Checking : Adjustments :
Running Faults : Booster Coils.

Spark Plugs:

Cleaning and testing procedure : Precautions.

General Knowledge:

Log Book entries : F.700 760E : Publications
dealing with Mods. U.M.O's. N.Z.T.I's.

Testing of Aero Engines:

Procedure and general checks.

SPEC - 1 WILD STEEL
FINISH - FILE ONE FACE ONLY
LIMITS - 1.002
SCALE - FULL SIZE

SPEC - 1 WILD STEEL
FINISH - FILE ONE FACE ONLY
LIMITS - 1.001
SCALE - FULL SIZE

FITTERS II (E)

SPEC. $\frac{1}{4}$ " MILD STEEL.
 FINISH: FILE ONE FACE ONLY.
 LIMITS: $\pm .002$
 SCALE: FULL SIZE

FLIGHT MECHANICS.

SPEC. $\frac{1}{4}$ " MILD STEEL
 FINISH: FILE ONE FACE ONLY.
 LIMITS: $\pm .001$.
 SCALE: FULL SIZE

FITTERS II (E).

Analysis of Marks awarded in various sections of trade test.

TRADE: FLIGHT MECHANIC.

FOR: PASSING OUT EXAMINATION.

COURSE: NO. 30.

STATION: TECHNICAL TRAINING SCHOOL, NELSON.

	Part I Writ.	Part II Prac.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- mendations
	100	50	50	300	500		
A	57	36	35	189	317	63.4	AC1
B	48	39	35	150	272	54.4	AC2
C	45	25	29	192	291	58.2	AC2
D	Back a course.						
E	77	44	40	246	407	81.4	LAC
F	60	37	35	225	357	71.4	AC1
G	59	40	31	219	349	69.8	AC1
H	67	24	35	210	336	67.2	AC1
I	62	39	43	222	366	73.2	AC1
J	46	23	22	132	223	44.6	AC2
K	63	24	34	168	289	57.8	AC2
L	57	41	23	198	319	63.8	AC1
	(In hospital for prac.)						
M	80	45	40	249	414	82.8	LAC
N	56	41	37	210	344	68.8	AC1
O	81	38	41	240	400	80.0	LAC
P	47	37	40	195	319	63.8	AC1
Q	72	40	36	210	358	71.6	AC1
R	89	41	40	243	413	82.6	LAC
S	54	41	24	135	254	50.8	AC2
T	73	39	41	195	348	69.6	AC1

	Part I Writ.	Part II Prac.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- mendations
	100	50	50	300	500		
U	92	38	40	243	413	82.6	LAC
V	82	41	36	210	369	73.8	AC1
W	39	40	25	168	272	54.4	AC2
X	68	41	38	183	330	66.0	AC1
Y	56	39	25	129	249	49.8	AC2
Z	66	24	30	180	300	60.0	AC1
AA	76	37	37	192	342	68.4	AC1
BB	71	43	43	252	409	81.8	LAC
CC	63	38	38	210	349	69.8	AC1
DD	67	44	36	186	333	66.6	AC1
EE	61	44	38	222	365	73.0	AC1
FF	67	38	34	216	355	71.0	AC1
GG	86	22	40	261	409	81.8	LAC
HH	61	35	35	198	329	65.8	AC1
II	63	15	38	234	350	70.0	AC1
JJ	67	40	41	240	388	77.6	AC1
KK	52	22	32	174	280	56.0	AC2
LL	28	41	20	156	245	49.0	AC2
MM	78	44	34	204	360	72.0	AC1
NN	Off Course.						
OO	42	12	25	126	205	41.0	AC2
PP	68	29	30	180	307	61.4	AC1
QQ	39	42	20	160	161	32.2	Failed
RR	Off Course.						
SS	74	38	37	231	380	76.0	AC1

	Part I Writ.	Part II Prac.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- mendations
	100	50	50	300	500		
TT	70	42	40	228	380	76.0	AC1
UU	81	40	40	246	407	81.4	LAC
VV	69	39	40	228	376	75.2	AC1
WW	76	38	43	243	400	80.0	LAC
XX	79	37	37	213	366	73.2	AC1
YY	69	37	38	216	360	72.0	AC1
ZZ	45	41	23	123	232	46.4	AC2
AAA	78	36	40	246	400	80.0	LAC
BBB	79	41	38	249	407	81.4	LAC
CCC	79	43	34	222	378	75.6	AC1
DDD	77	40	35	228	380	76.0	AC1
EEE	66	42	38	210	356	71.2	AC1
FFF	74	39	35	195	343	68.6	AC1
GGG	76	41	25	222	364	72.8	AC1
HHH	77	41	40	207	365	73.0	AC1
III	74	41	38	231	384	76.4	AC1
JJJ	81	41	38	240	400	80.0	LAC
KKK	83	44	43	252	422	84.4	LAC
LLL	52	28	38	216	334	66.8	AC1
MMM	82	36	37	225	380	76.0	AC1
NNN	75	39	43	252	409	81.8	LAC
OOO	60	37	40	234	371	74.2	AC1
PPP	67	44	38	222	371	74.2	AC1
QQQ	65	41	38	213	357	71.4	AC1
RRR	70	43	39	234	386	77.2	AC1

Analysis of Trade Test Marks

	Part I Writ.	Part II Prac.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- mendations
	100	50	50	300	500		
SSS	74	43	40	246	403	80.6	LAC
TTT	68	44	35	222	369	73.8	AC1
UUU	57	43	42	222	364	72.8	AC1
VVV	58	43	40	234	375	75.0	AC1
WWW	57	32	30	186	305	61.0	AC1
XXX	61	42	35	201	339	67.8	AC1
YYY	56	43	33	186	318	63.6	AC1
ZZZ	66	37	35	186	324	64.8	AC1
AAAA	83	42	40	240	405	81.0	LAC

TOTALS 5043 2870 2701 15792 26406

Average 66.3 75.5 71.1 69.2 69.5
%

Students as available for further training.

K 77 38 40 243 403 80.0 LAC

L 68 38 43 228 369 75.0 AC1

M Not recommended for trade test, but considered
worth further training. Held back to join
Course 49.

N 80 41 42 243 379 73.0 AC1

O 46 43 43 170 312 62.0 AC1

P 39 43 39 220 360 75.0 AC1

Q 55 37 38 190 320 65.0 AC1

R 55 32 30 154 316 60.0 AC1

S 60 37 35 202 334 70.0 AC1

Analysis of Trade Test Marks.

TRADE: FLIGHT MECHANIC.FOR: PASSING OUT EXAMINATION.COURSE: NO. 44STATION: TECHNICAL TRAINING SCHOOL, NELSON.

	Part I Writ. 100	Part II Prac. 50	Part III Basic Oral 50	Part IV Trade Oral 300	Total 500	%	CTTB. Recco- mendations
A	72	40	43	213	368	73.6	AC1
B	72	29	38	234	373	74.6	AC1
C	50	41	36	222	349	69.8	AC1
D	43	32	41	240	356	71.2	AC1
E	49	40	39	138	266	53.2	AC2
F	60	40	35	216	351	70.2	AC1
G	43	27	26	120	216	43.2	AC2
H	59	29	32	222	342	68.4	AC1
I	60	32	22	144	258	51.6	AC2
J	Not recommended for trade test. Removed from course as unsuitable for further training.						
K	79	38	40	243	400	80.0	LAC
L	48	38	43	255	384	76.8	AC1
M	Not recommended for trade test, but considered worth further training. Held back to join Course 45.						
N	68	41	42	228	379	75.8	AC1
O	46	43	43	180	312	62.4	AC1
P	59	42	39	228	368	73.6	AC1
Q	55	37	35	198	325	65.0	AC1
R	55	35	30	194	314	62.8	AC1
S	60	37	35	222	354	70.8	AC1

	Part I Writ. 100	Part II Pract. 50	Part III Basic Oral 50	Part IV Trade Oral 300	Total 500	%	CTTB. Recco- mendations
T	74	40	40	246	400	80.0	LAC
U	64	41	41	210	356	71.2	AC1
V	30	37	26	120	213	42.6	AC2
W	70	41	40	249	400	80.0	LAC
X	62	36	40	234	372	74.4	AC1
Y	70	38	40	252	400	80.0	LAC
Z	44	41	35	180	300	60.0	AC1
AA	80	40	40	240	400	80.0	LAC
BB	64	37	35	210	346	69.2	AC1
CC	57	41	40	228	366	73.2	AC1
DD	Posted to Reserve during the Course.						
EE	76	40	43	249	408	81.6	LAC
FF	40	25	32	222	319	63.8	AC1
GG	56	36	30	227	349	69.8	AC1
HH	37	38	38	198	311	62.2	AC1
II	47	41	33	138	259	51.8	AC2
TOTALS	1756	1195	1172	6691	10814		
AVERAGE %	54.8	74.06	73.4	69.7			

Analysis of Marks awarded in Trade Test.

TRADE: FITTER IIE.FOR: PASSING OUT EXAMINATION.COURSE: NO. 40.STATION: TECHNICAL TRAINING SCHOOL.

