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REPORT

ON THE PROGRESS OF CIVIL AVIATION IN INDIA AND BURMA

1937-38



GOVERNMENT OF INDIA
DIRECTORATE OF CIVIL AVIATION

PRINTED BY THE MANAGER OF PUBLICATIONS, DELHI.
MANAGER, GOVERNMENT OF INDIA PRESS, NEW DELHI
1938.

Price Rs. 1 or 1s. 6d.

X4-2034-103

49114

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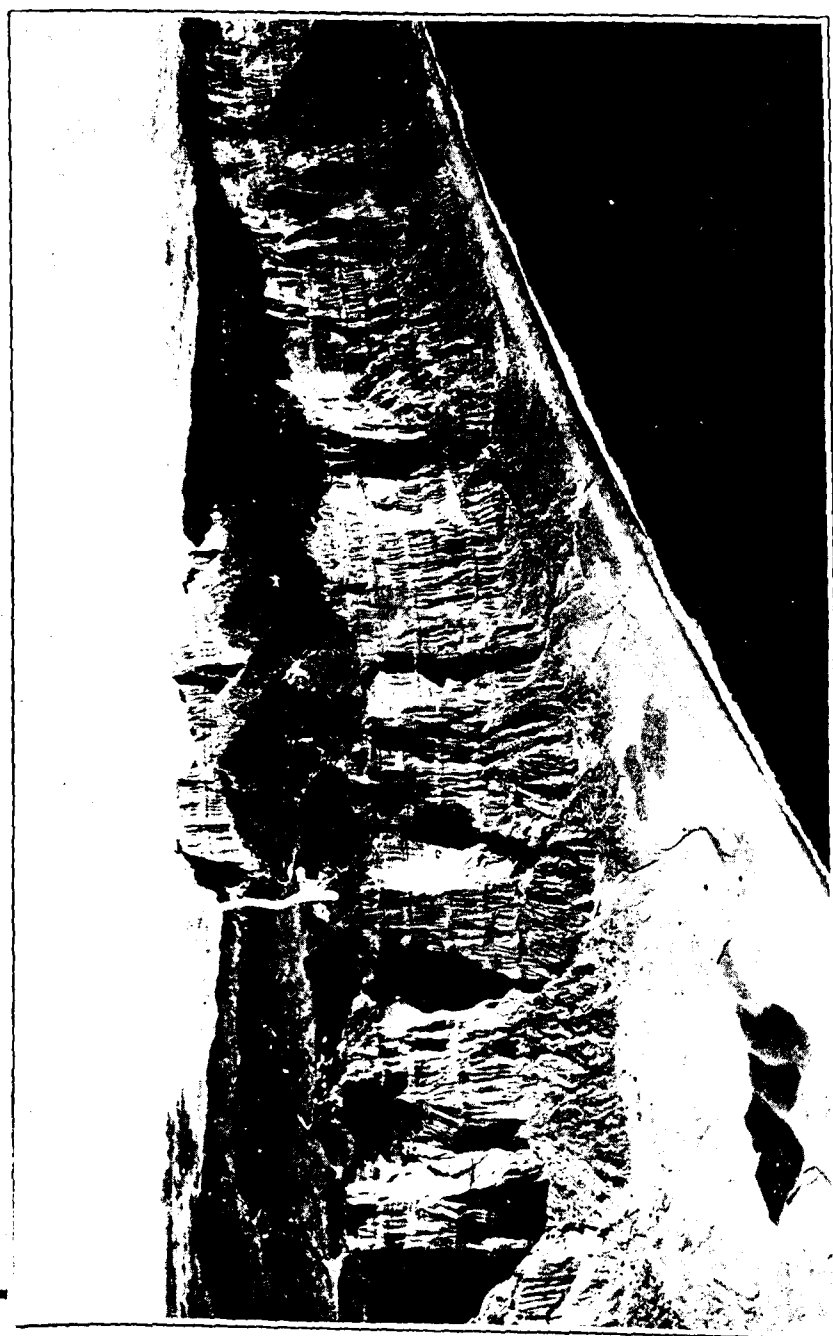
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With acknowledgments to Indian Air Survey and Transport, Ltd.
 The Cathedral Rock, Gwadar, the air travellers' "Gateway of India" on the Mekran Coast, Baluchistan. One of the best known and most distinctive landmarks on the airways. The rock, when silhouetted against the horizon, has the appearance of a vast cathedral and is the first point on Indian territory observed by eastbound passengers.

INTRODUCTION.

NOTE.—Following the practice of previous years, the text of this Report deals with events up to 31st March 1938, whilst the statistical tables relate to the calendar year 1937 to facilitate comparison with figures for other countries. As an exception, complete operational statistics are given for seasonal air services which operated during the winter months 1937-38.

The present Report completes the account of an era in air transport in India which reached its end with the opening of the Empire Air Mail Scheme in February 1938. The Report is thus concerned with a period when Indian air transport was in process of replanning and re-organisation in preparation for a greatly enlarged scheme of operation and utility.

The following tables illustrate the development of regular air transport services operated by the principal nations and the relative position of India in 1937 and previous years. The figures foreshadow the great advance in air traffic that may be expected in future years when the Empire air mail services are in full operation. The 1937 figures for Great Britain and the British Commonwealth of Nations include the operation of the all-up mail scheme on the England-Africa route during the second half of the year.

Indian route mileage was increased in 1937 by the opening of the Bombay-Kathiawar and Bombay-Delhi air services. These new air lines are significant of the impetus which has been given to projects for internal air services in India. The widening of public demand for air travel and the air carriage of mails will inevitably encourage the further growth of airways connecting with the trunk services or serving local needs.

Mileage of regular air routes.

Year.	Great Britain.	India.	British Commonwealth of Nations.	United States of America.	France.	Germany
1933 . . .	11,670	5,180	32,670	47,687	21,450	71,228
1934 . . .	13,750	5,830	41,390	50,800	21,290	23,440
1935 . . .	18,739	6,395	53,291	52,461	24,451	22,291
1936 . . .	23,717	6,483	68,240	61,532	33,798	23,494
1937 . . .	26,679	8,325	79,875	63,656	38,750	31,880

NOTE.—The mileage given is the mileage of the air routes over which services are operated by the countries named.

British Regular Air Transport Services.

Year.	Miles flown.	Passengers carried.	Outward airmail (external).	Total air mails (internal and external).
			Tons.	Tons.
1933 . . .	2,638,000	79,100	85	171
1934 . . .	4,557,000	135,160	122	250
1935 . . .	8,412,000	200,000	187	714
1936 . . .	9,584,000	236,300	325	977
1937 . . .	10,783,000	243,805	667	1,602

Internal Regular Air Services—India and Burma.

Year.	Miles flown.	Passengers carried.	Mails carried.
			Tons.
1933 . . .	153,680	155	10·5
1934 . . .	345,771	757	21·3
1935 . . .	553,754	553	43·4
1936 . . .	496,539	349	49·4
1937 . . .	622,193	1,178	61·2

Since the start of the "all-up" mail scheme, Indian aircraft operating on the feeder air services have increased their scheduled flying from 8,260 to 25,660 miles per week while the mail loads they carry have increased from 2,600 lbs. to 12,000 lbs. per week. Imperial Airways and its associated companies are flying daily a distance greater than a circuit of the earth. On the Indian and eastern route over 13 tons of mails are carried every week by air to and from Southampton. This figure will be greatly increased when mails to and from Australia and New Zealand are brought into the all-up scheme.

SECTION I.

COMMERCIAL FLYING.

A.—COMPANY ORGANIZATION.

Of the three new companies registered during the year 1936-37 two have started operations and the third, Aero Trade and Transport Limited, has closed down. The aircraft operating companies at the end of 1937 were as follows:—

Company.	Services or other operations.
<i>India—</i>	
Indian Trans-Continental Airways, Ltd.	Karachi-Singapore (operated jointly with Imperial Airways, Ltd.).
Tata Sons, Ltd.	(i) Karachi-Bombay-Madras (since extended to Colombo). (ii) Bombay-Cannanore-Trivandrum (Seasonal—since extended to Trichinopoly). (iii) Bombay-Indore-Bhopal-Gwalior-Delhi (Seasonal). (iv) Air charter.
Indian National Airways, Ltd.	(i) Karachi-Lahore. (ii) Air charter.
Air Services of India, Ltd.	(i) Bombay-Bhavnagar-Rajkot-Jamnagar-Porbandar. (ii) Air charter.
Indian Air Survey and Transport, Ltd.	Air survey and air charter.
Indian Aviation Development Company, Ltd.	Air charter, aeronautical consultants.
Himalaya Airways, Ltd.	(i) Hardwar-Gauchar (irregular). (ii) Air charter.
<i>Burma—</i>	
Irrawaddy Flotilla and Airways, Ltd.	(i) Rangoon-Yenangyaung. (ii) Rangoon-Tavoy. (iii) Air charter.

The non-Indian services across India continued to be operated as in previous years by Imperial Airways, Ltd., the K. L. M. and Air France.

B.—REGULAR AIR TRANSPORT.

1. General.

The Empire Air Mail Scheme began so far as India is concerned at the end of February 1938, shortly before the close of the

period to which this report relates. Interest in the events of 1937 and the figures concerning the regular air transport services in that year, to which the statistical tables in this report refer, must inevitably recede into the background in the new perspective created by the Empire Air Mail Scheme. Continuing the process begun in the previous year, 1937 was a period of deliberate stabilisation during which the organisation for the new order was being carried through in all its manifold details. The only important innovation was the introduction of the new 'Empire' flying boats on the England-India route.

Therefore, before dealing with the progress of the regular air services in 1937 it will be an advantage to give first a short general account of the beginning of the Empire Air Mail Scheme which must necessarily take a dominant place in the records contained in the Report.

The general plans for the Empire Air Mail Scheme were stated in the last report. Today the practical benefits of the scheme are already to a large extent being enjoyed by the public in India, and a detailed description of them is no longer required. It is sufficient to say that when this scheme has been fully completed during 1938, the inter-Empire letter mails, excluding those to and from territories on the American continents, will have been transferred to the air without an appreciable increase in postage rates but with an immense saving of time in correspondence between the participating countries.

In India a flat uniform rate of $2\frac{1}{2}$ annas per $\frac{1}{2}$ oz. has been fixed for postage to any of the participating countries. There are five services weekly to and from Europe and since 10th April a schedule of $2\frac{1}{2}$ days between Karachi and Southampton has been maintained, with but a few delays.

For the Indian air transport companies concerned in this scheme the new responsibilities that have fallen to them have had the effect of almost quadrupling their activities in a single stride. The following brief particulars will illustrate the scope of this expansion :—

Indian Trans-Continental Airways Limited, which with two Atalanta aircraft of Indian registration has since July 1933 taken a half share with Imperial Airways Limited in the operation of the route from Karachi to Singapore, is increasing its capital from Rs. 10,00,000 to Rs. 32,00,000, and will own four of the eight Armstrong Withworth 'Ensign' aircraft which will in future operate two services weekly over the entire route from England to Calcutta. The capacity-ton-miles to be operated by the Company will advance from 750,000 to 3,000,000 ton-miles a year.

The Tata service, measured by this yard stick of capacity-ton-miles, will show an enlargement from 76,500 to 306,500 ton-miles a year. The company's fleet has been renewed with larger and faster aircraft and the route of 1,800 miles now operated from Karachi to Colombo is no longer to be considered merely as an Indian feeder service but has become an important branch of the inter-Empire scheme.

Indian National Airways flying on the 700 mile route from Karachi to Lahore, have effected an increase in capacity-ton-miles from 30,300 to 94,000 a year, and the company now find themselves in a position to consider the development of passenger traffic on this route.

The first unsurcharged air mails to reach India from Europe under the Empire Air Mail Scheme left Southampton in two flying boats, the 'Coolangatta' and the 'Centurion' on the 23rd February 1938 and arrived at Karachi on the 27th February. The large load of mails on this initial service made it necessary to employ two flying boats, but of these only one, the 'Coolangatta', proceeded beyond Karachi to Singapore. A photograph of this flying boat on the water at Bally Reach, Calcutta, appears facing page 10. In the westbound direction, the first service to leave India departed from Calcutta on the 1st March 1938, left Karachi the following day and reached Southampton on Sunday, the 6th March 1938.

Before the commencement of the new services, survey flights were carried out to test the route organisation. Survey flights up to Karachi were first made, commencing with a flight by the Kent Class flying boat 'Satyrus' in July, followed by two more flights in August. Two flights by the Empire Class flying boats were made in September and paved the way for the opening of the regular flying boat service to Karachi on 7th October 1937. The first survey flight through to Singapore was made by the 'Satyrus' which arrived at Karachi on the 18th October and reached Singapore on the 27th October, to be followed by an Empire Class flying boat in November. Further flights were made in the following months, including one which was continued to New Zealand with the object of investigating the possibilities of a service across the Tasman Sea. All these flights were completed successfully and produced very valuable information for the improvement of the ground organisation.

At the outset, during the change-over period from the twice weekly schedule to the new frequency of four services weekly, many difficulties had to be overcome to preserve the regularity of mail deliveries before the services settled down to the new schedules. For example, the two eastbound services prior to February 27th were operated to Singapore by flying boats and the mails for Delhi were unloaded at Gwalior and brought to Delhi by aeroplanes chartered from Indian National Airways Limited,

while in the westbound direction for the first two weeks the flying boats flew to a slightly altered schedule which was later changed to the normal one.