	Part I Writ.	Part II Prac.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- menda- tions
	100	100	*100	*200	500		
A	56	79	72	138	345	69.0	Remain LAC F/Mech.
B	73	70	73	152	368	73.6	"
C	83	83	80	160	406	81.2	LAC F. II(E)
D	80	81	80	160	401	80.2	"
E	75	85	80	160	400	80.0	"
F	61	81	72	153	367	73.4	Remain LAC F/Mech.
G	84	86	80	167	417	83.4	LAC F. II(E)
H	80	80	80	160	400	80.0	LAC F. II(E)
I	59	66	70	125	320	64.0	AC1 F. II(E) Remain
J	69	74	75	136	354	70.8	LAC F/Mech.
K	77	83	80	160	400	80.0	LAC F. II(E)
L	Posted Sick and Wounded.						Remain
M	49	72	66	88	275	55.0	AC1 F/Mech.
N	54	74	60	147	335	67.0	Remain LAC F/Mech.

	Part I Writ.	Part II Pract.	Part III Basic Oral	Part IV Trade Oral	Total	%	CTTB. Recco- menda- tions
	100	100	100	200	500		
O	47	82	63	107	299	59.8	Remain LAC F/Mech.
P	49	80	73	149	351	70.2	Remain LAC F/Mech.
Q	74	84	82	160	400	80.0	LAC F.II(E)
R	51	80	70	144	345	69.0	AG1 F.II(E)
S	82	83	80	160	405	81.0	LAC F.II(E)
T	Posted to Reserve during Course.						
U	63	82	80	143	368	73.6	Remain CPL F/Mech.
V	66	83	83	152	384	76.8	Remain LAC F/Mech.
*W F.II(A)(A.G.)	90	85	80	160	415	83.0	LAC
*X F.II(A)(A.G.)	74	82	84	160	400	80.0	LAC
*Y F.MECH.(A.G.)	78	82	80	160	400	80.0	LAC F.II(E)
TOTAL	1637	1918	1829	3575	8959		
AVERAGE %	68.2	79.9	76.2	74.5			

* These three tradesmen - Air Gunners included in this course in order to qualify as Flight Engineers.

APPENDIX XVI

TABLE OF MARKS AWARDED IN PROGRESS TESTS DURING
FLIGHT MECHANIC COURSE - COURSE 44

CANDIDATE:	A	B	C	D	E	F	G	H
MATHS (1)	37	73	97	58	64	91	78	56
MATHS (2)	81	98		56	84		84	34
GEOM.	100	100	88	40	82	100	88	52
ELECT.	79	78	84	68	73	80	70	52
MECHANICS	45	80	100	62	100	80	76	44
PHYSICS	80	63	77	44	63	72	41	66
FILING	82	82	86	77	78		69	34
FITTING (1)	82	69	68	70	66	74	50	67
FITTING (2)	69	68	78	69	89	79	41	78
FITTING (3)	45	83	79	72	69	80	63	40
FITTING (4)	48	82	84	78	70	90	62	47
FITTING (5)	64	84	84	52	73	87	51	75
DRAWING	72	80	88	75	73	77	63	82
METALLURGY	75	80	82	62	60	55	75	78
ALLISON ENG.	83	82	75	46	54	60	58	76
CARBS.	88	86	85	87	79	77	40	78
INSTALLATION	78	85	86	77	74	81	48	68
MAINTENANCE	82	80	80.5	70.5	75	82	77	73
PRELIM. ENG.	81	87	73	63	66	82	66	75
AIR COOLED ENG.	83	81	61	60	63	70	56	68
ENG. COMPONENTS	79	81	70	54	61	75	43	69
MID TERM EXAM.	64	88	63	55	54	62	41	63
G.T.T.B. RESULT	73.6	74.6	69.8	71.2	53.2	70.2	43.2	68.4

CANDIDATE:	I	J	K	L	M	N	O	P
MATHS (1)	70	88	86	50	85	82	68	99
MATHS (2)		86		64		92		
GEOM.	72	80	100	85	100	100	65	94
ELECT.	55	81	90	74	92	80	95	81
MECHANICS	95	71	72	37	100	72	76	100
PHYSICS	60	69	81	65	88	74	70	85
FILING	52	52	64	74	75	63	60	58
FITTING (1)	60		61	42	74	68	69	59
FITTING (2)	67		44	60	80	56	82	75
FITTING (3)	49	69	76	63	83	79	74	67
FITTING (4)	70	57	52	74	88	73	78	77
FITTING (5)	84	71	47	78	89	71	77	80
DRAWING	50	64	86	72	81	86	78	74
METALLURGY	60	65	70	60	82	75	80	65
ALLISON ENG.	41	49	88	78	72	40	60	
CARBS.	60	88	70	66	74	50	44	82
INSTALLATION	74	77	76		80	64	66	76
MAINTENANCE	67	50	76	66	84	70	70	82
PRELIM. ENG.	63	66	86	46	90	50	70	84
AIR COOLED ENG.	60	61	76	66	80		66	84
ENG. COMPONENTS	31	48	96	68	70	62	54	80
MID TERM EXAM.	44	63	76	48	84	62	65	45
C.T.T.B. RESULT	51.6	X	80	76.8	75.8	63.8	62.4	73.6

CANDIDATE:	Q	R	S	T	U	V	W	X
MATHS (1)	98	89	24	92	88	61	70	91
MATHS (2)	94		46			72	80	
GEOM.	100	85	70	95	95	95	90	98
ELECT.	83	76	68	100	95	98	67	90
MECHANICS	100	97	40	100	100	80	96	84
PHYSICS	75	64	40	94	95	72	71	89
FILING	72	69	76	84	95	51	80	87
FITTING (1)	77	68	56	90	98	78	45	80
FITTING (2)	72	85	79	92	95	92	63	91
FITTING (3)	73	63	43	91	85	76	49	82
FITTING (4)	74	68	46	92	83	83	36	84
FITTING (5)	58	43	60	91	86	80	73	90
DRAWING	77	76	61	83	82	80	75	91
METALLURGY	60	45	35		85	70	55	70
ALLISON ENG.	86	52	52	88	90	50	78	95
CARBS.	69	46	72	76	90	86	52	86
INSTALLATION		76	68	80	90	74	67	87
MAINTENANCE	74	68	80	84	88		40	84
PRELIM. ENG.	66	70	73	90	88	68	36	94
AIR COOLED ENG.	74	76	68	80	90	70	72	92
ENG. COMPONENTS	61	80	66	70	86	74	76	88
MID TERM EXAM.	76	62	61		84	72	57	71
C.T.T.B. RESULTS	65	62.8	70.8	81.6	80	71.2	42.6	80

CANDIDATE:	Y	Z	AA	BB	CC	DD	EE	FF
MATHS (1)	70	90	94	66	99	66	84	47
MATHS (2)	58	58	58	58				66
GEOM.	70	100	95	80	100	74	80	53
ELECT.	90	98	76	14	94	71	74	31
MECHANICS	80	98	78	20	100	82	80	61
PHYSICS	32	100	92	46	90	82	72	34
FILING	76	77	67	70	72	73	74	57
FITTING (1)	80	91	65	64	68	87	67	
FITTING (2)	54	77	71	59	77	77	87	65
FITTING (3)	80	89	69	30	87	78	68	23
FITTING (4)	68	90	74	31	80	70	65	32
FITTING (5)	84	81	86	56	87	73	85	53
DRAWING	63	81	81	83	83	74	73	74
METALLURGY	45	75		38	85	65	65	32
ALLISON ENGINE	70	95	75	52	92	84	85	52
CARBS.	70	96	66	44	92	80	84	70
INSTALLATION	67	93	69	74	91	73	78	69
MAINTENANCE	68	92	72	62	96	80	78	81
PRELIM. ENG.	72	98	66	32	92	58	70	27
AIR COOLED ENG.	66	91	74	44	91	84	82	26
ENG. COMPONENTS	78	88	72	56	93	80	80	68
MID TERM EXAM.	47	89	71	46	84	68	67	60
G.T.T.B. RESULTS	74.4	80	60	62.2	80	69.2	73.2	51.8

TRAINING AND SELECTING IN THE ELEMENTARY BASIC SCHOOL

The following is an outline of the training organization of the Elementary Basic School which aims to train inexperienced personnel in the basic principles of engineering, teach them the fundamentals of mathematical and scientific facts, and sort these trainees into groups under trade headings for posting to technical courses.

The course covers ten weeks divided into 5 terms of two weeks each.

The two purposes of training and sorting are related in as much that the ability to learn the subjects taught is used as one basis of selection for the particular trades.

The necessary attributes looked for in trainees are:

- (a) Ability to acquire knowledge.
- (b) Ability to apply principles to every day service work.
- (c) Sense of responsibility.
- (d) Mechanical aptitude.
- (e) Keeness on the job.

During training in the Elementary Basic School various examination filters are used to sort and eliminate unsuitable trainees progressively.

1st TERM

Immediately on entering the School the entry is given an elementary mathematics test. The test takes the form of a printed sheet containing 15 questions. The actual values in the problems are so chosen that all except 5 or 6 can be solved by mental arithmetic. 30 minutes is allowed for the paper. A brief questionnaire at the end of the paper is included for the examinee to indicate which subjects he took at school. These papers are marked by the educational staff and sorted into three groups - high, low and medium, depending on the score. The object of grouping is to segregate the good from the slow thereby obtaining more even results from each group.

Those who obtain the highest score in this test and who obviously do not need elementary education are immediately advanced to 2nd term. Ex A.T.C. trainees who have successfully completed the first five assignments or more in the Maintenance educational course compiled by the Director of Educational Services whilst in A.T.C. are also advanced 2 weeks. Those who have a low initial standard are given 2 weeks of elementary mathematical and general education augmented by Physical Training and films of an educational nature. A test is given at the end of the term and

failures are interviewed by the Officer Commanding to determine if individual outlook warrants retention.