From 27th February, four services weekly between India and England were operated by flying boats as far as Karachi. From Karachi two of the flying boat services were continued across India to Singapore, and the other two services connected at Karachi with services operated by Atalanta aircraft between Karachi and Calcutta, *via* Delhi. The section Karachi-Calcutta is flown in one day both by the flying boats and the Atalantas. When the 'all-up' mail scheme was extended to Australia in August 1938, the frequency of the services between India and England was increased to five. The three flying boat services are operated right through to Australia *via* Singapore. Two of the services west of Karachi are operated by aeroplanes and three by flying boats. For a limited period until the new 'Ensign' aircraft are ready, use is being made of 'Hannibal' and 'Atalanta' aircraft for the aeroplane services on the section Egypt-India, connecting at Karachi with services across India to Calcutta operated by the existing 'Atalanta' machines, which will be supplemented, if necessary, by additional Atalantas brought from the African route.

Up to the end of May, 56 eastbound services from England landed 62.2 tons of mails for India and Ceylon and 51 westbound services carried 44.9 tons from India and Ceylon. On these figures it is estimated that the annual weight of mails inward and outward at Karachi from and to the West will be approximately 249 tons and 180 tons respectively per annum. The estimates arrived at before the inauguration of the scheme were 213.4 tons inward and 164 tons outward.

With this brief outline of the opening of the Empire Air Mail Scheme as a preface, the operations of the regular air services during 1937 will now be considered. There was again a substantial increase of air traffic generally during the year. Surcharged air mails to India increased from 61.2 tons to 73.4 tons. Surcharged air mails from India increased from 53.8 tons to 62.5 tons.

Air mails carried by the two Indian feeder services increased from 49.4 tons to 61.0 tons. These figures exclude the trans-India service which carried both transit mails and Indian internal air mails.

Air passengers to India increased from 864 to 960 whereas the passengers from India decreased from 973 to 930. This falling off was due not to any slackening of the demand but to the inability of Imperial Airways to carry all the passenger traffic offering from India to the West owing to the growth in mail loads and shortage of aircraft. This will be referred to again a little later.

In Appendix 13 will be found a comparison of the traffic carried by all the services expressed in ton-miles, from which a comparison may be made of the traffic carried by the Imperial Airways' services, the K. L. M. services to Batavia and the Air France services to Indo-China.

A point of interest in connection with imports and exports by air (Appendix 3) is the growth in the past two years in the importation of precious stones. At Karachi the value of such imports in 1936 amounted to Rs. 70,27,503. In 1937 this increased to Rs. 92,29,874. The low insurance rates for air carriage of valuables is a strong point in favour of this method of transport, apart from the saving of time.

2. Imperial Airways Limited and Indian Trans-Continental Airways Limited.

The trans-India services operated jointly by Imperial Airways, Limited, and Indian Trans-Continental Airways, Limited, from Karachi to Singapore as a part of the England-Australia services continued to run twice weekly throughout the year, the final section of this route from Singapore to Australia being operated by an Australian company Qantas Empire Airways, Limited, as in former years.

Croydon-Karachi Section.—The introduction of 'Empire' flying boats on the Croydon-Karachi section was mentioned in the last report. At first the section Southampton-Egypt was taken over by the flying boats on the 8th February 1937. This resulted with effect from the 1st of May in the saving of one day on the England-India schedule. From that date the schedule of operation was as follows:—

London	.	.	.	Dep. Thursday.	Sunday.
Karachi	.	.	.	Arr. Monday.	Thursday.
Karachi	.	.	.	Dep. Wednesday.	Saturday.
London	.	.	.	Arr. Sunday.	Wednesday.

Early in October, plans were completed for transferring the whole of the route Southampton-Karachi to operation by flying boats. Three trial services were run, arriving at Karachi on the 7th, 14th and 21st October and thereafter beginning on the 24th October, the two weekly services to and from India were all operated by flying boats. The 'Heracles' class aeroplanes hitherto employed on the Egypt-India section were withdrawn and held in reserve for duplicating the flying boat services if found to be necessary. With the coming of shorter hours of day light, however,

no further acceleration of the services was possible and it became necessary on the westbound journey to revert temporarily to a 5-day schedule. The schedule from the 24th October 1937 was therefore as follows :—

Southampton . . .	Dep. Sunday.	Thursday.
Karachi . . .	Arr. Thursday.	Tuesday.
Karachi . . .	Dep. Thursday.	Saturday.
Southampton . . .	Arr. Monday.	Thursday.

Statistics of Imperial Airways' traffic are given in Appendices 1, 2 and 13.

To facilitate comparison with the figures for previous years, the statistics of surcharged air mail carried to and from India and Burma are combined for the two countries in Appendix I. Indo-Burma mails are excluded. On this basis, the total weight carried by Imperial Airways amounted to 128·6 tons, comprising: mails to and from the west 110·6 tons; to and from the east 18·0 tons. The total compares with 108·2 tons carried in 1936 and shows an increase of 18 per cent.

Passengers carried by the company to and from India were 472 eastbound and 448 westbound, compared with 450 and 569 in 1936. The disparity between Imperial Airways' passenger figures and those given on a later page for the K. L. M., which show a substantial rise in both westbound and eastbound passengers will not escape notice, but the reasons for the difference are not far to seek. Imperial Airways had smaller machines and greater mail loads and such space as they were able to offer for passengers was booked to capacity. The K. L. M. offered machines with larger seating capacity besides the attraction of higher speed, and were consequently able to take full advantage of a situation very favourable to their service. Now that Imperial Airways and Indian Trans-Continental Airways are providing far better machines and are also operating to a 2½-day schedule between Karachi and England, it is expected that the balance will again turn in their favour.

Regularity and punctuality figures are given in Appendix 4. Of 104 scheduled services to India 17 were delayed through the following causes :—

Weather	6
Mechanical	4
Late at Alexandria (cause not specified)	7

This makes a favourable comparison with the previous year when owing to a serious shortage of aircraft on the Mediterranean section 43 services were delayed out of 105. Of the 104 westbound services from Karachi nine were late, five on account of weather and four owing to mechanical reasons. The number of late services was two less than in the previous year.

On the introduction of the Empire Mail Air scheme a schedule of 4½ days between Karachi and Southampton (5½ days between Calcutta and Southampton) was operated as shown below :—

(1) Services terminating at Calcutta—

Southampton . . .	Dep. Wednesday.	Friday.
Karachi . . .	Arr. Sunday.	Tuesday.
Karachi . . .	Dep. Thursday.	Sunday.
Southampton . . .	Arr. Monday.	Thursday.

(2) Through services to Singapore—

Southampton . . .	Dep. Thursday.	Sunday.
Karachi . . .	Arr. Monday.	Thursday.
Karachi . . .	Dep. Wednesday.	Saturday.
Southampton . . .	Arr. Sunday.	Wednesday.

After a few weeks of operation the services were working with such regularity and smoothness that with the lengthening hours of daylight it became possible to take the first step in the speeding up of the services. With effect from 10th April the schedule between Southampton and Karachi was cut to 2½ days (3½ days between Calcutta and Southampton) and the days of operation were revised as follows :—

(1) Services terminating at Calcutta—

Southampton . . .	Dep. Wednesday.	Friday.
Karachi . . .	Arr. Friday.	Sunday.
Karachi . . .	Dep. Wednesday.	Saturday.
Southampton . . .	Arr. Friday.	Monday.

(2) Through services to Singapore—

Southampton . . .	Dep. Sunday.	Thursday.
Karachi . . .	Arr. Tuesday.	Saturday.
Karachi . . .	Dep. Thursday.	Monday.
Southampton . . .	Arr. Sunday.	Thursday.

From this date onwards the advantage in time formerly possessed by the foreign services was eliminated. This schedule is based on day flying and further acceleration is still possible with the development of the organisation for night flying along the route and increased operational experience generally. So far as India is concerned, the facilities for night flying on the aeroplane route from Karachi to Calcutta are ready for service and are frequently used.

Karachi-Singapore Section.—Apart from alterations to the schedule consequent on the revisions of the schedule of the England-India service, no changes in the operation of the Karachi-Singapore section occurred during 1937. The mileage flown was 770,900—approximately the same as last year.

A substantial growth in trans-India traffic was again recorded. The passenger traffic increased by 9·7 per cent. from 139,603 passenger-ton-miles to 153,084 passenger-ton-miles, while mail traffic increased by 29·4 per cent. from 302,915 to 392,047 ton-miles. Freight traffic, after remaining stable in 1935 and 1936 at about 25,000 ton-miles increased in 1937 to 35,496 ton-miles.

The load factor (percentage of total traffic-ton-miles to capacity-ton-miles) on this section rose from 63·2 per cent. to 77·8 per cent., and even with the running of duplicate services it was seldom that all the passenger traffic offering could be accommodated.

Regularity and punctuality of operations on the Karachi-Singapore section continued on the whole to be maintained up to the same efficient standard as in previous years, although its punctuality was not infrequently affected by the operations on other sections. Delays of more than two hours which occurred on the Karachi-Rangoon section are shown below, together with comparative figures for the previous year:—

Delays of more than 2 hours on the Karachi-Rangoon section during 1936 and 1937.

<i>Eastbound.</i>			<i>Westbound.</i>		
<i>Reasons for the delay.</i>	<i>1937</i>	<i>1936</i>	<i>Reasons for the delay.</i>	<i>1937</i>	<i>1936</i>
Weather	7	9	Weather	6	5
Mechanical	8	7	Mechanical	7	5
Pilot not available	1	2	Aircraft not available	..	2
Aircraft not available	..	2	Intermediate night stop	2	..
Aerodrome unserviceable	..	1	"	"	"
Late arrival of mails	1	..			
Intermediate night stop	2	2			
Accident	..	1			
Total delayed services	19	24		15	12
Total services operated	104	105		104	105

On eastbound services delay amounting to 98 hours was made up between Karachi and Rangoon, very largely by night flying on the trans-India route. The total night flying on the Karachi-Singapore section, most of which was done in India, amounted to 757 hours as against 683 hours during the previous year. But for

several instances of serious delays on westbound services due to mechanical defects in May and June and a delay of 48 hours due to accidental bogging at Cawnpore in September, the record of delays on the Karachi-Rangoon section is very satisfactory.

The two 'Atalantas' owned by Indian Trans-Continental Airways Limited—'Arethusa' and 'Aurora'—were put into operation in July 1933. Up to the opening of the Empire Air Mail Scheme in February 1938 they had flown 660,000 and 706,000 miles respectively.

Operational statistics for the Karachi-Singapore section will be seen in Appendices 5, 6 and 13 and particulars of the staff employed by Indian Trans-Continental Airways, Limited, in Appendix 14.

Singapore-Australia Section.—No important development or changes took place in connection with this service, which continued to be run twice weekly by Qantas Empire Airways, Limited.

Penang-Hongkong Extension.—Until December 1937, this service was operated on a four-day schedule from Calcutta to Hongkong. The service was then scheduled to run from Bangkok instead of Penang, with a saving of one day between Calcutta and Hongkong as follows:—

Calcutta	Dep. Saturday.
Bangkok	Dep. Sunday.
Hongkong	Arr. Monday.
Hongkong	Dep. Sunday.
Bangkok	Dep. Tuesday.
Calcutta	Arr. Tuesday.

On the introduction of the Empire Air Mail Scheme the days of operation were changed, the service leaving Calcutta on Wednesdays and Hongkong on Tuesdays. From 27th March the service was duplicated and is now running to the following schedule:—

Calcutta	Dep. Monday.	Thursday.
Bangkok	Dep. Wednesday.	Friday.
Hongkong	Arr. Wednesday.	Friday.
Hongkong	Dep. Monday.	Friday.
Bangkok	Dep. Tuesday.	Saturday.
Calcutta	Arr. Wednesday.	Sunday.

Passengers are not accepted for stations between Bangkok and Hongkong. Surcharged mails are carried to Hongkong. The British Government have under investigation a direct route across

Burma to China which would result in a still further saving of time in communication with the Far East. Reconnaissance figures were carried out over the route as far as the Indo-China boundary by the Air Ministry in November and the Government of India Avro X aeroplane was placed at the services of the Air Ministry for this purpose.

3. Foreign Services—K. L. M. and Air France.

The frequency of the K. L. M. services from Amsterdam to Batavia was increased to three services weekly from the beginning of October 1937 and at the same time the company replaced the Douglas D. C. 2 aeroplanes by the larger and slightly faster Douglas D. C. 3 machines. The effect of these changes was a great enlargement in the capacity-ton-miles provided by the company on the route. From 2,069,937 capacity-ton-miles a year the figure increased to 3,056,375 and the result has been much more active competition by K. L. M. for traffic on the Europe-India route. The K. L. M. services continued to operate to a 2½-day schedule between Amsterdam and Karachi. During 1937, 117 services were operated to India and 114 from India as compared with 104 services in each direction by Imperial Airways. The temporary inability of Imperial Airways to hold the advantage which they formerly possessed in passenger traffic on this route has already been explained. The increase in passenger traffic gained by the K. L. M. is shown by the following figures :—

1936—

Passengers to India	291
Passengers from India	385

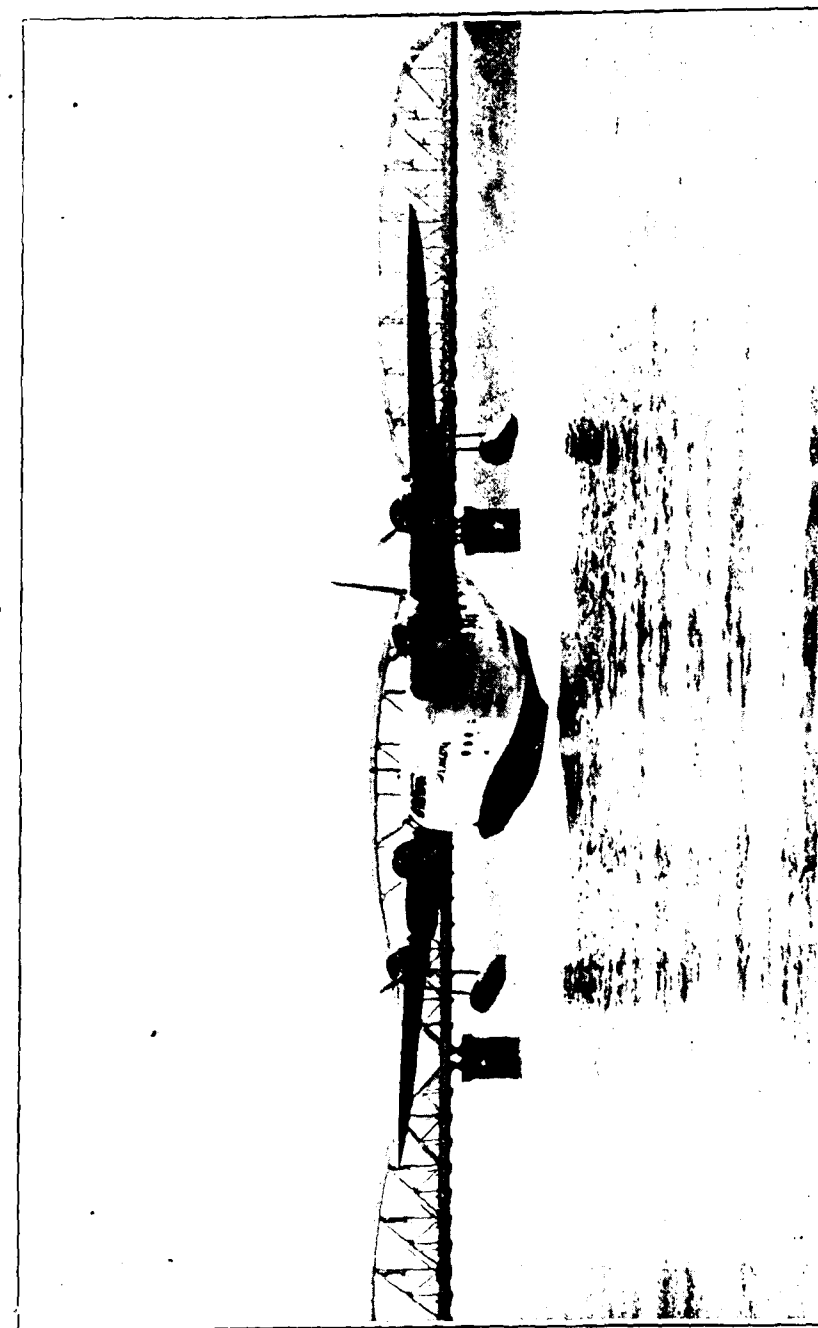
1937—

Passengers to India	466
Passengers from India	472

The mails carried to India by K. L. M. from certain foreign countries again showed an increase of about 40 per cent. over the previous year. The figures will be seen in Appendix I. Mails to India from the west advanced from 10,338 lbs. to 14,542 lbs. and mails from the east from 1,841 lbs. to 1,942 lbs. The mails carried by K. L. M. from India remained negligible as the Company receives mails for carriage only to those countries not served by the British services.

Air France continued to operate one service weekly in each direction on the route Paris-Saigon. With the introduction of new aircraft the schedule was accelerated and is now on a parity with K. L. M. and Imperial Airways, with a 2½-days schedule from Paris to Karachi. The mails carried by Air France from Europe to India showed an increase from 1,101 lbs. to 2,720 lbs., an advance of about 146 per cent. Mails from the East to India and mails from India remain at about the same level as in 1936.

To face page 10.



With acknowledgments to "The Statesman".

Calcutta.—The Empire flying boat 'Coolangatta' landing at the Calcutta seaplane port. Bally Rea is above the Willingdon Bridge on the river Hooghly. The occasion was the first through flight with 'all up' mails to Singapore.

During the period from 6th October 1937 to 1st March 1938, prior to the introduction of the Empire Air Mail Scheme, Imperial Airways, Limited, and Indian Trans-Continental Airways, Limited, were unable to find accommodation for the passenger traffic offering between India and Burma. As a temporary measure, therefore, permission was given to K. L. M. and Air France to carry passengers between the two countries on occasions of urgency when Imperial Airways were obliged to refuse accommodation. While this arrangement was in force, K. L. M. carried 22 passengers between India and Burma.

Statistics relating to these services will be found in Appendices 1, 2, 4 and 13.

The introduction of faster aeroplanes, particularly the K. L. M. D. C. 3, requiring more room for take off and landing began to create problems in connection with aerodromes in India. The problem is not confined to India. It is open to doubt whether the improvement of aerodromes can keep pace with the phenomenal rate of progress of design or be continued to the point which the trend of design seems to indicate. The vast improvement in speed and load carrying capacity of modern transport aeroplanes has yet to be matched by corresponding advances in design for landing and take off.

4. Tata Sons, Limited.

In 1936 Tata Sons, Limited, operated a total route mileage of 2,160 miles, which in 1937 was extended to 2,960 miles. On the inception of the Empire Air Mail Scheme in 1938 the company's routes were extended still further to 3,600 miles. In the same period of two years the mileage scheduled to be flown weekly on regular services increased from 6,900 miles to 19,800 miles. The expansion effected by the company in the past year includes not only the doubling of the frequency of the Karachi-Madras service and its extension to Colombo, but also the extension of the Bombay-Trivandrum service to Trichinopoly to provide a connection with the main route to Colombo, and the establishment of an entirely new service between Bombay and Delhi.

The contract with the company for the operation of the Karachi-Colombo service under the Empire Air Mail Scheme came into operation on 28th February 1938, when the first 'all-up' mails were conveyed from Karachi to the south. The principal features of the contract are as follows :—

The agreement is for the duration of the Empire Air Mail Scheme as at present constituted, a period of 15 years, but subject to revision after the end of every fifth year.

The company will receive a fixed minimum payment of Rs. 15,00,000 a year for the carriage of mails up to a limit of 500,000 lbs. and a fixed rate of Re. 1 per lb. for mails carried in excess of 500,000 lbs.

Of this fixed payment of Rs. 15 lakhs the Government of Ceylon will contribute Rs. 4½ lakhs, this sum being based on an estimated weight of 150,000 lbs. of Ceylon mails to be carried annually by the service. On the same basis the Government of India will contribute Rs. 10½ lakhs for a weight of 350,000 lbs. to be carried annually.

The company's aircraft employed on the service will be exempted from landing and housing facilities at all Government aerodromes. The company will employ so far as possible only Indian personnel in respect of their operations in India and Ceylonese personnel in respect of ground operations in Ceylon. When sufficiently trained Ceylonese personnel is available, the company will employ a suitable proportion of them in all branches of its service.

Experience of the working of the agreement for the first eight weeks up to the end of April 1938 indicated that the total Indian mails will reach approximately 381,500 lbs. a year, which is 37,000 lbs. in excess of the estimate.

On the other hand, the Ceylon mails will, it is expected, average approximately 114,000 lbs. a year, which is 30,000 lbs., below the estimate. It is surmised that the deficiency in Ceylon mails is due partly to the exclusion of certain mails at the wish of the Government of Ceylon.

The total weight of Indian and Ceylon mails combined is likely on these figures to amount to 495,500 lbs. a year, i.e., 7,500 lbs. above the original estimate.

One of the chief problems which had to be overcome by the company in their preparations for the enhanced scale of operations was the training of new staff—particularly pilots and wireless operators. Details of the training are given in Section II.

The company's fleet was increased during the year by the purchase of three D. H. Dragon Rapides and five Waco C. 6 aeroplanes. With four Wacos previously purchased, the fleet now comprises 12 modern machines and two of an older type in reserve.

The Tata aviation organisation has always been noteworthy for the high degree of Indianisation attained. At the end of 1937, 95 per cent. of the total personnel was Indian. Details of the personnel and aircraft employed by the company are given in Appendix 14.

Karachi-Madras Service.—Until the opening of the Empire Air Mail Scheme the service continued to operate twice weekly on the same basis as in 1936.

In order to gain experience on the Madras-Colombo route before the advent of the contract service, the company operated at their own cost experimental services twice weekly between Madras and Colombo from 29th January 1938.

Mails carried in 1937 increased by 26 per cent. from 36.1 tons to 45.5 tons. The weight of northbound mails was again greater than the southbound. The total weights were 23.6 and 21.9 tons respectively. While passenger-carrying still remained a subsidiary object, the total number of passengers carried increased from 69 to 109 and the passenger-miles operated from 38,633 to 68,915.

The high standard of regularity of Tatas' services was well maintained in 1937. Only one service out of 208 was seriously interrupted. This occurred in July, when owing to mechanical defect a forced landing was made at Mughal Bhim and connection was missed with the Imperial Airways' westbound service. Fortunately the flying boat 'Satyrus' on a survey flight left Karachi the morning after the arrival of the mails from Mughal Bhim so that the delay was less serious than otherwise it would have been. The only other instance of delay during the year occurred the same month when a machine was five hours late in arriving at Poona northbound, owing to stress of weather. This delay was made up before arrival at Karachi. 17 southbound services were delayed owing to the late arrival of Imperial Airways' machines at Karachi. Operational statistics for the service will be found in Appendix 7.

A stop at Bhuj in Cutch State was introduced from 16th April 1937. During the rains, however, the landing ground at Bhuj became unserviceable, and the Cutch State have therefore undertaken the construction of a runway so that Bhuj may be included in the permanent itinerary of the service.

The schedule of operation decided upon at the start of the Empire Air Mail Scheme divided the route Karachi-Colombo into two days' flying, with a night stop at Hyderabad, Deccan. The schedule in force after the revision of Imperial Airways' schedule on 10th April 1938 was as follows:—

Southbound.

Karachi	Dep.	Monday.	Wednesday.	Saturday.	Sunday.
Colombo	Arr.	Tuesday.	Thursday.	Sunday.	Monday.

Northbound.

Colombo	Dep.	Monday.	Tuesday.	Thursday.	Saturday.
Karachi	Arr.	Tuesday.	Wednesday.	Friday.	Sunday.

Later, with increased operational experience and the completion of lighting facilities and W/T organisation on the Karachi-Bombay section, the company will be in a position to accelerate

the schedule by night flying in order that, as the next step in development, Madras will be brought within one day's flying from Karachi.

Some difficulty has been experienced by the company owing to the unequal mail loads on southbound services. It was not to be expected that the habit of a weekly mail day so long observed by correspondents in India and Europe would disappear at once on the inauguration of the Empire Air Mail Scheme. It was found that a concentration of mails for South India and Ceylon occurred usually on Mondays. On several occasions when the load was in excess of the capacity of the machine, a small quantity of mails had to be left behind at Karachi for despatch by the service on the following day when the mail weight was less. By April, however, the position had very much improved and mails were delayed through this cause on only two occasions.

Bombay-Trivandrum Service.—This service was again operated during the fine weather season from October to April. From 2nd March 1938, the service was extended from Trivandrum to Trichinopoly, connecting at that place with one of the services on the Karachi-Colombo main line. The extension gives the Travancore State an air connection with Madras, Hyderabad and Ceylon. The complete route, Bombay-Trivandrum-Trichinopoly, is operated weekly in each direction. The services in 1937-38 were again operated with 100 per cent. regularity over the entire season, with a total distance flown of 40,300 miles. Traffic remained light at 385 lbs. of mails, 51 passengers and 179 lbs. of freight. Nevertheless, these results are more than double those returned for 1936-37. Passenger mileage increased from 13,903 to 33,047. Operational statistics are given in Appendix 9.

Bombay-Delhi Service.—The company's new service between Bombay and Delhi was inaugurated at Delhi on 8th November 1937 by the Honourable Sir Thomas Stewart, K.C.I.E., Member in charge of the Department of Communications. His Excellency the Viceroy sent messages of greeting on the first service to the Rulers of Gwalior, Bhopal and Indore and to the Governor of Bombay. This service was made possible by the support of the Indian States mentioned, whose interest has been shown by the payment of subsidies and the provision of aerodrome facilities. The service was operated very successfully until 9th May 1938 when it was suspended for the monsoon months. Operational statistics are given in Appendix 10.

Up to the suspension of the service 105 services were scheduled and 101 completed, a percentage regularity of 96.2. 103 passengers were carried and 161 lbs. of mails. Passenger mileage amounted to 68,770.

5. Indian National Airways, Ltd.

Indian National Airways, Limited, was nearing the completion of its fifth year of operation at the close of the period under review and a statement of the position of the company in the new conditions of 1938 will be of importance as showing how firmly it is established as a national company predominantly Indian in character.

Details of the company's capital were given in last year's report. Since the company started operations in 1933 it has operated 16 aircraft and has safely carried 8,169 passengers. Its aircraft have flown for approximately 11,400 hours, covering a distance of about 1,064,000 miles and involving something like 7,000 departures and landings. The activities of the company embrace the operation of the Karachi-Lahore air mail service, the maintenance of a fleet of aeroplanes at Delhi for charter purposes and the principal agency in India and Burma for Imperial Airways and Indian Trans-Continental Airways, both for bookings and traffic management.

Under a new agreement with these companies, the traffic organisation has been considerably enlarged to meet the increased demands of the trans-India service. Thus, Indian National Airways now controls ten stations for traffic purposes, *i.e.*, five sea-plane stations—Udaipur, Gwalior, Allahabad, Calcutta, and Akyab, and five aeroplane stations—Jodhpur, Delhi, Cawnpore, Allahabad and Calcutta. After the Indian Area Headquarters of Imperial Airways has moved from Karachi to Calcutta this year, the company will take charge of traffic at Karachi also.

The company holds 25 per cent. of the shares of the Indian Trans-Continental Airways, Ltd., and will continue to do so when the share capital is increased to meet the cost of the four "Ensign" aircraft to be acquired by the latter company.

The subsidy of Rs. 1,12,000 per annum which was granted to Indian National Airways during the year 1936-37 was maintained on the same basis and for the same reasons up to the 28th February, 1938, when the company's contract under the Empire Air Mail Scheme began. The subsidy continued to be related to the mail revenue earned on the Karachi-Lahore service. As a result of the increased mail loads the amount of subsidy actually paid was reduced by Rs. 27,000 approximately during the year 1937-38.