2nd TERM

For the second 14 days the trainees spend half their time on educational work and half on simple hand work involving the use of elementary workshop tools. A metal fitting exercise is given involving two progressive stages. Accuracy of work is encouraged rather than speed. No points are lost by those failing to complete the exercise, as the work is averaged on the processes completed successfully and accurately. Failure to obtain good marks in practical work is not always an indication of unsuitability during the first 14 days. Aptitude, diligence and keenness are noted more particularly, coupled with the ability to concentrate on accuracy. A report is submitted on each trainee by the workshop instructors, using a standard assessment system amplified if necessary, by further remarks.

The educational subjects covered are those necessary for trainees to carry out the workshop calculations and geometrical constructions used in the Basic Elementary School Workshops, together with "trade" science. At the conclusion of the term examinations are set on all the educational work which has been covered. Trainees who are unsuccessful and show neither aptitude nor enthusiasm are interviewed by the Officer Commanding and usually rejected from the School.

3rd TERM

The third fortnight of training consists of concentrated practical work and basic workshop instruction. The lecturing is done both in class rooms and during two "quiet" periods daily of thirty minutes duration each. A more advanced exercise is undertaken demanding accuracy and concentration to detail. Films (motion pictures and ship films) are used to assist tuition and individual attention is given to each trainee. Nowhere in the school workshop do classes exceed 16 in number. Every trainee is issued with a kit of tools which have to be kept in perfect order. Every endeavour is made during the 3rd fortnight to lay the foundations of tidiness, accuracy and pride of workmanship. Reports are submitted by the workshop instructors on each trainee. Any who fail to satisfy the requirements are rejected.

It is possible to judge from the results, reports and personal aspirations of each trainee at this stage which trades he is most suitable for. Actual individual selection for a particular trade depends on circumstances too involved to detail here. The main factors are:

- (1) Requirements of the Service (Courses scheduled, and vacancies on same).
- (2) Previous experience (Civilian occupation).

- (3) Personal choice (Two choices are named, and it is possible in about 70 per cent of cases to allot personnel to one of these).
- (4) Hobbies followed assiduously in civil life.
- (5) Skill of hand, as shown by tests.
- (6) Aptitude in scientific subjects, as shown by tests.
- (7) Age (Other factors being equal, a younger man will be allotted to a course vacancy before a man of say 35 years or over).
- (8) Medical grading (Personnel unfit for overseas are debarred from most trades; this has applied since the expansion of the Service in the Pacific. In addition, colour blindness debars from certain trades),

Since a definite number of trainees are required for each trade at a certain time, continual scrutinization of the above factors is necessary. This is assisted by an efficient filing and indexing system.

4th TERM

During the 4th fortnight, more advanced workshop instruction is given together with tuition in soldering, screw cutting etc. Four advanced exercises are made by each trainee designed to enable them to apply all the points taught during the previous month. Thin metal is used to obviate waste of time on heavy work, emphasis being laid on precision and attention to detail.

An examination is set at the end of the term covering the whole workshop syllabus. This examination is made as comprehensive as possible and designed to ascertain how much knowledge a trainee has absorbed rather than ability to write detailed answers. An oral examination is given after the papers have been marked as a final check. A short period of instruction on elementary electrical theory is given each week.

5th TERM

The fifth fortnight is devoted to scientific educational work of a specialised nature to prepare trainees for the trade courses to which they will be posted. Emphasis is laid on electrical knowledge, considerable practical work being carried out in two laboratories equipped for this purpose. Three separate syllabuses are run at the same time to accommodate the general requirements of different engineering trades. An examination on electricity and science completes the Elementary Basic School Course.

Trainees who have qualified are sorted into trades and posted to their main trade courses. The records of training compiled in the Elementary Basic School are made available to those administering the courses.

Airmen who are rejected as unsuitable for trade training

APPENDIX XVIII

No.

are posted as "wastage" to a clearing unit elsewhere ("non-effective pool") where they are interviewed by an Air Department selection committee and remustered to ACH/General Duties, or transferred to Army.

Married with () children Home Town:

Occupation: Age:

years apprentice as journeyman: ()

Educational Standard:

for interview:

Eyes: R..... L..... Colour vision.....
Hearing: R..... L..... Remarks.....
Grading:

SELECTION COMMITTEE ACTION::: Committee:

Trade tests	Trades applied for Keenness:				Overseas service	Committee
Above aver.	Suitable	Suitable; no vacancies	NS: Education	Not suitable	() Very keen	Impression
Average					() Indifferent	
Below Av.					() Not at all keen	
Tests					Keenness/study:				Appearance and manner:
.....	Suitable	Suitable; no vacancies	NS: Education	Not suitable	() Very keen	() Above average
Above average					() Just average	() Average
Average					() Not keen	() Below a.
Below average	Suitable	Suitable; no vacancies	NS: Education	Not suitable	Keenness for RNZAF	
.....					() Likes the life	Contacts recommended
Return intentions					() Indifferent	() See Educ Officer
Return civil trade	Suitable	Suitable; no vacancies	NS: Education	Not suitable	() Dislikes the life	() AEW?
Take on new					.....	( ) Maths study
.....						

Signed:

ACTION ("C" Division action)

taken: Remustered to:.....wof / /
Reclassified to:.....wof / /
Remain as:.....

Ref No.

Recording Unit:

Rank:

Name:

Age:

Group:

Date attested:

Single ()

Married with () children

Home Town:

Previous Occupation:

Age:

No of years apprentice: ()

No of years as journeyman: ()

Qualifications:

Educational Standard:

Reason for interview:

Medical:

Eyes:

R..... L.....

Hearing:

R..... L.....

Grading:

.....

Colour vision.....

Remarks.....

.....

SELECTION COMMITTEE ACTION::: Committee:

Attitude tests

Trades applied for Keeness:

Tests

Above aver.

Average

Below Av.

Suitable
Suitable; no
vacancies
NS: Education
Not suitable
Civil exp.

Overseas service

() Very keen

() Indifferent

() Not at all keen

Committee
Impression

Appearance
and manner:

() Above

average

() Average

() Below a.

Other tests

Above average

Average

Below average

Keeness/study:

() Very keen

() Just average

() Not keen

Keeness for RNZAF

() Likes the life

() Indifferent

() Dislikes the
life

Contacts
recommended

() See Educ
Officer

() AEWG
Maths
study

Post-war intentions

Return civil

trade

Take on new

thing

Remarks:

Signed:

RECOMMENDING ACTION

("C" Division action)

Action taken:

Remustered to:.....wef

/ /

Reclassified to:.....wef

/ /

Remain as:.....

Authority: Recd Advice No.

C. of / /194

APPENDIX XIXPRELIMINARY MATHEMATICS TEST - FOR RECRUITS - (PAPER B)

NAME:..... INITIALS:.....

Time Allowed: 30 MINS.INSTRUCTIONS:

Most of the problems can be done by mental arithmetic. If you want to do any working, put it in the space provided. Do as many questions as you can. Always put the answer in the place provided on the right. Don't start until you are told to do so.

1. The sides of triangular piece of metal measure $2\frac{5}{6}$ ", $4\frac{3}{7}$ " and $2\frac{1}{6}$ ". What is the length right round?
2. How many pieces of metal each $1\frac{1}{3}$ " long could be cut from a yard of steel?
3. If 6 U.S.A. gallons equal 5 Imperial Gallons, how many Imperial Gallons will an American tank marked 240 U.S.A. Gallons hold?
4. A certain kind of alloy contains 3 parts copper and 4 parts zinc. What weight of each metal will be required to make 168 lbs. of the alloy?
5. A large map is drawn to a scale of 1" = 5 miles. How far apart are two places whose distance on the map is $2\frac{3}{4}$ "?
6. If a gallon of fuel weighs 7.5 lbs. how many gallons could an aeroplane carry instead of a 550 lb. bomb?
7. A dimension is given as $4\frac{5}{16}$ ". What is the measurement in decimals? (4 places).
8. One Whitworth hexagonal nut weighs .0345 lbs. What would be the weight of 300 nuts?
9. An aircraft makes four flights and its flying times and petrol consumption are:- 1 hour - 23 gals; 3 hours - 61 gals; 2 hours - 33 gals; 2 hours - 36 gals; Find the average consumption in gallons per hour?
10. A rectangular piece of metal is 2" x $1\frac{1}{2}$ ". What is the distance from corner to corner?

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO

11. Find the area of a circle inscribed in a square whose side is 7". ($\pi = 3\frac{1}{7}$).
12. $L = \frac{WH}{8D}$. Find L when $W = 16$, $H = 120$, $D = 4$.
13. A propellor is 7 ft. in diameter. What will be the speed of the tip in feet per second when it is running at 1800 R.P.M.?
14. A block of metal is 8" x 6" x 4". If a cubic inch weighs .284 lbs. what is the weight of the block?
15. The following is the cross-section of a girder. Calculate the area.

Not to scale

You will find on the following pages a number of questions. In many questions four answers are suggested, and you are to choose the right one. Write the number of your choice in the brackets.

Sad people are:

1. honest
2. clever
3. unhappy
4. joyful

Sad means the same as unhappy. Since answer number 3 "unhappy" is the correct answer, 3 has been put in the brackets.

In other questions you are to choose the right answer and write it in the brackets. The question below is a sample.

What number comes next in the series:
2, 4, 6, 8, 10, 12

In this example each number is 2 more than the one before it. Since the next number after 12 will be 14, write 14 in the brackets.

Now try these practice questions:

1. The opposite of Rude is
1. foolish 2. considerable 3. polite 4. readable
2. What number comes next in the following series?
1. 10 2. 20 3. 30
3. Snow is to Winter as Rain is to
1. water 2. cloud 3. shower 4. spring

J is to C as P is to

- (1) U
- (2) V
- (3) D
- (4) S

There are eighty questions in the test. You will have Thirty Minutes to do them. You may not finish, but work as quickly as you can, and work accurately. Skip any questions that are too difficult and return to them later if you have time. You may figure in the margins of the pages, if you wish. Do not ask any questions during the test.

Do not open the booklet until instructed to do so.

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO

NºB 1788

R.N.Z.A.F. Classification Test "B"

.....A.F. Number N.Z.....Month and Year
 (print last name) (print given names) of Birth.....

Course.....

INSTRUCTIONS

You will find on the following pages a number of questions. In many questions four answers are suggested, and you are to choose the right one. Write the number of your choice **in the brackets**. The following question is a sample:

Sad people are:

1. honest 2. clever 3. unhappy 4. joyful.....(3)

Sad means the same as unhappy. Since answer number 3, "unhappy", is the correct answer, 3 has been put in the brackets.

In other questions you are to work out the right answer and write it in the brackets. The question below is a sample:

What number comes next in the following series?

- 2, 4, 6, 8, 10, 12()

In this example each number is 2 more than the one before it. Since the next number after 12 will be 14, write 14 in the brackets.

Now try these practice questions:

1. The opposite of **Rude** is

1. foolish 2. considerable 3. polite 4. readable.....()

2. What number comes next in the following series?

- 1, 10, 2, 20, 3, 30()

3. **Snow** is to **Winter** as **Rain** is to

1. water 2. cloud 3. shower 4. spring()

4. J is to C as P is to

- (1) (2) (3) (4) ()

There are eighty questions in the test. You will have **Thirty Minutes** to do them. You may not finish, but work as quickly as you can, and work accurately. Skip any questions that are too difficult and return to them later if you have time. You may figure on the margins of the pages, if you wish. **Do not ask any questions during the test.**

Do not open the booklet until instructed to do so.

1. **White** is to **Black** as **Good** is to
1. time 2. clothes 3. bad 4. magic
2. **Victory** is the opposite of
1. success 2. defeat 3. glory 4. cowardice
3. If there are three odd numbers in the series 4, 5, 6, 7, 8, 9, write M; if not, write Z.
4. What number comes next in the following series?
9, 12, 15, 18, 21
5. If the words below were arranged to make a good sentence, what would be the last letter, of the last word?
six for applied enlistment men
6. What number comes next in the following series?
1, 2, 4, 8, 16
7. How many hours will it take a tank to go 55 miles at the rate of 11 miles per hour?
8. **Spring** is to **Summer** as **Autumn** is to
1. warm 2. harvest 3. winter 4. season
9. What number comes next in the following series?
40, 39, 35, 34, 30
10.
is to as is to
(1) (2) (3) (4)
11. Write the letter that comes just before the 11th letter of the alphabet
12. What number comes next in the following series?
14, 17, 18, 21, 22
13. **Happiness** is to **Sadness** as **Hope** is to
1. frolic 2. fun 3. despair 4. joy
14.
is to as is to
(1) (2) (3) (4)
15. **Knowledge** is to **Ignorance** as **Wealth** is to
1. poverty 2. riches 3. health 4. comfort

What number comes next in the following series?

7, 11, 13, 17, 19

Incite means the same as

1. short 2. delay 3. place 4. provoke

A rectangular bin holds 300 cubic feet of lime. If the bin is 20 feet long and 3 feet wide, how deep is it?

What number comes next in the following series?

4, 7, 12, 15, 20, 23

Convoy means the same as

1. carry 2. escort 3. standard 4. flock

Agree is to **Quarrel** as **Friend** is to

1. comrade 2. ship 3. enemy 4. need

Speculate means the same as

1. squander 2. think 3. mirror 4. diminish

What is the weight of a sheet of metal 3 feet wide and 4 feet long if one square foot of the metal weighs $2\frac{1}{4}$ pounds?

Eagle is to **Bird** as **Lion** is to

1. roar 2. king 3. jungle 4. animal

28. The opposite of **Acquit** is
1. start 2. prisoner 3. convict 4. judge()
29. What number comes next in the following series?
65, 63, 59, 51, 35()
30. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Find the letter midway between E and K, then write the letter which is the third to the right of it()
31. **Soldier** is to **Officer** as **Citizen** is to
1. council 2. army 3. mayor 4. city()
32.
R is to R as F is to
(1) F (2) F (3) E (4) L()
33. If 11 men can turn out 330 pieces of equipment in 4 days, how many men would be needed to turn out the same number in 1 day?()
34. What number comes next in the following series?
4, 8, 10, 20, 22, 44,()
35. **Transient** means the same as
1. opening 2. passage 3. instrument 4. passing()
36. Tommy weighs four-fifths of his weight plus 10 pounds.
How many pounds does he weigh?()
37.
= is to || as ↗ is to
(1) ↘ (2) ↔ (3) ↗ (4) ↖()
38. What number comes next in the following series?
24, 18, 21, 15, 18, 12()
39. **Merchant** is to **Customer** as **Lawyer** is to
1. judge 2. court 3. client 4. fee()
40. Print the letter of the word "BLANDISHMENT" that is as far from the beginning of the word as it is from the beginning of the alphabet()

41. If a boy can run 30 feet while a car travels 54 feet, how many feet can the boy run while the car travels 90 yards?()
42. What number comes next in the following series?
5, 9, 7, 12, 9, 15, 11()
43. **Aspire** means the same as
1. desire 2. drug 3. breathe 4. flower()
44. In the word "ECCLESIASTES" how many E's are there with an S next to them? ... ()
45. If $3\frac{1}{2}$ pairs of heavy duty motor tyres cost £119, how much will $5\frac{1}{2}$ pairs cost?..()
46. What number comes next in the following series?
5, 7, 11, 19, 35()
47. The letters of the word "RUN" can be re-formed to make another word. Print the letter which has the same position in each word()
48.
△ is to 7 as M is to
(1) ∟ (2) ∟ (3) ∟ (4) ∟()
49. must clothes sometimes mend content poor you be with
If one word were omitted from the above, the others could be rearranged to form a sentence. Print the last letter of the word to be omitted()
50. What number comes next in the following series?
84, 42, 52, 26, 36, 18, 28()
51. L U R 3 R T R 3 R S U R 3 R X R 3 Y R 3 R S
Count the number of 3's immediately preceded and immediately followed by an R where the second R is not immediately followed by an S. Put the answer in the brackets.....()
52.
N is to | as A is to
(1) ∟ (2) ∟ (3) ∟ (4) ∟()
53. An **Irascible** person is easy to
1. deceive 2. convince 3. provoke 4. kill()
54. I gave Tom half my money and three shillings and sixpence besides. I have eight shillings left. How many shillings had I in the beginning?()

55. Except for one letter the letters of the word "POLITE" follow one another in the opposite order to that in which they occur in the alphabet. Print this letter

56.

57. A pie is cut so that one piece, which is one-quarter of the pie, is twice as large as each of the other pieces. Into how many pieces is the pie cut?

58. Which letter in this sentence appears a second time nearest the beginning? Print it... ()

59. Fill is to Full as Pin is to

1. pour 2. needle 3. pull 4. pun

60.

61. Vestige means the same as
1. vegetation 2. garment 3. trace 4. church

62. A clock which loses four minutes a day shows the correct time at 10 a.m. How many seconds slow will it be by 1 P.M. of the same day?

63. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
What letter comes just as far after K in the alphabet as M comes after S in the word "SUPERNUMERARY"? Print it

64. Plane is to Solid as Area is to

1. circle 2. square 3. diameter 4. volume

65. An 8-mile race starts at 2.29 P.M. The second man finishes at 3.27 P.M., 8 minutes behind the winner. How many minutes did the winner take to run the race?

66. Expedite means the same as

1. traveller 2. shows 3. hasten 4. forgive

67. In the line below, how many odd numbers are greater than 7 and smaller than 23?

5, 26, 12, 27, 15, 9, 7, 10, 23, 11, 22, 14, 31, 17, 3

68. August is to June as October is to

1. November 2. December 3. September 4. August

69. What number comes next in the following series?

7, 2, 7, 6, 7, 18, 7

70. A team of clothing workers had an output of 1,000 air force caps per week. This output was increased by 20%, which demanded an increase of 50 caps per man. How many men are there on the team?

71. If all the odd-numbered letters were omitted from the alphabet, what would be the middle letter of those omitted? Print it

72. What number comes next in the following series?

76, 73, 67, 58, 46

73. Extant means the same as

1. existing 2. size 3. exit 4. dilate

74. It was 3.10 by Smith's watch when he left home to go to the post-office. While at the office he corrected his watch by setting it forward from 3.35 to 3.44. It was 4.04 by his watch when he returned home. How many minutes was he away?