The subsidy was granted not only for the operation of the Karachi-Lahore service, but also for the maintenance and operation of the Government aircraft at Delhi. That contract expired on 11th December 1937. His Excellency the Viceroy's aeroplane "Star of India" was transferred to the Royal Air Force, but the company is continuing to maintain and operate the Government Avro X.

The Karachi-Lahore service is now operated by Indian National Airways under a new 15-year contract, the general principles of which are similar to the contract concluded with Tatas. A minimum sum of Rs. 3½ lakhs will be paid to the company for the carriage of mails up to 130,000 lbs. annually. Any mails carried in excess of this figure in any one year will be paid for at a fixed additional rate of Re. 1 per lb.

After the first few weeks of operation it was seen that the mail loads will probably fall a little short of the figure fixed as the basis for the guaranteed minimum payment. On the first 18 services southbound the mails totalled 4,580 lbs., whilst on the first 20 services northbound the weight was 6,867 lbs. The southbound loads are slightly less than the estimated quantity whereas the northbound loads are 25 per cent above the estimate. On these present figures the total weight per annum is expected to amount to 125,000 lbs., 12,000 lbs. above the estimate but 5,000 below the limit beyond which the company will receive extra payment.

The company's fleet on 31st December 1937 consisted of two D. H. Dragons, two D. H. Fox Moths, one D. H. Puss Moth, one Percival Vega Gull and one Percival Gull. Of these aircraft the Karachi-Lahore service is at present operated chiefly by the Percival Gull, the Vega Gull and two Fox Moths; the two Dragons are available if required to cope with extra loads.

Among possible developments of the future the company are contemplating extensions of the Karachi-Lahore service when circumstances permit from Lahore to Kashmir and from Lahore to Delhi.

Karachi-Lahore Air Mail Service.—Operations on this route in 1937 were not marked by any new features of interest. Up to the start of the Empire Air Mail Scheme the service remained unchanged from 1936 on a twice weekly schedule. Mail traffic in 1937 continued to show a steady increase. The total weight carried was 18.3 per cent. above the figure for 1936—15.5 tons compared with 13.1 tons.

Passenger and freight traffic remained small. In view of the inadequacy of facilities, particularly for the night stop at Jacobabad, passenger traffic was not actively encouraged. There were, however, 13 paying passengers as compared with three during 1936. There are signs of an increasing demand consequent on the increased frequency of service, there being seven passengers in March 1938.

208 services were scheduled during the year and 206 were completed—a regularity of 99.0 per cent. Connection with the Imperial Airways' westbound service was missed on two occasions.

The first, in June, was due to engine defect which occasioned 15 hours' delay in arriving at Karachi. The second, in October, was also the result of mechanical trouble, which led to an unscheduled landing at Pad Idan. 17 northbound services were delayed due to the late arrival of Imperial Airways' eastbound.

Minor delays on the service of more than two hours occurred on 11 occasions for the reasons given below :—

Northbound—Weather, 6; Mechanical, 3.

Southbound—Mechanical, 2.

A point deserving of special mention is that, although this route is not yet adequately equipped for night operation, the company's pilots were called upon regularly to fly after sunset and before dawn. For his record of reliability in flying on this route, involving as it did frequent night flying, the senior Indian pilot of the Company, Mr. P. D. Sharma, was awarded the Willingdon Trophy for the most meritorious performance of the year 1936 by an Indian pilot. The schedule of the service during 1937 involved no less than 435 hours night flying, which was completed without incident.

Under the new schedule introduced on the opening of the Empire Air Mail Scheme the Karachi-Lahore route is flown by day in eight hours. The schedule from 10th April was as follows :—

Karachi	Dep.	Monday	Wednesday	Saturday
			Sunday	5.30 hrs.
Lahore	Arr.	Monday	Wednesday	Saturday
			Sunday	13.30 hrs.
Lahore	Dep.	Tuesday	Wednesday	Friday
			Sunday	11.00 hrs.
Karachi	Arr.	Tuesday	Wednesday	Friday
			Sunday	19.00 hrs.

A disadvantage of the change in timing in the arrival and departure of Imperial Airways' services at Karachi is that it is not at present possible for the Indian National Airways' service to connect at Jacobabad with the night mail trains to and from the Quetta district and Baluchistan. Mails from England arriving at Karachi in the evening and taken by the Indian National Airways' northbound service the next morning have to await at Jacobabad the following night's mail train. Similarly, in the other direction, mails arriving in the early morning by the mail train are taken that day by the Indian National Airways southbound service to Karachi and there have to await Imperial Airways departure the next morning. With the full development of night flying on the Karachi-Lahore route these delays will largely be eliminated and a considerably improved service will be given both to the area served by the rail connection at Jacobabad and also to Lahore.

Statistics relating to this service will be found in Appendix 8.

6. Air Services of India, Ltd.

This company started operations on 1st November 1937, when a regular service organised by the company between Bombay and the Kathiawar States was opened by the Honourable Sir Thomas Stewart, K.C.I.E., Member in charge of the Department of Communications. The service calls at Bhavnagar, Rajkot and Jamnagar and terminates at Porbandar. The frequency of the service was at first four times a week but was reduced to three on 22nd November 1937. Between 20th January and 4th February 1938, two separate services were run, one between Bombay, Bhavnagar, Rajkot and Jamnagar and the other between Bombay, Bhavnagar and Porbandar. The second service was then abolished and the extension from Jamnagar to Porbandar resumed. Traffic increased steadily so that by 18th April 1938 it became possible to increase the frequency to five times a week until the suspension of the service for the monsoon season on 5th June 1938. The company will re-open the service as soon as the aerodromes in Kathiawar are serviceable after the rains.

During the 1937-38 season, 219 services were operated with 99.5 per cent. regularity and 933 passengers were carried. The service saves an appreciable amount of time. For example, the journey from Bombay to Porbandar which takes 27 hours by rail can be made by air in a little less than 4 hours. Passengers and freight are carried but not mails. The company receives subsidies from the Kathiawar States whose interest are served.

Operational statistics of the regular service will be found in Appendix 11. The company also undertake charter flights and joyrides, details of which are given on pages 21 and 22.

7. Irrawaddy Flotilla and Airways, Limited.

Continuing its policy of pioneering seaplane services in Burma the following services were operated by the company without subsidy or mail contract :—

- (i) Rangoon-Mandalay, *via* Prome or Yenangyaung. Services as required by traffic. (Suspended on 24th May 1937).
- (ii) Rangoon-Yenangyaung, *via* Prome. Twice weekly.
- (iii) Rangoon-Moulmein. Three times weekly.
- (iv) Rangoon-Tavoy, *via* Moulmein—Extension to Tavoy of Rangoon-Moulmein Service. (Suspended from 22nd June 1937 to 4th November 1937 during the monsoon).

The Mandalay service was withdrawn owing to lack of support and has not been resumed. Traffic on the other services showed a considerable development. 90,662 miles were flown and 744 passengers carried as against 55,414 miles and 249 passengers in 1936.

The services were cancelled when there were no bookings ; this occurred on 50 occasions. Two services were cancelled through engine trouble, four on account of weather conditions, three due to illness of the pilot and 21 when aircraft were not available during overhauls.

Operational statistics are given in Appendix 12 and details of personnel employed and aircraft operated in Appendix 14. Apart from the regular services the company conducted charter flying and joyriding as recorded on page 21.

During the year, the company built a new hangar at their seaplane station on Pazundaung Creek, Rangoon.

C.—MISCELLANEOUS FLYING AND COMMERCIAL ACTIVITIES.

1. Air Survey—Indian Air Survey and Transport, Ltd.

The company's operations during the year amounted to 333 hours flown, 2,159 square miles surveyed and 25 charter flights performed. Among subsidiary activities, the company maintained and operated an ambulance aeroplane for the Government of Bengal, sold two new aeroplanes and carried out overhauls on five machines. Air survey operations extended from Burma to Baluchistan. The chief features of interest are as follows :—

Burma.—At the commencement of the year part of an extensive survey in the Karenni States, Burma, had been already carried out. The balance of the work, consisting of 800 square miles, was completed early in the year. Photographic plans on the scale of 3" to 1 mile were delivered in April 1937.

The Punjab.—The party released from Burma moved to the Punjab, where in addition to town survey, they carried out an interesting experimental survey of areas which have in recent years suffered serious deterioration in cultivable value on account of saline saturation. It was proved that, provided the photography is carried out at the right time, much valuable data can be obtained from the photographs. At certain periods in the winter months, the salt which has reached the surface shows white in the photographs, and the extent of the areas thus rendered useless for cultivation can be determined. Furthermore it was possible to assess the extent to which deterioration had taken place in the less affected areas, and also the locality and extent of areas already deserted for this or other reasons.

Before returning to Dum Dum, the party carried out a forest survey in Rewa State, plans of which were subsequently prepared on a scale of 4" to 1 mile.

Bengal.—The usual programme of Cadastral surveys was replaced by a survey for canalising purposes, and other surveys of a miscellaneous nature. Later in the season, forest surveys were carried out in the Arakan Yomas, using Akyab aerodrome as the base.

Akyab Harbour was surveyed and photographic plans prepared which clearly showed the position of all banks and recent changes to the islands and channels in the inner harbour.

After the rains, field work recommenced with the survey of the town of Bettiah, of which rectified photographs on a scale of 16" to 1 mile were prepared to enable the Survey of India to compile accurate town plans at this scale. At the same time a small forest survey in Bihar was completed.

Assam.—Work was commenced on certain areas in Assam by photographing 141sq. miles of mountainous country, a part of which was subsequently mapped at 8" to 1 mile.

Baluchistan.—In November, a party moved to western India and by the close of the year had completed 1,099 sq. miles of photography in Baluchistan for oil prospecting purposes.

Aerodromes Plans.—The development of aerodromes has led to a demand for more exact and detailed plans, particularly to show the nature and position of structures, trees and other obstructions situated on the approaches. Photography of aerodromes and the preparation of rectified prints from which existing plans may be corrected or fresh plans drawn is undertaken as opportunity offers. Seven aerodromes were photographed and planned during the year.

2. Indian Aviation Development Company, Ltd.

The company was formed in 1937 with the primary object of acting in the capacity of aeronautical consultants and investigating the possibilities of aviation development in all its branches. The company's work embraces the selection and planning of aerodromes, the preparation of detailed schemes for the organization of air lines, flying schools, etc., together with advice on the purchase and operation of aircraft and other technical matters. The company operates a Fox Moth aeroplane for charter flying and joyriding. During the year, 32 hours were flown on charter work and 193 on joyriding, in the course of which 4,050 passengers were carried. Details of the flying done are given on the following pages.

3. Non-regular Air Transport.

Statistics of charter flying by operating companies and flying clubs are given in the table below :—

Company or organisation.	Journeys.	Hours flown.	Miles flown.	Passengers carried.
* Tata Sons, Ltd.	Not known	1,022	104,676	89
Indian National Airways, Ltd.	64	652	62,918	188
† Air Services of India, Ltd.	3	14	1,612	8
Indian Air Survey and Transport, Ltd.	25	58	5,102	37
Indian Aviation Development Co., Ltd.	5	32	2,960	6
Irrawaddy Flotilla and Airways, Ltd.	15	65	6,355	39
Flying Clubs	52	363	32,299	73
Total 1937	139	2,156	215,922	440
Total 1936	411	1,598	140,449	401

* Mainly instructional and test flights which accounts for the small number of passengers.

† Started operations in November 1937.

The amount of charter flying in 1937 compares well with 1936. Whilst the number of passengers carried was about the same, the mileage flown was 54 per cent. more.

At the order of the British Air Ministry an important charter occupying four weeks in November and December 1937 was carried out by Indian National Airways, Ltd., with the Government of India Avro X, over the Southern Shan States for the purpose of surveying a shorter route to China.

Irrawaddy Flotilla and Airways, Ltd., were responsible for delivering diplomatic mails to His Excellency the Viceroy and to His Excellency the Governor of Burma while they were engaged on a tour by steamer. The company also conducted a special flight over Rangoon for His Excellency the Governor of Burma and Party, and provided a seaplane for a tour in Burma by the President of the Indian National Congress.

No details have been received from Himalaya Airways, Ltd. of their operations during the year.

4. Joyriding.

There was considerable activity in joyride flying during the year as will be seen from the following table :—

Company or organisation.	Flights.	Hours flown.	Passengers carried.
Indian National Airways, Ltd.	105	29	418
* Air Services of India, Ltd.	7	1	17
Indian Aviation Development Co., Ltd.	1,351	193	4,050
Irrawaddy Flotilla and Airways, Ltd.	9	3	63
Flying Clubs	Not known	285	3,089
Total 1937	1,472	511	7,637
Total 1936	1,251	419	5,293

* Started operations in November 1937.