75. Piscatorial matters refer to

1. medicine 2. art 3. fish 4. astronomy

76. Circle is to Square as Cone is to

1. triangle 2. sphere 3. pyramid 4. radius

77. If in the army there is one officer for every 16 privates, how many officers are there in a corps consisting of 1105 officers and privates?

78. Mendacious persons are

1. particular 2. bold 3. beggars 4. untruthful

79.

80. How many soldiers are there in a group of 27 airmen and soldiers if there are four-fifths as many airmen as soldiers?

55. Except for one letter the letters of the word "POLITE" follow one another in the opposite order to that in which they occur in the alphabet. Print this letter

56.

57. A pie is cut so that one piece, which is one-quarter of the pie, is twice as large as each of the other pieces. Into how many pieces is the pie cut?

58. Which letter in this sentence appears a second time nearest the beginning? Print it... ()

59. Fill is to Full as Pin is to

1. pour 2. needle 3. pull 4. pun

60.

61. Vestige means the same as

1. vegetation 2. garment 3. trace 4. church

62. A clock which loses four minutes a day shows the correct time at 10 a.m. How many seconds slow will it be by 1 P.M. of the same day?

63. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

What letter comes just as far after K in the alphabet as M comes after S in the word "SUPERNUMERARY"? Print it

64. Plane is to Solid as Area is to

1. circle 2. square 3. diameter 4. volume

65. An 8-mile race starts at 2.29 P.M. The second man finishes at 3.27 P.M., 8 minutes behind the winner. How many minutes did the winner take to run the race?

66. Expedite means the same as

1. traveller 2. shows 3. hasten 4. forgive

67. In the line below, how many odd numbers are greater than 7 and smaller than 23?

5, 26, 12, 27, 15, 9, 7, 10, 23, 11, 22, 14, 31, 17, 3

68. August is to June as October is to

1. November 2. December 3. September 4. August

69. What number comes next in the following series?

7, 2, 7, 6, 7, 18, 7

70. A team of clothing workers had an output of 1,000 air force caps per week. This output was increased by 20%, which demanded an increase of 50 caps per man. How many men are there on the team?

71. If all the odd-numbered letters were omitted from the alphabet, what would be the middle letter of those omitted? Print it

72. What number comes next in the following series?

76, 73, 67, 58, 46

73. Extant means the same as

1. existing 2. size 3. exit 4. dilate

74. It was 3.10 by Smith's watch when he left home to go to the post-office. While at the office he corrected his watch by setting it forward from 3.35 to 3.44. It was 4.04 by his watch when he returned home. How many minutes was he away?

75. Piscatorial matters refer to

1. medicine 2. art 3. fish 4. astronomy

76. Circle is to Square as Cone is to

1. triangle 2. sphere 3. pyramid 4. radius

77. If in the army there is one officer for every 16 privates, how many officers are there in a corps consisting of 1105 officers and privates?

78. Mendacious persons are

1. particular 2. bold 3. beggars 4. untruthful

79.

80. How many soldiers are there in a group of 27 airmen and soldiers if there are four-fifths as many airmen as soldiers?

A.....

R.N.Z.A.F.

MECHANICAL ARITHMETIC TEST

Date.....

Score.....

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill in these blanks.

Number N.Z..... Name..... Date of birth.....

What class or form were you in when you left school?

How long is it since you left school?.....

This is a test to see how quickly and well you can do Mechanical Arithmetic. It starts with very easy examples and none of the 100 is really hard.

Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. Put the answers in the proper column and do any working in the space provided.

Do not turn this page until you are told to begin.

No.		Answers	Do any working here
1.	$9 + 6 + 8$ .....	.....	.....
2.	$8 + 7 + 13$ .....	.....	.....
3.	$34 - 19$ .....	.....	.....
4.	$156 - 156$ .....	.....	.....
5.	$100 - 4 - 96$ .....	.....	.....
6.	$3,000 - 1$ .....	.....	.....
7.	$17 + 18 - 14$ .....	.....	.....
8.	$200 - 13$ .....	.....	.....
9.	$54 + 368 + 7$ .....	.....	.....
10.	$8 + 9 - 3 + 2$ .....	.....	.....
11.	$201 - 102$ .....	.....	.....
12.	47×8 .....	.....	.....
13.	587×7 .....	.....	.....
14.	$1 \times 1 \times 1 \times 1 \times 1$ .....	.....	.....
15.	How much are 50 half-crowns? .....	.....	.....
16.	Reduce £1 5s. 2d. to pence .....	.....	.....
17.	How many hours in a week? .....	.....	.....
18.	$2 \text{ ft. } 3 \text{ in.} \times 8$ .....	.....	.....
19.	$\text{£}5 - \text{£}2 \text{ 12s. } 6\text{d.}$ .....	.....	.....
20.	$\text{£}3 \text{ 12s.} + \text{£}1 \text{ 4s. } 6\text{d.} + 13\text{s. } 6\frac{1}{2}\text{d.}$ .....	.....	.....
21.	$2982 \div 6$ .....	.....	.....
22.	$4856 \div 8$ .....	.....	.....
23.	$3 \text{ lb. } 4 \text{ oz.} - 1 \text{ lb. } 12 \text{ oz.}$ .....	.....	.....
24.	$5 \div 1$ .....	.....	.....
25.	$1 \div 1$ .....	.....	.....
26.	$0 \div 4$ .....	.....	.....
27.	$63 \times 5 \div 9$ .....	.....	.....
28.	$16\text{s. } 7\frac{1}{2}\text{d.} \times 2$ .....	.....	.....
29.	$\text{£}2 \text{ 17s. } 3\text{d.} \times 5$ .....	.....	.....
30.	How many 2s. 6d. books for £3 17s. 6d.? .....	.....	.....
31.	How many pints in $2\frac{1}{2}$ gals.? .....	.....	.....
32.	32 oranges at 8 for 5d .....	.....	.....

Do not stop. Go on with the next page.

	Answers	Do any working here
lb. 4 oz. at 1s. a lb.		
cost of 1 ton at 3s. 6d. a cwt.		
Reduce $\frac{2\frac{1}{2}}{3\frac{1}{3}}$ to lowest terms		
$\times \frac{4}{5}$		
$- 4\frac{2}{5}$		
$\div \frac{1}{2}$		
$- 1$		
$- \frac{1}{4}$		
$+ \frac{1}{3}$		
$\times \frac{1}{2}$		
$+ \frac{3}{5}$		
yd. 1 ft. at $2/6$ a yd.		
2 lb. 3 oz. $\div 5$		
11 18s. $\div 7$		
yds. 0 ft. 6 in. $\div 6$		
31×201		
$\frac{1}{2} - \frac{1}{2} + \frac{1}{4}$		
$+ 1\frac{1}{2} - 2\frac{2}{3}$		
$\div \frac{5}{8}$		
$\times \frac{4}{5} \div \frac{3}{4}$		
$\frac{1}{2}\text{d.} \times 36$		
What decimal is 7s. 6d. of 10s.?		
yds. 2 ft. 8 in. $- 2 \text{ ft. } 10 \text{ in.}$		
s. $3\frac{1}{2}\text{d.} \times 15$		
$10 - 7\cdot35$		
$6 \times \cdot07$		
$31 - 3\cdot01$		
$11 \times \cdot26$		
$4 + \cdot75 + \cdot25$		
$1 \times \cdot1$		
$182 - 6\cdot7 + 11\cdot8$		
$20 \times \frac{1}{3}$ —Express as £ s. d.		
Average of 5, 17, 17, 19		
Average of $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$		

Do not stop. Go on with the next page.

No.		Answers	Do any Working here
67.	Average of .5, .01, 1.2		
68.	2s. 9d. $\times$ 40		
69.	Express £375 as money		
70.	What decimal of £1 is 16s.?		
71.	5 per cent. of 10s.		
72.	5% of £250		
73.	Divide £2 between 2 people giving one 10/- more than the other		
74.	How many sq. inches in $\frac{3}{4}$ sq. ft.?		
75.	What percentage of £1 is 12s.?		
76.	What fraction is 2s. 3d. of 3s. 9d.?		
77.	1.2 — 3.6 + 2.7		
78.	.576 $\div$ 6		
79.	6 $\div$.5		
80.	£3 12s. 6d. $\times$ $\frac{2}{3}$		
81.	Divide £5 in proportion of 6 : 4		
82.	At 3s. 4d. in £ what is total tax on £270?		
83.	Cost of 15 if 9 cost £12		
84.	645 $\times$ 260		
85.	How many hrs. and mins. from 2.47 p.m. to 5.15 p.m.?		
86.	1 per cent. of 100		
87.	100 per cent. of 1		
88.	100 per cent. of 100		
89.	200 per cent. of 100		
90.	Express £2 17s. 6d. as a decimal of £1		
91.	How much a year is 17s. 6d. a week?		
92.	4 $\times$ 7 $\times$ 9 $\times$ 0		
93.	What percentage is 1s. 9d. of 5s.?		
94.	Volume of water in a tank 2 ft. long, 2 ft. wide, 1½ ft. deep		
95.	3½ per cent. of £300		
96.	1 $\div$.1		
97.	3 $\div$.03		
98.	Divide £9 in proportion of 6 : 5 : 4		
99.	Area of plot 2½ yd. square		
100.	Area of all the faces of a cube of 2 inch edge		

If you finish before time is up, go back and make sure that every answer is right.