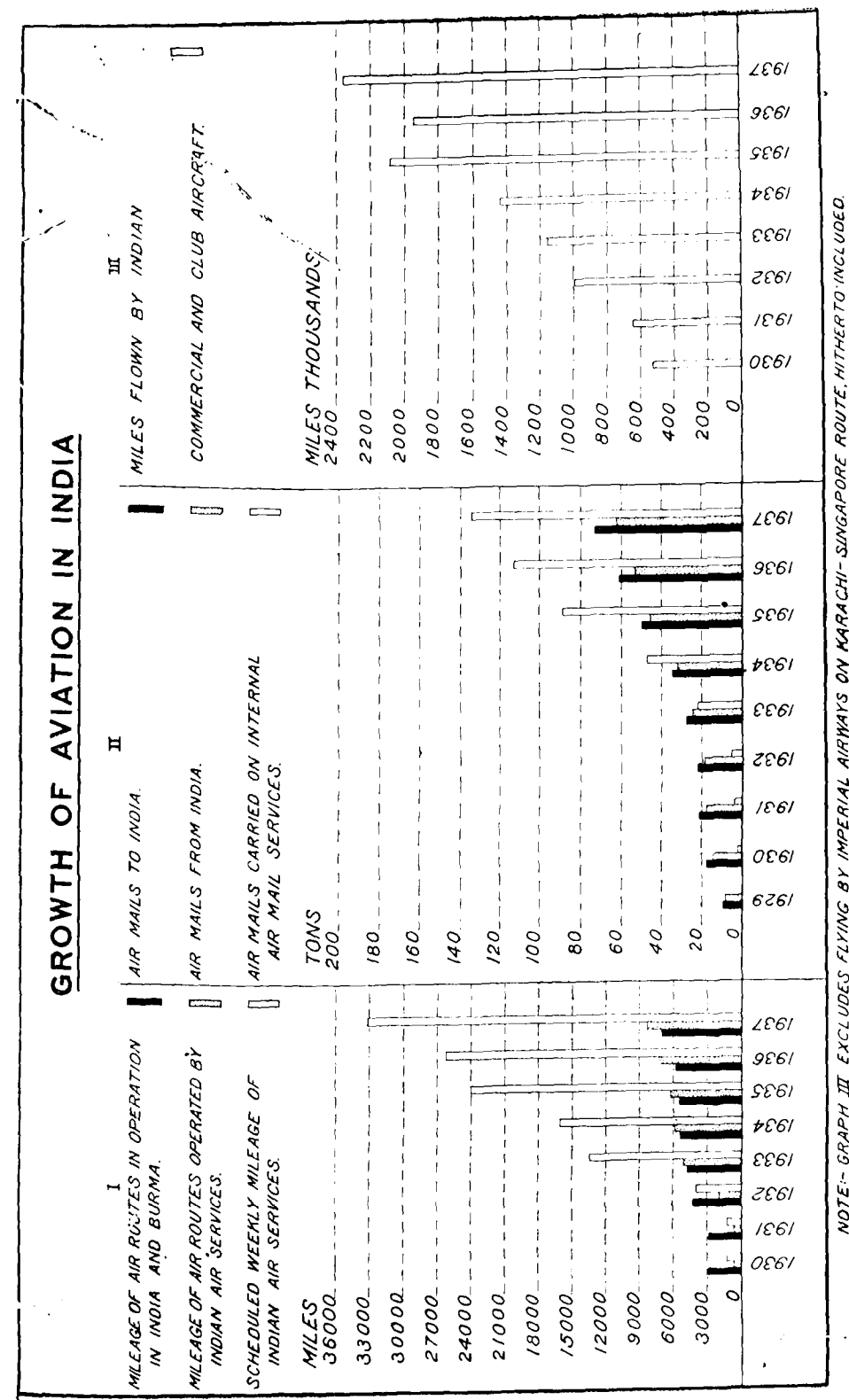
The flying clubs almost doubled the number of passengers taken up for short flights as compared with 1936, but the main increase was due to the efforts of the Indian Aviation Development Company Ltd., who organised a joyriding campaign on systematic lines at centres in South India.

5. Government Aircraft.

The Bengal Government Ambulance Fox Moth continued to give valuable assistance in times of emergency. On one occasion in a case of sickness the machine was used to convey the patient for a consultation at Chittagong. The Inspector General of Prisons, Bengal, availed himself of the machine for an urgent journey to Dacca and back.

To increase the utility of the aeroplanes, the Bengal Government made improvements to the landing grounds at Midnapore and Jessore and are considering the enlargement of the landing ground at Jalpaiguri.

On the expiry of the contract with Indian National Airways, Ltd. for the maintenance and operation of His Excellency the Viceroy's 'Star of India' and the Government of India Avro X,



In December, 1937, the 'Star of India' was transferred to the charge of the Royal Air Force. Fully satisfactory service was given by Indian National Airways during the two years that the machine was operated by them, but as a matter of convenience it was decided to place the maintenance and operation of His Excellency's aeroplane in the hands of the Royal Air Force.

The Avro X remained in the care of Indian National Airways for a further period pending a decision on the general policy of the Government towards the employment of an aeroplane for official tours and other purposes.

Under temporary arrangements with Indian National Airways, the Avro X is being utilised for a programme of training Indian pilots as described in Section II. In addition, the machine is being used in connection with the calibration of the new Adcock direction finding W/T stations.

In the year ending 31st December 1937, the following flights were made in the 'Star of India' by special permission of His Excellency the Viceroy :—

Month.	By.
13th August 1937 . Delhi- Jodhpur- Delhi. }	Quarter Master General in India.
27th October 1937 . Delhi- Karachi- Bombay- Delhi.	The Hon'ble Member in the Industries and Labour Department.

In the same period the Avro X made flights with officials totalling 220 hours. Details are given below :—

Month.	By.
April 1937 . . Delhi-Calcutta-Rangoon Loikaw-Delhi.	Director of Civil Aviation in India.
August 1937 . . Lahore-Karachi-Gwadar- Delhi.	Ditto.
October-November 1937. Delhi-Karachi-Quetta- Delhi.	Director, Intelligence Bureau.
December 1937 . . Delhi-Southern Shan States-Delhi.	Survey of route to China on behalf of the Air Ministry.

6. Sales and Service Organisations.

The value of sales effected by importers and distributors of aircraft and aircraft spares is given in the following table :—

Name of Company.	Sales during 1937.		Increase (+) or decrease (—) on sales in 1936.	
	Aircraft.	Spares and other accessories.	Aircraft.	Spares and other accessories.
	Rs.	Rs.	Rs.	Rs.
De Havilland Aircraft Co., Ltd., Karachi.	2,66,092	1,04,869	—37,022	—3,303
Indian Air Survey and Transport, Ltd., Dum Dum.	45,959	14,495	..	—2,582
R. K. Dundas, Ltd., New Delhi.	2,32,431	27,118	+1,39,531	+5,718
Aero Stores, Ltd., Karachi.	..	21,000	..	+5,000
Other sales and service organisations.	..	6,479	..	—1,358
Total 1937	5,44,482	1,73,961	+1,02,509	+8,639

(1) *De Havilland Aircraft Co., Ltd., Karachi.*—The company's total turnover of Rs. 3.71 lakhs during 1937 includes 2.67 lakhs in respect of sales of complete aircraft which comprised three Dragon Rapides, one Dragonfly, two Hornet Moths and two Tiger Moths.

The company continued to maintain a service organisation at Karachi.

(2) *Indian Air Survey and Transport, Ltd., Dum Dum.*—This Company maintains an efficient sales and service organisation and reports increased business.

(3) *R. K. Dundas, Ltd., New Delhi.*—Turnover increased by Rs. 1.45 lakhs during the year. The firm now represents the following British aircraft manufacturers :—

Airspeed (1934), Ltd.
General Aircraft, Ltd.
Percival Aircraft, Ltd.
Phillips and Powis, Ltd.
Whitney Straight, Ltd.

(4) *Aero Stores, Karachi.*—The company reports that the year 1937-38 was the first year since 1922 which had proved profitable—the result of an all-round development of business. The company has an efficient sales and service organisation and has now added departments for aviation maps and aerodrome supplies. Special attention has been given to supplying such aerodrome requirements as “No wind” signal balls, crash equipment, asbestos fire-fighting suits and paraffin flares.

(5) *Indian Aviation Development Co., Ltd.*—A qualified staff is maintained to erect and test and service aircraft. The company co-operates with Aero Stores, Karachi.

(6) *A. R. Haseler and Co., Ltd., Bombay.*—This company now holds in stock more than 500 different items. It has introduced a scheme of servicing aircraft instruments in conjunction with Smith's Aircraft Instruments, Ltd., London. Spare instruments are loaned to operators while theirs are being repaired or overhauled and this had proved a very useful facility to aircraft owners.

7. Imports of Aircraft and Aircraft Material.

The import trade in aircraft and aircraft parts and accessories made a remarkable advance from Rs. 14 lakhs in 1936 to Rs. 41 lakhs in 1937. Complete aircraft imported rose from 30 valued at Rs. 6.4 lakhs to 62 valued at Rs. 31.4 lakhs. A large part of this increase is attributable to the additions made to the fleets of the feeder services in India and to the new aircraft of more modern types acquired by several Indian Princes. The total includes complete aeroplanes valued at Rs. 4,14,880 and accessories worth Rs. 49,590 imported from the United States of America. A comparison with the figures for the three previous years is given below :—

Year.	Aircraft imported.		Value of aircraft parts, etc., imported.	Total value of aircraft and aircraft parts, etc., imported.
	No.	Value.		
		Rs.	Rs.	Rs.
1934	32	4,06,140	4,02,425	8,08,565
1935	25	3,13,131	5,03,473	8,16,604
1936	30	6,43,580	8,04,408	14,47,988
1937	62	31,44,027	9,73,678	41,17,705

A list of the aircraft added to the Indian Register of Aircraft in 1937 is given in Section IV—Administration (page 63).

SECTION II.

FLYING CLUBS, TRAINING AND PRIVATE FLYING.

A.—TRAINING INSTITUTIONS AND FLYING CLUBS.

No new flying clubs or training institutions were formed. A summary of the work done during the year is given in Appendix 15. This Appendix has been re-arranged to show the comparative figures for the last three years and to enable the work of the subsidised and unsubsidised flying clubs to be more easily compared. The number of Indian members of the flying clubs and schools has remained practically stationary and represents 65 per cent of the total. The number of aircraft employed in the clubs and the Aeronautical Training Centre of India rose from 35 to 39.

Appendix 15 shows that 10,683 hours' flying has been done by the subsidised flying clubs as against 8,782 the previous year, an increase of 1,901. The total flying, including the flying performed by the Aeronautical Training Centre, the State flying clubs and the Rangoon Flying Syndicate, has increased by 3,061 hours, i.e., from 10,342 in 1936 to 13,618 in 1937. There has also been a substantial increase in the amount of night flying done.

The principal contributors to this increase among the subsidised clubs were Bombay, Delhi, Karachi and Northern India. The increase shown by the unsubsidised organisations was chiefly due to 1,732 hours' flying accomplished by the Aeronautical Training Centre, as against 348 in the previous year. An interesting feature is that the Delhi Flying Club in 1935, before the establishment of the Aeronautical Training Centre, achieved only 816 hours' flying. In 1937, however, the hours rose to 1,859, in spite of the fact that the Training Centre did 1,732 hours' flying from the same aerodrome. These two organisations, therefore, averaged jointly nearly 10 hours a day flying training during 1937.

During the year the agreement mentioned in last year's Report whereby the Delhi Flying Club carried out *ab initio* flying training on behalf of the Aeronautical Training Centre of India was discontinued. The Training Centre thereafter undertook the entire training of its pupil pilots and the Delhi Flying Club now employs its own engineering personnel for aircraft maintenance.

Subsidies to Flying Clubs.—The total sum available for subsidies to flying clubs in 1936-37 amounted to Rs. 1,36,500, of which Rs. 21,000 was contributed from the Petrol Tax Fund.

The year 1937-38 was the second year of the three year scheme of subsidies introduced in 1936. It was again shown that none of the clubs was capable of earning the maximum subsidy under the

terms laid down. The Government of India, therefore agreed, as they did in the financial year 1936-37, to make additional special grants to the clubs in order to increase the amount of subsidy actually paid. A departure was made, however, in the system of payment. In 1936-37, at the end of the financial year, each club received a grant up to the maximum subsidy payable, i.e., Rs. 20,000 per club irrespective of the actual results. In 1937-38 besides the bonus payment in respect of pilots' 'A' licences issued and renewed (Rs. 300 and Rs. 100 respectively) an additional payment related to flying hours performed was given. A distinction was made between inland clubs and clubs located at seaports, with a view to compensating the former for the higher cost of petrol, spares and other stores at inland centres. The bonus was paid on flying hours at the rate of Rs. 6 per hour for inland clubs and Rs. 3-8-0 for port clubs for the first 1,000 hours, and Rs. 4-8-0 and Rs. 2 respectively for flying in excess of 1,000 hours.

Under this system of bonus payments the total budget provision of Rs. 1,36,500 would have been exceeded. It was, therefore, decided by the Government that the maximum subsidy and bonus payable to any one club should be limited so as to keep within the budget provision. This resulted in two of the clubs, which had done exceptionally well as regards flying hours and the training of pilots for 'A' licences, receiving the limit payment of Rs. 21,799 when under the bonus system they had earned a good deal more.

The award of bonus for 'A' licences issued and renewed was again made to the Jodhpur State Flying Club in 1937-38.

The amounts paid as subsidies to individual clubs are shown in the following table:—

	1935-36.	1936-37.	1937-38.
	Rs.	Rs.	Rs.
Bengal	20,000	19,992	13,783
Bombay	19,100	20,000	21,709
Delhi	19,600	20,000	21,799
Karachi	21,000	23,000	21,799
Madras	19,500	20,000	21,762
Northern India	17,000	19,976	19,742
United Provinces	18,500	20,160	15,606
Jodhpur	..	2,000*	300*

*Bonuses for 'A' licences.

B.—TRAINING RESULTS.

Pilots.—Appendix 15 gives the detailed results of flying training compared with the 1935 and 1936 results. There was a further increase in the number of commercial pilots trained in 1937, while the training of 'A' licence pilots remained at about the same level.

The United Provinces Flying Club purchased during the year for *ab initio* training a 'Taylor Cub' aircraft which it is possible to operate at the much reduced flying rate of Rs. 19 an hour. The use of an aeroplane of this type should create a ready response from those who have hitherto found flying in the standard Moth training type too expensive for local flying and short cross country flights and should enable more 'A' licence pilots who have learnt to fly to keep in flying practice.