APPENDIX XXII

RESULTS OF TESTS AND INTERVIEW BY SELECTION COMMITTEE, RECRUIT COURSE NO. 9, 1945 (103 CASES)

NOTE: In the cases in which the airman's choice of trade was not agreed to, the reason is indicated in Column 5 by an index letter, as under:-

- A - Applied for trade in which training is given, but educational standard too low (as revealed by results of Mechanical Arithmetic Test and Classification Test).
- B - Applied for trade in which training is not given, but civilian experience not judged sufficient.
- C - Not available for overseas service (under 24, and without parental consent to overseas service) therefore not granted trade training.
- D - No vacancies in trade requested.
- E - Under age for entry to the trade desired.

	1	2	3	4	5	6	7	8
Civilian Occupation	Age	Educ.	Trade applied for by Recruit	Decision of Selection Committee	Mechanical Arithmetic	Classification Test		
Presser	18	2 Sec.	W/Op.	A	ACH/GD.	27	24	
Draughtsman	20	3 "	Electrician	C	"	92	48	
Engineer	20	4 "	Technical Trainee		Tech.	67	52	
Bushman	28	Matric.	Bushman		Bushman	85	55	
Elect. Eng.	23	VI Std.	Electrician	A	ACH/GD.	25	17	
Cutter	18	Prof.	Technical Trainee		Tech.	56	28	
Plant Operator	18	Prof.	Plant Opr.		Plant Opr.	47	50	
Millhand	18	V Std.	Bushman	B	ACH/Wks.	15	20	
Carpenter	30	2 Sec.	Carpenter		Carp.W.	51	33	
Farmhand	22	VI Std.	ACH/General Duties		ACH/GD.	27	19	
Carpenter	20	3 Sec.	Tech.		Tech.	47	35	
Mechanic	18	Prof.	Tech.	A	ACH/GD.	39	27	

1	2	3	4	5	6	7	8
Civilian Occupation	Age	Edu.	Trade applied for by Recruit		Decision of Selection Committee	Mechanical Arithmetic	Classification Test
Copper-smith	21	1 Sec.	ACH/Works		ACH/Wks.	42	18
Farmer	22	2 "	ACH/Works		ACH/Wks.	56	36
Radio Mechanic	19	Prof.	Rad/Trainee		Rad.	55	35
Bushman	20	Prof.	Bushman	B	ACH/Wks.	40	33
Farmhand	18	VI Std.	ACH/GD.		ACH/GD.	21	15
Motor Mechanic (15 yrs)	32	4 Sec.	Tech.		Tech.	74	38
'A' Grade Student	21	Half B. Sc.	M/Ord.		M/Ord.	75	42
Tractor Dvr.	27	VI Std.	Tech.	A	ACH/Works	60	22
Butcher	18	VI Std.	ACH/GD.		ACH/GD.	18	12
Postman	19	VI Std.	W/Op.		Rad.	51	39
Butcher	26	Prof.	Cook	A	Mess	47	25
Sawmiller	19	V Std.	Bushman	B	ACH/Works	9	11
Brass Finisher	22	1 Sec.	F/Mech.		Tech.	44	42
Farmer	25	2 "	Tech.		Tech.	79	40
Motor Mechanic	20	2 "	Tech.	A	ACH/GD.	51	25
" "	21	3 "	F/Rigger		Tech.	73	54
P. & T. Messenger	18	1 Sec.	Cook		Cook	24	42
Fitter and Turner	22	3 "	Tech.		Tech.	54	33
Sawmiller	19	S. Cert.	Arm.	C	ACH/GD.	68	30
Seaman	21	2 Sec.	W/Op.		Rad.	77	44
Civil Servant	19	P.S.E.	Rad.		Rad.	98	66
Hotel Steward	18	Prof.	M/Ord.		M/Ord.	67	47
Butcher	20	Prof.	Tpr/Op.		Tpr/Op.	50	53
Patternmaker	19	1 Sec.	F/Rigger	A	ACH/GD.	56	29
Clerk	22	3 Sec.	Clk. SA.		Clk. SA.	63	44
Ins. Clerk	19	4 Sec.	F/Mech.		Tech.	71	52
Electrician	20	3 Sec.	Rad.		Rad.	62	46
Bushman	38	2 Sec.	Bushman		Bushman	72	47
Hairdresser	19	V Std.	F/Mech.	A	ACH/GD.	17	20
Butcher	22	1 Sec.	Butcher	D	ACH/Works	71	49
Typewriter Mechanic	19	VI Std.	Type. Mech.		Tech.	41	38
Welder	19	Prof.	ACH/Works		ACH/Works	18	13
Painter	20	4 Sec.	Tech.		Tech.	90	54
Dry Cleaning	19	P.S.E.					
Driver & Mechanic	21	VI Std.	ACH/GD.		ACH/GD.	11	11
		3 Sec.	Tech.		Tech.	25	27

1	2	3	4	5	6	7	8
Civilian Occupation	Age	Educ.	Trade applied for by Recruit		Decision of Selection Committee	Mechanical Arithmetic	Classification Test
Farmer	22	1 Sec.	ACH/Works		ACH/Works	63	32
Sawdoctor	20	VI Std.	M/Ord.	C	ACH/GD.	30	31
Rad/Mech.	19	1 Sec.	Rad.		Rad.	66	37
Carpenter	33	1 "	Carp.W.		Carp.W.	53	33
Freezing Lab.	21	VI Std.	ACH/Works		ACH/Works	51	33
Farmer	27	1 Sec.	Tech.		Tech.	53	40
Seaman	19	IV Std.	ACH/Works		ACH/Works	17	23
Engineer	20	Part	Rad.		Rad.	99	76
P. & T.		B.Se.					
Grocer	20	VI Std.	E/A.	C	ACH/Works	49	25
Warehouseman	20	3 Sec.	Rad.		Rad.	80	36
Fitter & Turner	29	4 "	F/Mech.		Tech.	97	55
Grocer	18	2 "	E/A.	C	ACH/GD.	39	27
Shepherd	21	3 "	Bushman		Bushman	44	35
Coach Builder	21	2 "	F/Rigger		Tech.	45	41
Ins. Clerk	20	4 "	F/Mech.	C	ACH/GD.	67	28
Driver	21	2 "	F/Rigger		Tech.	80	40
Tech. Asst.	20	3 "	Mech.I.C.		Tech.	54	34
Driver	31	VI Std.	D/P.		D/P.	46	24
Fitter	28	VI Std.	Tech.		Tech.	60	40
Plumber App.	21	1 Sec.	Tech.		Tech.	37	29
Labourer	19	Prof.	ACH/Works		ACH/Works	51	46
Motor Mechanic	19	2 Sec.	Tech.		Tech.	52	46
Cutter	20	4 "	Tech.		Tech.	66	35
Carp. Appt'ce.	20	Prof.	Carp.W.	B	ACH/GD.	47	30
Grocer	18	VI Std.	F/Mech.		Tech.	74	42
Fitter & Turner	21	2 Sec.	I/Mech.		Tech.	90	53
Clk. Railways	20	3 Sec.	CLK.SA.		Clk.SA.	32	28
Factoryhand	20	1 Sec.	ACH/Works		ACH/Works	25	30
Farmer	27	VI Std.	Tech.		Tech.	54	30
Cabinet Mkr.	20	1 Sec.	Tech.		Tech.	51	32
Fitter & Turner	21	1 Sec.	ACH/Works		ACH/Works	39	20
Driver	18	1 "	Driver(P)	E	ACH/Works	23	42
Teacher	21	M.A.	M/Ord.		M/Ord.	100	79
Painter	20	5 Sec.	Painter		Painter	80	54
Butcher	19	Prof.	ACH/Works		ACH/Works	28	28
Salesman	20	Matric.	Tech.		Tech.	85	50
Teacher	20	U.Ent.	M/Ord.		M/Ord.	90	55
Cabinet Mkr.	20	2 Sec.	M/Ord.		M/Ord.	55	50
Tractor Dvr.	22	Prof.	Cook		Cook	37	31
Tractor Dvr.	18	1 Sec.	Plant Opr.		Plant Opr.	29	31

APPENDIX XIII

41 Milne Terrace,
Island Bay,
Wellington

QUEST 1 MAIRE

1	2	3	4	5	6	7	8
Civilian Occupation	Age	Educ.	Trade applied for by Recruit		Decision of Selection Committee	Mechanical Arithmetic	Classification Test
Engineer	19	1 Sec.	Tech.	A	ACH/GD.	25	28
Clerk	19	2 Sec.	Tech.		Tech.	56	31
Motor Mechanic	20	2 "	Mech. M. T.		ACH/GD.	64	37
Plumber	21	1 "	Plumber	D	ACH/GD.	52	28
Labourer	19	V Std.	ACH/Works		ACH/Works	43	30
Seaman	19	2 Sec.	ACH/GD.		ACH/GD.	57	42
Shearer	20	1 Sec.	ACH/GD.		ACH/GD.	55	38
Farmhand	23	VI Std.	ACH/GD.		ACH/GD.	42	31
Painter	19	VI Std.	ACH/GD.		ACH/GD.	9	18
Farmhand	18	3 Sec.	Driver (P)	B	ACH/GD.	64	39
Farmhand	19	2 "	Driver (P)	B	ACH/GD.	44	45
Fitter & Turner	21	1 "	Mech. I. C.	A	ACH/GD.	22	29
Driver	34	V Std.	ACH/GD.		ACH/GD.	15	10
Rabbitier	19	Prof.	ACH/Works		ACH/Works	80	41
Joiners App.	20	Prof.	Bushman		ACH/GD.	69	42
Cheesemaker	19	V Std.	ACH/Works		ACH/Works	26	25

CASES : 103.