For commercial licence training, three clubs (Madras, Karachi and Delhi) possess aircraft of the light cabin type, such as the three seater 'Leopard Moth', and the Bombay Flying Club purchased for advanced training purposes a 'Vega Gull', a high speed single-engined four-seater monoplane suitable for use commercially on feeder lines and of a type already in use by two Indian operating companies. The Karachi Aero Club have purchased a light two-engined aeroplane in order to give 'B' licence trainees experience in flying multi-engined aircraft. No bonus is at present given for commercial pilots' training, which in most cases forms the bulk of the flying training given by the clubs, and it is impossible with their available financial resources for the clubs to equip themselves with the types of aircraft which are really needed for commercial pilots' training.

The advanced training of 'B' pilots passed out by the flying clubs with only light aeroplane experience was one of the problems which had to be overcome by Tata Sons, Limited, in their preparations for the development of their services under the Empire Air Mail Scheme. The company at their own cost established a training school and brought out an instructor from England to train selected pilots on the new types of aircraft which they have now brought into use.

In order to assist Tatas and Indian National Airways in this matter the Government of India placed the Avro X at the disposal of nominees of these companies at half the normal flying rate in order that they might be given flying experience on a large multi-engined aeroplane. Six pilots received about 10 hours flying in this way before the end of 1937.

This scheme proved very successful and it was proposed to continue with such training in 1938, taking advantage of the flying of the Avro X to give air experience to wireless operators at the same time. As the Empire Air Mail Scheme had started by the time the further scheme received Government sanction, most of the

available personnel were actively employed by the operating companies and could not be spared to undergo further training. Up to date it has not therefore been possible to give so much of this training as was anticipated.

Training for commercial licences, coupled with the up-to-date facilities afforded by the ground lighting equipment at Karachi, Jodhpur, Delhi, Cawnpore and Bombay, accounts for the remarkable increase in night flying by the clubs at these aerodromes. The total night flying during the year amounted to 344 hours compared with 66 hours in 1936. The Delhi, United Provinces and Karachi clubs headed the list with 86, 71 and 70 hours respectively.

Air Navigators.—The Aeronautical Training Centre of India and the Karachi and Delhi Flying Clubs have instructors holding 2nd class Air Navigator's licences who give navigational training to those wishing to take this class of licence, but there is still a need for improvement in the facilities for specialised training in air navigation, particularly in the practical application of navigation theory in the air and the use of wireless aids to navigation. Four Indian licences for 2nd Class Air Navigators were issued in 1937. Two candidates received their training at the Karachi Aero Club, one held a British licence and one qualified by passing the Air Ministry examination held in England.

Wireless operators.—Seven candidates for W/T operator's licences were trained by the Aeronautical Training Centre of India during 1937; of these two were licensed during the year and four have been licensed since. As mentioned on a later page (under 'Scholarships') four of these candidates were assisted by Government. Tata Sons, Limited, whose aircraft operating on the section Karachi-Bombay are equipped with W/T, have now taken into their employment two of these W/T operators on the regular staff and two on probation. The company selected the most efficient men from six of the newly trained operators who had been engaged on trial.

Permission has been granted to the company to establish a private W/T station in order to give further training to their personnel. Similar permission has been granted to the Aeronautical Training Centre for the establishment of a station at Delhi.

Ground Engineers.—In addition to pilots, the clubs have trained 12 ground engineers as opposed to 11 in the previous year. Bombay and Karachi trained three each, Bengal and Northern India two each and Madras and United Provinces one each.

In all, 40 new ground engineers received licences in 1937. Of the remaining 28, 11 were trained by the Aeronautical Training Centre, nine in England, six with commercial companies in India, one by Patiala State Aviation Department and one by the Rangoon

Flying Syndicate. All the above licences were for the 'A' and 'C' category. While there is no shortage of ground engineers licensed in this category, there is a demand for engineers holding the more advanced 'B' and 'D' licences. Two Indian ground engineers who had been trained in England and already held Indian 'A' and 'C' licences were licensed in the 'B' and 'D' categories.

It is noticed that the average candidate for an initial ground engineer's licence is insufficiently trained in the use of hand tools. A thorough grounding in the use of metal and wood hand tools must be regarded as the first essential in the curriculum of a ground engineer's training and should receive more attention than at present. Another point for remark is that pupils should be encouraged to pass in electrical services, turn indicators and compass adjustment, an asset to their qualifications which many neglect.

Total licensed personnel.—For reference in connection with the foregoing information on training results it may be mentioned that a table showing the number of licences in each class issued during the year and current on 31st December 1937 appears in Section IV, page 58.

C.—CIVIL AVIATION SCHOLARSHIPS.

Apart from the Government assistance given to pilots for multi-engined training on the Avro X, the Government gave the under-mentioned scholarships :—

Pilot-instructors.—Last year's Report mentioned two Indian pilots who were trained as flying instructors and had since obtained posts in that capacity. The grant of two courses for instructors was repeated this year. The two pilots selected were given training, one at the Bombay Flying Club and the other at the Delhi Flying Club. One of these has obtained his pilot-instructor's licence and is now employed as an assistant instructor at the United Provinces Flying Club. The other pilot has not yet completed his training, but will shortly do so.

Transport Pilots.—A 'B' licence pilot, mentioned in last year's Report, is continuing his training in England with a view to employment as First Officer by Indian Trans-Continental Airways, Limited. Another Indian pilot, who had previously received initial training at his own expense and has been employed by this company as a probationary First Officer, was given special training in the Government Avro X aeroplane at the joint expense of Government and the company in order that he should obtain some experience of handling and taking sole charge of an aeroplane of moderate size before going to England to obtain experience of the new "Ensign" type aircraft.

Wireless Operators.—Four scholars were trained at the Aeronautical Training Centre and were subsequently given further experience at Government aeronautical radio stations under arrangements made by the Posts and Telegraphs Department. They obtained the Posts and Telegraphs Certificate of competency as operators. Three of these scholars obtained employment with Tatas and the fourth was selected for further technical training with a view to his ultimate employment on the inspectional staff of the Civil Aviation Directorate.

Research Student.—Further financial assistance was given to Mr. Nazir during 1937-38 to continue his investigations for an improved method of lateral control of aeroplanes. He has taken out a patent in which the Government of India have an interest. The preliminary stage of the investigations was completed during the year and as from 1st April 1938 further financial assistance from the Government of India has been discontinued. It now remains to be seen whether Mr. Nazir's invention will be taken up by a firm of aircraft constructors, who would be in a position to develop it to the practical stage. It is possible that the British Air Ministry may interest themselves in the development.

Scholarship awarded by Government of Burma.—A scholarship was awarded for the training of a ground engineer in England for the 'A', 'B', 'C' and 'D' categories and also the pilot's 'A' licence. The scholarship will be for a period of three years, but may be extended for a further year.

Scholarships granted by Local Governments, Indian States and private bodies.—A pilot of the Madras Flying Club who, as recorded in last year's Report, was given a scholarship by the Madras Government for a course of flying training in England, has returned to India and has since found employment with Tata Sons Limited.

The United Provinces Government have decided to award 10 scholarships for the training of 'A' licence pilots, two of whom will be selected for further training for 'A-1' licences. One half, or in exceptionally deserving cases the whole, of the cost will be borne by the local Government.

The Trustees of the Parsee Panchayat Funds and Properties of Bombay have awarded assistance to six students for aeronautical training, amounting to a total value of Rs. 7,450, as follows :—

1. 'A' licence pilot to be trained for 'B' licence at Karachi.
2. 15½ hours' flying for renewal of 'A' and 'B' pilot's licences.
3. Five hours' practice flying on an advanced type of aircraft.
4. Training for 'A' and 'C' Ground Engineer's licences.
5. Course of training in England for 'A', 'B', 'C', and 'D' Ground Engineer's licences.
6. Training in England for 'B', 'D' and 'X' Ground Engineer's licences and qualification as A.M.I.Ae. E.

D.—PRIVATE FLYING.

Aero Club of India Burma Limited.—All the subsidised clubs have now become affiliated to the Aero Club of India and Burma which continues to represent their interests in matters of common concern.

Twenty-nine Customs Carnets were issued by the Aero Club during 1937, and other assistance was given to pilots engaged on international flights. Col. Lindbergh, who passed through India in March 1937, was assisted in connection with permits.

By arrangements with the Automobile Association of the United Kingdom, a large number of A. A. touring maps was hired out by the Aero Club to aviators passing through India. This system of hiring maps to members saves pilots a considerable amount of money and obviates the carrying of unnecessary maps, as maps of the section of the route which has just been flown can be returned in India and the maps for the further section of the route obtained in their place.

The Committee of the Aero Club decided that a race for the Viceroy's Trophy should not be held. It is hoped to hold a central rally of all the flying clubs during 1938 instead of the race, and plans are being considered for this event to be organised in connection with the opening of the new buildings at Karachi Airport towards the end of the year.

Rangoon Flying Syndicate.—Flying activities by the Syndicate began in April 1936 following the closing down of the Rangoon Flying School operated by India National Airways Ltd. Since that time, some 500 hours have been flown by the Syndicate, including a considerable proportion of cross-country flights. Although, owing to the lack of a pilot instructor, no tuition can at present be carried out by the Syndicate, its operations are otherwise similar to those of a flying club and have kept alive the private flying movement in Burma. Members of the Burma Flying Club make use of the facilities afforded by the Syndicate, all members of the latter being also members of the Club. Seven pilot's 'A' licences were renewed during the calendar year 1937.

Proposals were put forward for the formation of a subsidised flying club but were not accepted by the Government. The Syndicate has however been granted free facilities for the housing and landing of its aircraft at Rangoon from 1st June 1938.

Three aircraft were used during the year for private flying, two of which belonged to the Syndicate and the third to a company associated with one of the members. A complete overhaul of the latter machine was carried out.

Privately-owned aircraft.—The number of registered privately-owned aircraft on the 31st December 1937 was 64, as against 56 on the same date in the previous year. All except eight of these aircraft were of British design and manufacture. 24 were owned by Ruling Princes and Rajahs, included in which are the two fastest aeroplanes in India with top speeds of 225 miles an hour.

International Flights.—There was a total of 51 international flights to, from or across India by non-Indian aircraft and 14 international flights to or from India by Indian aircraft during 1937.

A training flight to England and back was again accomplished successfully by the Bombay Flying Club for the fourth year in succession. Four aircraft took part in the 1937 flight.

The fastest flight so far recorded from the United Kingdom to New Zealand and back was established in March 1938 by Flying Officer A. E. Clouston and Mr. V. Ricketts, who covered a total distance of approximately 26,500 miles in a total of 11 days, traversing India in both directions.

In April 1938 Mr. H. F. Broadbent set up a new record for the Australia-England solo flight of 5 days, 4 hours, 21 minutes, beating Miss Jean Batten's record of the previous October by about 12 hours.

Among other flights across India may be mentioned the feat by the Japanese pilot, Masaaki Jinuma, who flew from Tokio to England in 3 days, 22 hours and 18 minutes in the monoplane 'Divine Wind', the flight of Mlle. Marys Hiltz, the French woman pilot, to and from Indo-China, and a visit by five French military aircraft also *en route* to and from Indo-China.

SECTION III. GROUND ORGANIZATION.

A.—REVISED CAPITAL WORKS PROGRAMME.

The revised project for Civil Aviation Capital Works which was mentioned in the last report was sanctioned by the Government of India at an estimated cost of Rs. 91.60 lakhs (£687,000), for expenditure in India (excluding Burma). Included in this total is a sum of Rs. 40,000 (£3,000) for the provision of accommodation for the Postal, Health, Customs and Passport authorities at seaplane stations on the trans-India route.

Burma having been separated from India, no expenditure in Burma was included in the revised project. The Burma Government have found themselves unable up to the present to proceed with any scheme of capital expenditure on civil aviation, and the position at aerodromes and landing grounds in Burma remains the same as stated in the last Report apart from small improvements at Rangoon and Akyab carried out as "Minor Works".

The total expenditure on capital works in India up to the end of 1937-38 was Rs. 51,66,700 (£387,500). The expenditure during the year, including expenditure on wireless works, amounted to approximately Rs. 20,87,000 (£156,500).

Delays due to various causes held up progress earlier in the year but during the cold weather season the work proceeded at a satisfactory pace and it is anticipated that all the major items of the programme will be virtually completed by the end of the financial year 1938-39.

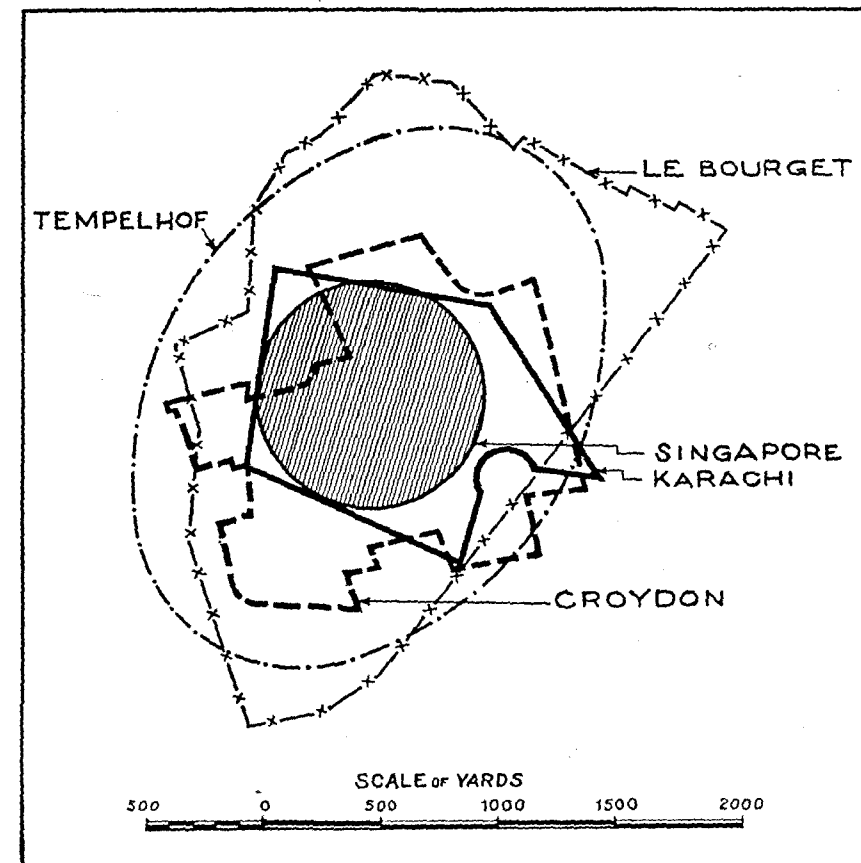
Attention has been given during the year to the protection of aerodromes from obstructions on surrounding land. At those aerodromes where the need for early action is most important, steps have already been taken for the acquisition of essential lands under the present Capital Works project.