Mean Age

21 $\frac{3}{12}$

Mean

52

Mean

35.7

Apprenticeship completed/partially completed (or) no apprenticeship

Has your Air Force training been counted towards completing apprenticeship?

If so, by how many months was your apprenticeship reduced:

Air Force trade:

Percentage gained at end-of-course trade test:

Present civilian occupation, after demobilisation:

If you intend later to change your occupation, what would you change to?

Do you feel that your Air Force training has helped to improve your knowledge and ability in your present or future occupation? (underline one: A large amount/to a fair extent/to a small extent/not at all.)

2nd October, 1945.

Dear Sir,

As a member of the R.N.Z.A.F. who is also undertaking diversity studies, I am endeavouring to ascertain to what extent trade training and experience gained in the R.N.Z.A.F. has influenced personnel in their choice of employment after being demobilised. For purposes of this study I have taken the fitting trades, as being very important in the R.N.Z.A.F. as well as in industry.

I would be very grateful therefore if you would assist me by filling in a few details in the form attached, and dropping it in the post as soon as you can.

I know you have had a lot of forms to fill in, but this is quite an unofficial one (although undertaken by permission). If you don't wish to complete any particular answer, leave it out. Your reply of course will be treated as confidential. The form can be folded so that the address will show through the window-face envelope.

Yours faithfully,

.....
Name: _____

Occupation before joining RNZAF: _____

How many years employed at that occupation: _____

Apprenticeship completed/partly completed (or) no apprenticeship.

Has your Air Force experience been counted towards completing apprenticeship? _____

If so, by how many months was your apprenticeship reduced: _____

Air Force trade: _____

Percentage gained at end-of-course trade test: _____

Present civilian occupation, after demobilisation: _____

If you intend later to change your occupation, what would you change to? _____

Do you feel that your Air Force training has helped to improve your knowledge and ability in your present or future occupation?
(underline one: A large amount/to a fair extent/to a small extent/
not at all.)

.....

J.L. WHITE,
11 MILNE TERRACE,
ISLAND BAY.

APPENDIX XXIV - PERCENTAGE VALUES OF CERTAIN AIR FORCE
TRADES AS COMPARED WITH CERTAIN CIVILIAN OCCUPATIONS;
TOGETHER WITH METHOD OF ASSESSMENT FOR CREDITING OF
APPRENTICES.

(Issued by Department of Labour).

Part 1 - Method of Assessment.

Part 2 - Table of Percentage Values - (referred to as the Summary, since it is a summary of the report made to the Department of Labour by the investigating officer).

PART I.

The percentage recorded under each Air Force trade in the Summary is the estimated degree of skill the Air Force tradesman possesses after having served 3 years or more in the Service compared to the degree of skill of a civilian trade apprentice who has served 5 years. Thus the estimated percentage value of the Air Force training of a Flight Mechanic for the trade of general engineering is shown as 60%. If an apprentice has had 3 years or more in the Air Force as a Flight Mechanic, this time is equivalent to 60% of a 5 years apprenticeship as a general engineer, and he should therefore be credited with the full period of his Air Force Service (with a maximum of 3 years).

It will be found that the time with which an apprentice who has served in an Air Force Trade should be credited may be calculated by the following formula:

Number of Months in Air Force (with a maximum of 36)	Estimated percentage x value of Air Force Train- ing for Civilian Trade concerned (see SUMMARY).
---	---

60

equals number of months apprentice may be credited with in civilian trade.

The following are examples:-

- (a) Apprentice who has served for 2 years in Air Force as Flight Rigger;

Time to be credited with in trade of Coachwork and Panel Beating:

$$\frac{24 \text{ months} \times 30}{60} \text{ equals } \underline{12 \text{ months}}$$

(If he had served 4 years the calculation would be:-

$$\frac{36 \text{ months} \times 30}{60} \text{ equals } \underline{18 \text{ months}})$$

(b) Apprentice who has served for 18 months in Air Force as Flight Rigger and 6 months as Fitter IIA:

Time to be credited with in trade of Tinsmith and Sheet-metal Worker:

$$\frac{18 \times 20}{60} \text{ plus } \frac{6 \times 40}{60} \text{ equals } \underline{10 \text{ months.}}$$

It is pointed out that the percentage value of Air Force Trade training recorded in the Summary in relation to civilian trades is an estimate of the knowledge gained in the Air Force by a serviceman of average ability who has had an "average" opportunity to acquire knowledge. It follows, therefore, that some men may have capabilities, for the civilian trade selected, above the assessment shown in the Summary, while others may not have gained experience up to the assessed percentage. Much depends on the effort made by the men to acquire knowledge while at the same time opportunities afforded to personnel to maintain interest and increase knowledge may vary considerably. For example, an Air Force tradesman employed substantially in a Repair Depot has more opportunity to acquire experience and mechanical skill than a similar tradesman attached to a Flight Squadron Station where the main task may be routine checking and testing.

It is suggested, therefore, that the percentages recorded in the summary be used only as a guide to decisions by Apprenticeship Committees and that each case should be carefully examined, whether for the purpose of completing an interrupted apprenticeship or for entry into a selected trade as an adult apprentice, in order to ensure that the total period to be served by the trainee to enable him to reach journeyman status is not excessive in the particular circumstances. On the other hand the applicant may have his own ideas as to his degree of fitness for the trade selected and notwithstanding the assessment, as shown by the summary, he may, even although his military service at related trade work entitles him to regard his apprenticeship as completed, himself feel that he needs a refresher course or that he should undergo a short period of additional training. All cases will require tactful handling and the serviceman's estimate of the knowledge and experience he has gained should receive due consideration.

PART 2 - SUMMARY.

PERCENTAGE VALUE OF AIR FORCE TRADE EXPERIENCE IN
RELATION TO CIVILIAN OCCUPATIONS UNDER
AWARDS.

<u>Trade Award</u>	<u>Air Force Trade</u>	<u>Percentage</u>
<u>Coachworkers:</u>		
(a) Coachwork and Panelbeating	Flight Rigger	30
"	Fitter II.A.	60
"	Coppersmith and Sheetmetal worker	
	Repair Depots	100
	Flight Stations	70
(b) Trimmers	Flight Rigger	20
"	Fitter II.A.	40
<u>Electricians:</u>		
	Instrument Repairer Classes 2 & 3	
	Electrician For decision Wiremen's Registration Board.	
<u>Meter Makers and Repairers:</u>	Instrument Repairer Class 1	100
<u>N.Z. Furniture Trades etc.</u>		
(a) Cabinetmaking	Flight Rigger	25
"	Fitter II.A.	40
(b) Upholstery	Flight Rigger	25
"	Fitter II.A.	40
<u>N.Z. Metal Trades:</u>		
(a) General engineering.	Flight Mechanic (tool room 40)	60
Light fitting only.	Fitter II.E (" " 40)	60
"	Machine T.S. & O. Repair Depots	100
"	" Flight Stations	50
(b) Light precision repetition fitting only.	Fitter Armourer	60
(c) General engineering light precision work only and in turning and fitting including light tool room work.	Machine T.S. & O. Repair Depots	100
	Flight Stations	50
(d) Scientific instruments.	Instrument Repairer Class 1.	100
	" " Class 2.	75
	" " Class 3.	40
(e) Gunsmith	Fitter Armourer	100
"	Armourer	50
<u>N.Z. Motor Mechanics.</u>	Flight Mechanic	75
	Fitter II.E	75

<u>N.Z. Motor Mechanics</u> (cont'd.)	Flight Rigger		20
	Fitter II.A		40
	Petrol (Drivers) Mechanic		
	Motor Mechanics		100
	Drivers		40
(a) Motor Electrician	Instrument Repairer.	Class 2	80
"	"	Class 3	70
"	Electrician		95
"	Radio Mechanic		80
<u>Optical Employees</u>	Instrument Repairer.	Class 1	85
	"	Class 2	85
	"	Class 3	60
<u>Radio Mechanics</u>	Radio Mechanic	For decision Wire-	
		men's Registration	
		Board.	
<u>Tinsmiths, Copper-</u>			
<u>smiths and Sheetmetal</u>			
<u>Workers.</u>			
(a) Coppersmithing	Coppersmith and		
	Sheetmetal worker		
	Repair Depots		20
	Flight Stations		20
(b) Sheetmetal work	Flight Rigger		20
"	Fitter II.A		40
"	Fitter Armourer		25
"	Coppersmith and Sheet-		
	metal worker		
	Repair Depots		100
	Flight Stations		70
<u>Jewellers and Watch-</u>	Instrument Repairer	Class 1	85
<u>makers.</u>		Class 2	85
		Class 3	60

GLOSSARY OF AIR FORCE TERMS

- ACH. - Aircraft-hand; recruit, not yet allotted to specific duties.
- ACH/GD. - Aircraft-hand, General Duties; the trade covering unskilled duties and duties for which no specific trade exists.
- ACH.u/t TECH. - Aircraft-hand, under training to enter one of the Technical trades.
- AC1 - Aircraftmen, first class - airman qualified in a particular trade, for which if qualification depended on trade test he gained between 60 and 80 per cent.
- AC2 - Aircraftmen, second class - airman qualified in a particular trade, for which if qualification depended on trade test he gained between 40 and 60 per cent.
- Air Department - The Government department in control of civil aviation in New Zealand as well as Headquarters of the Royal New Zealand Air Force.
- Airman - Any member of the Air Force other than a commissioned officer or a member of the W.A.A.F.
- Airwoman - Member of W.A.A.F. (other than a commissioned officer).
- Classification - The differentiation in status between airmen and airwomen who are not N.C.O's. Airmen may be AC1, AC2, or LAC. Airwomen may be Airwomen first class (WA1), or Leading Airwomen (WAL).
- Conversion - Advancement (by means of further training followed by a qualifying trade test) from one trade to another (allied) trade of more advanced status.
- C.T.T.B. - Central Trade Test Board - The Air Force examining authority, responsible for maintenance of trade standards.