Continuing the account given in the last report, the following notes show the further progress that has been made on outstanding works :—

Hangars.—A hangar is under construction at Madras, the St. Thomas' Mount aerodrome having been handed over by the Defence Department early in February 1938. The remaining hangar (for Rangoon) awaits a settlement of the aerodrome site.

Lighting.—The lighting of the Karachi-Jacobabad sector of the Karachi-Lahore air route and of the Karachi-Ahmedabad air route has been sanctioned. Work is in progress on the first route and tenders have been invited for the second route. Details of the installations are given below, with other particulars of the works in progress on these routes.

To face page 34.



Aerodrome Development.—Diagrammatic comparison of the size of the landing area at Karachi, Singapore, Croydon, Le Bourget (Paris) and Tempelhof (Berlin) Airports, on completion of present development works. Very rapid advances are being made in the speed and load capacity of commercial aircraft. As a consequence the run required for take-off and landing tends to increase and larger aerodromes are needed.

Multan.—Arrangements have been made with the Defence Department for the development of the army landing ground for civil aviation. Exhaustive investigations have failed to reveal a satisfactory alternative site.

Lahore.—Completed : enlargement of the aerodrome, fencing and improvements to drainage. Work in progress : construction of runway and taxi strip ; quarters for aerodrome staff ; clearance of approaches.

Karachi-Madras Air Route.

Mughal Bhim.—Further works : installation of airway beacon.

Bhuj.—Mobile floodlight beacon to be provided at the State landing ground. Temporary boundary lights and obstruction lights will, it is proposed, be supplied by the State.

Dhrangadhra.—An airway beacon is to be installed.

Ahmedabad.—Completed : clearance and levelling of the landing area ; construction of W/T Station including Adcock D. F. station. Works in progress : clearance of approaches ; construction of a small hangar ; quarters for aerodrome and meteorological staff ; fencing. Further works : installation of aerodrome lighting.

Surat.—The project of constructing a new landing ground has been abandoned owing to difficulty in finding a suitable site and lack of funds. The Baroda State propose to establish a landing ground at Navsari, 15 miles from Surat.

Bombay (Juhu).—Nearing completion : construction of Adcock D. F. W/T station and W/T transmitting station. Works in progress : quarters for aerodrome and meteorological staff. Further works : construction of small administration office if sufficient funds are available. The shortage of hangar accommodation at Juhu mentioned in the last report has been relieved by the construction of two temporary private hangars.

Donakonda.—Landing ground nearing completion.

Madras.—Work in progress : erection of hangar ; acquisition of additional land for extension of aerodrome. Estimates for the development of the aerodrome including residential buildings, a small office building, garages, etc. are under examination.

Trichinopoly.—Completed : extension and improvement of landing ground. Works in progress : aerodrome staff quarters.

Ramnad.—New landing ground to be constructed ; acquisition proceedings started.

B.—TRANS-INDIA SEAPLANE ROUTE ORGANISATION.

The route for seaplanes operated by Imperial Airways Ltd. under the Empire Air Mail Scheme has been established as follows :—

- Karachi (Keamari—West Wharf).
- Udaipur State (Raj Samand Lake).
- Gwalior State (Madho Sagar Lake).
- Allahabad (Jumna River).
- Calcutta (Hooghly River—Bally Reach).
- Akyab (Harbour—Fakir Point).
- Rangoon (Harbour).

In addition, emergency refuelling sites have been selected at the following places :—

- Hyderabad (Sind) (Indus River—a few hundred yards below Kotri Railway Bridge).
- Kandla (Cutch State).
- Chittagong (Harbour).
- Moulmein (Harbour).

The route differs in several details from that mentioned in the last report. Mergui and Victoria Point have been excluded as it was finally decided to carry the route *via* Bangkok. At Calcutta the site of the seaplane port has been changed from the Akra Reach to the Bally Reach near the Willingdon Bridge. The Akra Reach site proved inconvenient as a result of the survey flights carried out by Imperial Airways, Ltd.

The exposed bay at Gwadar was expected to give trouble in the monsoon, and, at the request of the Air Ministry, a survey was carried out in January at Jiwani in Kalat State, 40 miles west of Gwadar. As a result, a suitable sheltered alighting place was found in Khor Jiwani. With the co-operation of the Khan of Kalat, arrangements were made to transfer the operations to Jiwani. A temporary organisation was arranged and the operations were transferred in May 1938. The permanent organisation is now being planned.

By end of February 1938, when the all-up mail service began, the preparation of the route was well advanced and permanent or temporary organisation was in readiness at all stations.

Investigation of the work to be carried out was completed early in 1937 and detailed estimates were prepared by the Central Public Works Department. Certain urgent items were put in hand

immediately, and the main work was commenced in August 1937. On 31st March 1938 the position was as stated briefly below :—

Karachi.—All works including buildings, slipway and jetty completed.

Udaipur (Raj Samand).—Construction of essential buildings completed. An office and quarters for staff, including the Meteorological staff, under construction. Meteorological quarters nearing completion.

Gwalior (Madho Sagar).—Provisional arrangements made for the use of existing buildings until the completion of the permanent station buildings. Owing to the late decision to adopt Gwalior, (Madho Sagar) instead of Jhansi (Parichha Reservoir), construction of the permanent works was not commenced until the beginning of 1938.

Allahabad.—Construction of the necessary buildings completed but a few items outstanding.

Calcutta.—A site selected on the west bank of the Hooghly River at Bally Reach and temporary arrangements made for utilising an existing building. A jetty constructed connecting to a floating pontoon.

Akyab.—Detailed estimates accepted and sanctioned by the Government of Burma and the works well advanced.

Rangoon.—No special works necessary as it was decided to use existing facilities in the harbour. Owing to the high cost of dredging the water area selected as an alighting site at Monkey Point this project was abandoned.

Where the flying boat route follows the aeroplane route the existing wireless and meteorological organisation for aeroplane service also serves the flying boat services. Communication between the aerodrome control offices and the seaplane stations is effected by telephone connections. Three seaplane stations, Karachi, Allahabad and Calcutta, are served in this manner. Direct line telephone connections between the aerodrome control and the seaplane port have been provided at Karachi, Calcutta and Allahabad. At Raj Samand and Gwalior, W/T stations equipped with the same type of apparatus as the company's control launches are operated by Imperial Airways. These stations communicate on short-wave with Karachi and Delhi and also with the flying boats. Before the equipment arrived, in order to provide an organisation for the survey flights over the route, temporary arrangements were made for the loan of Royal Air Force equipment and this was used until replaced by the company's own equipment just prior to the introduction of the regular seaplane services.

In order to afford navigational assistance during the monsoon, medium-wave transmitting apparatus will be supplied on loan by the Royal Air Force, on which the flying boats can "home", using their own directional receivers. In addition, a Bellini-Tosi D. F. receiver, released from Delhi on its replacement by an Adcock D. F. station there, will be installed temporarily at Raj Samand.

During 1938-39 a permanent W/T station will be constructed at Gwalior, the recurring charges of which will be met by the Air Ministry. This will be equipped with both medium and short-wave installations and with an Adcock D. F. receiver. At Raj Samand, however, the present temporary arrangements will continue until the future of the lake as a permanent station for seaplanes is decided. When a permanent station is eventually established, the organisation will be completed so that the two W/T stations special to the seaplane route will be able to join fully in the trans-India chain.

Telegraphic communication is also provided at Gwalior and Raj Samand, primarily as a stand-by in the event of interruption of the radio service.

As regards the meteorological organisation, pilot balloon observatories are being established both at Gwalior and Raj Samand. In order to collect information on the local conditions, particularly the prevalence of bad visibility and low cloud a current weather observer was posted to each station during the monsoon of 1937. He now provides reports of current weather for the regular services.

Arrangements for refuelling were made by Imperial Airways with the petrol supply company. Similarly all arrangements for moorings, motor control launches and other movable equipment were made by Imperial Airways on behalf of the Air Ministry.

The survey flights along the route gave very useful information on the working of the operational organisation and pointed to the great importance of co-ordination between the arrangements at the seaplane stations under the control of Imperial Airways and the ground organisation laid down by the Government of India for trans-India services as a whole. The commencement of the regular service in February 1938 shewed that the organisation was adequate, but it still requires considerable development.

C.—GENERAL.

Budget, Maintenance and Minor Works.—(i) **India.**—The budget estimates for 1937-38 for India included a provision of Rs. 3,15,000 for works services, consisting of maintenance of aerodromes and landing grounds, maintenance and operation of aerodrome equipment and minor works. The actual expenditure for

the year and the budget estimates for 1938-39 for India are shown below :—

	1937-38 Approximate Expenditure	1938-39 Budget Estimates
	Rs.	Rs.
Maintenance and repairs of aerodromes and landing grounds	1,48,700	1,80,000
Maintenance and operation of aerodrome maintenance equipment	15,800	32,000
Maintenance and operation of aerodrome operational equipment	60,200	1,00,000
Minor works	77,900	59,000
Departmental charges	19,100	26,000
	3,21,700	3,97,000
	Less cut	37,000
		3,60,000

The following statement of the more important minor works carried out during the year 1937-38 will give an idea of their diversity and importance.

Karachi Airport.—Lamp room and store room ; lean-to shelters for the fire trailer and the Dunlop cart ; lights and fans in the new annexe to Government hangar No. 2 ; expanded metal guard for the Neon beacon ; improvements to hangar drains ; installation of electrical anemometer on the Meteorological Observatory ; supply of a battery charging unit.

Hyderabad (Sind).—Clearance of trees from the air approaches modification of obstruction lights ; ladders for access to the obstruction lights on the church near the landing ground.

New Delhi.—Improvements to the restaurant and bedroom accommodation ; quarantine store in the new hangar ; additional water tanks and a fire hydrant. Installation of electrical anemometer. Improvements to drainage.

Etah.—Trees shielding the beacon cut.

Cawnpore.—Trees lopped to clear air approaches and an overhead telephone line diverted.

Allahabad.—Trees acquired and cut down to clear air approaches. Control desk for the ground lighting equipment moved into the new extension to the control room. Improvements to office accommodation. Flagstaff and a new wind indicator pole erected.

Gaya.—Trees cut to clear the air approaches. Picketing base constructed and a flagstaff erected.

Calcutta (Dum Dum).—Air approaches improved by cutting trees. Annexe to the No. 2 Government hangar partitioned to provide rooms for Meteorological and Customs Officers, and additional lights and fans provided. Ventilator and exhaust fan added to 4½ K. W. floodlight.

Bombay.—Land acquired for widening the flying gap on the west side of the aerodrome. Temporary office accommodation. Extension of the taxi strip on the west side of the aerodrome. French drain constructed to improve the drainage conditions near the flying club hangar.

Poona.—Royal Air Force landing ground extended to give better take-off towards west.

Madras.—Temporary office and lean-to shelter.

Jacobabad.—Storm water drain ; flagstaff and wind indicator.

Lahore.—Hangar annexe partitioned to provide further office accommodation. Apron extended to flying club hangar. Temporary shelter built for the tractor, roller, ambulance, etc., and an open shelter for cars. Flagstaff and two wind indicators. Telephone line in the vicinity of the aerodrome diverted.

(ii) **Works—Burma.**—The following details are given of the position of works in Burma :—

Rangoon.—Works completed during the period under review : construction of a covered way and Laterite road ; improvements to approach road ; surfacing the hangar apron ; construction of signal base.

Akyab aerodrome.—Works under consideration : Construction of an office building ; improvements to culverts, roads, water supply, etc., quarters for Aerodrome Officer and Assistant Aerodrome Officer ; quarters for Meteorological staff.

The construction of a married Wireless Operator's quarter is in progress. The East-West and North-South runways were completed in May 1937. Grass was encouraged to grow and by the end of the year the runways were completely grass-grown. Two areas near the hangar on each side of the apron were treated in the same way.

Sandoway.—Work in progress : Construction of a married Wireless Operator's quarter.

Bassein.—Work under consideration : Acquisition of land for clearance of air approaches.

Moulmein.—A piece of land on the northern side was acquired and obstructions caused by tall bamboos removed.

Aerodrome operational equipment.—The balance of the supply of ambulances, fire trailers and signalling equipment for which provision was made in the Capital Works Project has been completed during the year. In India every aerodrome under the control of an Aerodrome Officer is now furnished with this equipment. The allotment in the Capital project of Rs. 66,000 for aerodrome operational equipment has been fully expended and has in fact been exceeded owing to the rise in cost of materials and to improvements in the equipment suggested by experience. In Burma, the equipment provided under the Capital Works Project was supplied prior to separation with the exception of a fire trailer for Akyab. The purchase of this item is under consideration by the Government of Burma.