APPENDIX VIII

Serial No.

No. SQUADRON

Period of commencing / / 194

AEROPLANE MAINTENANCE FORM

F. 700

A/C Transferred to Unit on Sgnd.

Authority. Rank. .

AEROPLANE, TYPE :

AEROPLANE No.

AERO-ENGINE, TYPE :

SERIES

INSTRUCTIONS FOR USE

GENERAL

1. F. 700 may be used for any period specified by Unit Maintenance Orders, Part I, or until it is full.
2. F. 700 is to be completed in ink or indelible pencil.
3. F. 700 for each aeroplane are to be numbered consecutively.
4. F. 700 is to be prepared by the N.C.O. i/c Flight in accordance with the detailed instructions in A.P. 1574, paras. 71 and 72.
5. All changes of maintenance personnel are to be initialled by the Flight Commander or N.C.O. i/c Flight.

DAILY INSPECTION CERTIFICATE

6. *Col. 1: Date.*—To be completed on each day on which flying takes place or an inspection is made.
7. *Col. 2: Airframe.*—Hours flown by the airframe are to be brought forward from Col. 29 by the responsible airman on cessation of flying each day.
8. *Cols. 3-6: Aero-engine(s).*—Hours run by the aero-engine(s) are to be brought forward from Col. 29 by the responsible airman on cessation of flying each day.
9. *Col. 7: Automatic Controls.*—The senior flight rigger of the maintenance crew is responsible for the entry of the running time of the automatic control.
10. *Col. 8: Auxiliary Power Unit.*—The senior flight mechanic of the maintenance crew is responsible for the entry of the running time of the auxiliary power unit.
11. *Cols. 9-12 and 15-19: Daily Inspections.*—Appropriate column to be initialled by tradesman responsible on completion of the daily inspection.
12. *Columns 13-14: Armament.*—These are to be completed by the tradesman responsible respectively for bombing up and for rearming the guns. The signature of the airman responsible will be a certificate to the effect that he has satisfied himself that the aircraft has been bombed up and rearmed as detailed by the Armament N.C.O. i/c, and that the equipment immediately involved is functioning correctly.
13. *Cols. 20-26: Fuel, &c., State.*—To be completed by the responsible airmen before the start of each flight. Where tanks are normally filled to capacity, the word "Full" is to be entered in the appropriate column and the amounts of fuel and oil added are to be entered in Cols. 21 and 23. Where tanks are not normally filled to capacity, the quantities in the tanks before the start of each flight, measured in accordance with the facilities available, are to be entered. NOTE.—Any special Unit orders on this subject are, however, to be observed.
14. *Col. 27: N.C.O. i/c Flight.*—Before initialling this column, the N.C.O. i/c Flight is to satisfy himself—
- (i) That flying and running times have been brought forward correctly;
 - (ii) That the periodical inspections due have been done;
 - (iii) That the daily inspection has been done by each tradesman concerned;
 - (iv) That all work detailed in the Change of Serviceability and Repair Log has been completed and certified by the N.C.O. i/c of each trade concerned, and that the Certificate of Serviceability has been signed by the competent officer or N.C.O.
15. *Col. 28: Pilot.*—The initials of the pilot before each flight will be taken as an indication—
- (i) That he has seen the Serviceability Certificate for that day of the N.C.O. i/c Flight (Col. 27).

Operational endurance at.....R.P.M.....hours.

Capacity—Fuel : Gals. Oil : Gals.

Consumption : Gals. an hour (Cruising).....

No.	Position	Replaced by	Date	No.	Position	Replaced by	Date

Periodical Inspections	Next 2 minor		Next major (180-hr.) Due at	Complete Overhaul. Due at
	Period	Due at		
Airframe and ancillary equipment	 Hr			
	 Hr			
Aero-engine No.	 Hr			
	 Hr			
Aero-engine No.	 Hr			
	 Hr			
Aero-engine No.	 Hr			
	 Hr			
Aero-engine No.	 Hr			
	 Hr			

OVERHAULS: The overhaul table is to be completed for all items of equipment installed on the aircraft have a specified life between overhaul. On replacement of any such items the original entries are to be crossed through and the details of the new item entered in the appropriate columns. The hours at which overhaul is due are to be recorded as the airframe hours at which the installation or overhaul occurs or is due.

[illegible]

107 521

CERTIFIED that I have made or supervised the daily inspection of this aeroplane in accordance with Unit Maintenance Orders, Part I, and the appropriate section of Part II of those Orders.

[illegible]

Next repair Serial No.	Airframe.	Engine No.....	Engine No.....
		Engine No.....	Engine No.....

CHANGE OF BILITY AND REPAIR LOG

CHANGE OF BILITY AND REPAIR LOG

[illegible]

CHANGE OF SERVICEPAIR LOG—continued

[illegible]

Entries as necessary have been made in the appropriate log-books : Pilot i/c aeroplane or N.C.O. i/c. /...../194..... Form passed for filing..... O.C. "....." Flight. /...../194.....

PERIODICAL CERTIFICATE

CERTIFIED that I have made or supervised the periodical inspection of this aeroplane in accordance in Unit Maintenance Orders, Part I, and the appropriate section of Part II of those Orders.

[illegible]

CERTIFIED that I have made or supervised the periodical inspection of this aeroplane in accordance with my duties as defined in Unit Maintenance Orders, Part I, and the appropriate section of Part II of those Orders.

INSTRUCTIONS FOR USE—continued

CHANGE OF SERVICEABILITY AND REPAIR LOG

18. An officer or airman placing an aeroplane unserviceable is responsible for—
 - (i) Changing the aeroplane serviceability board to “Unserviceable”;
 - (ii) Completing Cols. 1-4 and 6 of this log;
 - (iii) Informing the Flight Commander, the N.C.O. i/c Flight, or the pilot i/c of the aeroplane.
19. The reasons for placing an aeroplane unserviceable (which include the periodic inspections) are to be stated in general terms—e.g., “Starboard lower plane damaged.”
20. Cols. 1-4 and 6 may be used by pilots to record minor defects which do not, in their opinion, render the aeroplane unserviceable—e.g., “Aeroplane flying slightly left wing low.” When an entry of this kind is made the word “Serviceable” is to be entered in Col. 9.
21. In addition to changes of serviceability, this log is to show details of—
 - (i) Repairs: Nomenclature and number of part or assembly and detail of repair.
 - (ii) Replacements: Nomenclature and number of part or assembly, serial number (if any), and the reason for replacement.
 - (iii) Alterations and modifications: The serial number of the alteration or modification and the A.P. Leaflet number are to be quoted without further description.
22. Airmen other than fitters II, riggers and fitters, flight riggers and flight mechanics—e.g., instrument makers, wireless and electrical mechanics and armourers—are to report commencement and completion of repair, replacement and modification work to the N.C.O. responsible for maintenance work on the aeroplane. Whenever possible the work is to be inspected by an N.C.O. of the trade concerned; if this is impracticable the N.C.O. i/c Flight is to arrange for inspection of the work at all necessary stages. On completion of the work, even if it has been inspected by an N.C.O. of the trade concerned, the N.C.O. i/c Flight is to satisfy himself that the flying qualities and safety of the aeroplane have not been impaired.
23. Cols. 10-12: To be completed by the airman responsible for the work detailed in Cols. 6 and 9.
24. Col. 13: To be signed by the N.C.O. i/c of each trade concerned, or by the N.C.O. in general charge on completion of a major inspection.
25. Col. 14: To be signed only by the Flight Commander, or the N.C.O. i/c Flight, or the pilot i/c of the aeroplane. Before certifying the aeroplane serviceable the competent officer or N.C.O. is to verify from the Change of Serviceability and Repair Log that the work in each trade concerned has been inspected and certified on F. 700, and, where applicable, from the Daily and Periodical Inspection Certificates that appropriate inspection work is up to date.

PERIODICAL INSPECTION CERTIFICATE

26. Col. 1: To show period of inspection—*e.g.*, 10-hour, 30-hour, 60-hour, or 180-hour.
27. Col. 2: To show flying or running hour at which the inspection is due.
28. Col. 3: To show the actual flying or running hour at which the inspection is made.
29. Cols. 4-5: To show the date(s) on which the inspection is commenced and finished.
30. Col. 6: To be initialled by the tradesman responsible on completion of the inspection.
31. Cols. 7-9: To record and certify assembly groups checked by pilot or N.C.O. NOTE.—If an inspection is not made as a complete inspection, the assembly groups or items of groups inspected by the tradesman are to be entered in Col. 7 and a diagonal line drawn through Cols. 8-9. If Col. 7 is used in this manner, separate lines are to be used to record the assembly

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