Among minor items of operational equipment supplied to aerodromes, supplementary to the provision under Capital, may be mentioned the following: electrical test instruments; asbestos suits for fire fighting; bicycles for aerodrome watch-keeping staff and flood-light staff; fire extinguishers and first-aid equipment and portable 'prism' markers for demarcating bad ground. Standard minimum scales of operational equipment have been established for aerodromes and landing grounds.

All aerodromes in charge of an Aerodrome Officer are now equipped with the visual signals necessary to comply with the provisions of Annex D to the International Air Convention. A standard type of steel mast and gaff for the display of signals has been produced together with a standard layout of signal base in which the prescribed signals to aircraft are displayed.

Night lighting equipment.—While night flying on the trans-India route has not yet been undertaken as a regular practice occasions frequently occur when owing to delays on other sections outside India the services across India are operated by night. The words 'flying continuously' in a flight programme, indicating that the machine will proceed without a night stop, have been a frequent feature of eastbound flights. During the year 1937 an aggregate of 98 hours was made up in this way on services which had been delayed west of Karachi.

With the exception of one additional beacon which may be installed at Sikar in Jaipur State, a chain of beacons approximately 100 miles apart over the entire route from Karachi to Calcutta is now complete and in regular operation as and when required. The reports received from pilots on their observations of the beacons indicate their value. On numerous occasions the beacons have been seen at distances up to 75 miles, and even 100 miles when visibility conditions have been particularly favourable. At times when visibility has been reduced through dust haze, ranges of 50

to 60 miles have not been unusual. The pilots' remarks on the general appearance of the lights are invariably 'good' and occasionally 'excellent'.

The whole of the ground lighting installations together with mechanical plant and vehicles are now maintained and operated departmentally and are in the charge of an Electrical and Mechanical Superintendent attached to the office of the Chief Aerodrome Officer, Karachi. No instances of serious defect or breakdown have occurred during the year. Ground lighting equipment and power plants are being brought under a regular maintenance and inspection procedure which is specified in a detailed schedule and report form for each type of apparatus.

Practical experience of the lighting installations at aerodromes has pointed the way to a number of improvements which will increase the safety of night operations. For example, a considerable amount of work has been done to clear obstructions in the air approaches at Allahabad, Cawnpore, Gaya, Delhi and Akyab. A method of indicating unfavourable lines of approach by substituting red for orange boundary lights is being tried out at a number of aerodromes where a more elaborate system of obstruction lighting would not be justified by the particular circumstances. The pilot's choice of a safe direction for take-off and landing can well be guided by the marking of the boundary with orange lights for unobstructed sectors and red lights for those sectors which are not entirely free from obstacles. This system is supplemented when necessary by the use of green light to indicate flying gaps.

Indication of the compulsory direction of landing by means of an illuminated 'T' actuated by the wind has not proved entirely reliable in conditions of light and variable winds. Experiments are therefore being made with a power operated 'T' which may be set in the required direction by remote control from the aerodrome control room. International Rules now necessitate the provision of a separate illuminated wind indicator since the wind direction may not always be identical with the direction landing. Experiments will be made this year with two new types of illuminated wind indicators.

Another subject which now requires attention is the development of a system of electric runway lighting. At present hurricane lamps are used to demarcate the edges of a runway during the rainy season when the land outside the runways becomes unserviceable. When funds become available it is proposed to instal strip lighting encased in concrete troughs, manufactured in India, on the new runway at Dum Dum. The runway lighting would also serve as a fog line to assist take-off when misty conditions obtain. It is expected that the present scheme of equipment of the Karachi-Bombay and Karachi-Jacobabad routes for night flying will be completed this year.

Aerodrome and route traffic control.—Continuous development is in progress in the system of route traffic control by aerodrome offices. Traffic on the seaplane route has now been brought into the organisation. There are now eight regular services a week in each direction across India, two of which are seaplane services. This enhanced frequency coupled with the development of night flying has led to a very considerable increase in the responsibilities and hours of work of the aerodrome control staffs. The aerodrome offices are now organised to provide 24 hours service whenever required.

Four aerodromes—Karachi, Delhi, Allahabad and Calcutta—undertake the major work of traffic control on the trans-India route, each being responsible for the co-ordination of the ground facilities in its own section. The movements and requirements of aircraft traversing the route are notified from one section to another and it is the duty of the control officer to see that the necessary wireless, meteorological and lighting facilities are provided at the proper times.

At the seaplane stations under the control of Imperial Airways, Limited, the company's Station Superintendents act as the link between the seaplane services and the route organisation generally.

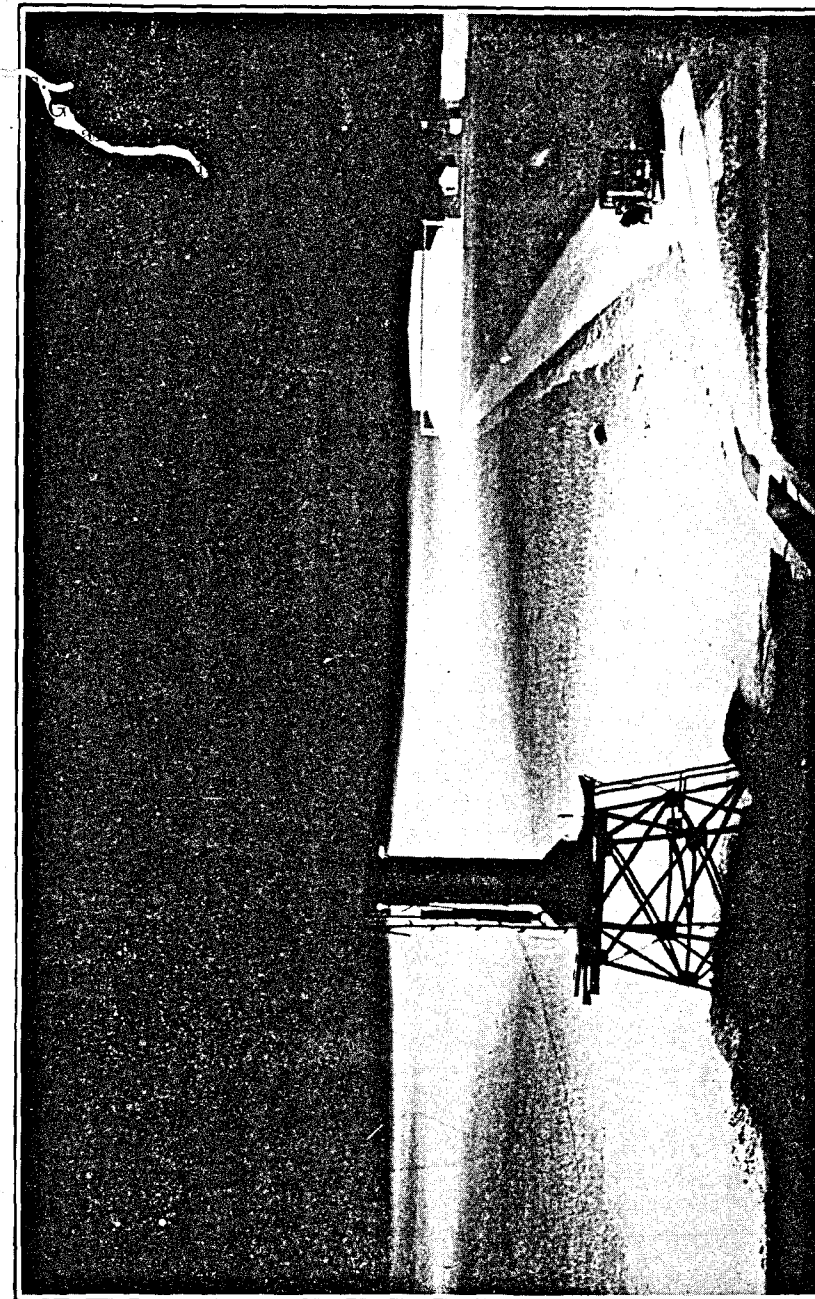
Since the opening of W/T communication on the Karachi-Colombo route on 1st December 1937, a partial traffic control system has been started which will be further developed on the Karachi-Bombay section when the further W/T facilities for aircraft are provided.

A control officer was posted at Madras on 7th October 1937.

By arrangement with the South Indian Railway and the Government of Ceylon an organisation has been established for reporting the passage of aircraft across the Palk Strait between India and Ceylon and for ensuring that rescue operations will be undertaken immediately in the event of an aircraft being forced to descend during the crossing. Aircraft reporting bases have been arranged at Dhanushkodi on the Indian side and Talaimannar in Ceylon, communication between them being effected by telephone. The South Indian Railway have a steamer lying at Dhanushkodi with steam up during the day time and in the event of an aircraft being reported missing they will give all possible assistance in the interests of humanity.

Licensing and approval of aerodromes.—A great deal of progress has been made during the year in the work of revising and bringing up to date information regarding civil aerodromes and landing grounds both in British India and the Indian States. The provisions of the Indian Aircraft Rules 1937 with regard to the licensing of aerodromes have required owners of aerodromes in British India to render full reports on their grounds. In

To face page 44.



With acknowledgments to General Electric Co. (India), Ltd.

Dum Dum.—The aerodrome illuminated by floodlight, representative of the modern equipment for night flying now in service at aerodromes on the trans-India route. The light is designed to be operated either as a floodlight or

the case of the Indian States, the provisions of the Rules do not apply, but the same standard of safety is observed and the State authorities have been requested to furnish full information on their aerodromes. The particulars will be published for general information by the Government of India provided that the requisite safety requirements are complied with.

On completion of this work the results will be embodied in a revised edition of 'The Air Pilot—India and Burma'. Particulars of new aerodromes and landing grounds or of those which have been substantially altered since details were last published are being issued in Notices to Airmen.

Additions have been made to the list of persons approved to act as inspectors of aerodromes for the purpose of licensing and approval. At the end of the year the number of such inspectors stood at 23.

The Indian States continued to show a lively interest in the construction and improvement of landing grounds, and almost invariably they seek the advice of the Director of Civil Aviation in this work. Thus, during the year the following States have been supplied with detailed information and advice on the development of existing landing grounds or the selection of new sites : Baroda, Bhavnagar, Bhopal, Dhrangadhra, Gwalior, Hyderabad, Jaisalmer, Jamnagar, Porbandar, Radhanpur, Sachin and the Sikar Thikhana.

The brochure entitled "Notes on the preparation, licensing and operation of aerodromes and landing grounds", which was issued with a view to clarifying the procedure for aerodrome licensing and stimulating an interest in and knowledge of aerodrome development, has now been revised and brought up to date. Copies of the new edition will be distributed and placed on sale before the issue of this report.

The table on the following page shows the number of aerodromes and landing grounds of various classes in India and Burma available for use by civil aircraft. Comparative figures are given for the three years 1935-37. Whilst the total number of grounds of all categories remained about the same, viz., 171, the number in the 'public' category, i.e., grounds open for public use without prior permission, increased from 54 to 59 and the total number of grounds normally maintained in a serviceable condition increased from 102 to 117.

In Burma, the water areas along the Irrawaddy river used by the seaplanes of Irrawaddy Flotilla and Airways Ltd. were inspected during the 'high water' season by the Assistant Director of Civil Aviation. A further inspection during the 'low water' season is proposed. For the present the company has been given temporary exemption from the provisions of the Rules requiring the licensing of aerodromes used regularly for commercial purposes.

Classification of all aerodromes and landing grounds open to civil aircraft in British India, Indian States and Burma.

Year.	Grounds normally maintained in serviceable condition.							Not normally maintained.		Maintenance not recorded.		British Air Ministry grounds. Available for emergency only.		Total.	
	Open to public use.		Restricted use, Special permission necessary for scheduled air services, Joy riding etc.			R. A. F. and on R. A. F. charge.	Indian States.	Indian States.	Army.	Restricted use, Permission necessary.	Restricted use, Permission necessary.	Indian States.	Local Government.		Private.
	Government Civil.	Private.	Indian States.	Local Government.	Private.										
1935	22	4	23	1	3	34	7	22	12	5	10	16	159		
1936	24	3	27	1	2	34	11	19	16	8	9	16	170		
1937	26	2	31	1	4	33	20	18	10	6	5	15	170		

Provincial Government landing grounds.—The number of landing grounds maintained by the Bengal Government is five and by the Bihar Government two. Steps are being taken by the latter for the 'approval' of the landing grounds under its control for use by commercial aircraft.

Landing grounds acquired from the Defence Department.—The aerodrome at St. Thomas Mount, Madras, has been transferred to the Civil Aviation Office and will be enlarged and developed. The position with regard to other landing ground proposed to be transferred remains unchanged. No progress will be possible until further funds are available for acquisition and development.

Wireless Services.—The Aeronautical Wireless Service in India accepts for free transmission messages which directly affect the safety and regularity of air navigation. Existing facilities do not at present permit the acceptance of all types of messages specified in the International Regulations, *e.g.*, messages relating to passenger reservations. In addition to meeting civil aircraft requirements, wireless facilities were afforded to Royal Air Force aircraft operating along the civil air routes. During the year 1937 between aircraft and the aeronautical stations in India, 19,000 messages were handled and between the aeronautical wireless stations themselves 140,000 messages were handled. Broadcast messages are included in the latter total and the figure represents the number of telegraph operations effected, that is to say, a message transmitted from one station and received by another is counted twice.

In November 1937, 40 new operators completed their training the majority of whom were posted to the aeronautical radio stations in readiness to meet the increased watch-keeping requirements on the inception of the Empire Air Mail Scheme. Further operators have since been recruited for training so as to meet requirements on the completion of the development works now in progress. Quarters for the increased staff are in course of construction at most of the aeronautical stations.

Trans-India route.—During 1937 no new communication services were introduced on the Trans-India route. Communication between all aerodromes with the exception of Cawnpore is provided by the medium-wave stations at Karachi, Jodhpur, Delhi, Allahabad, Gaya, Calcutta and Chittagong. Communication with Cawnpore and with landing grounds and beacon stations is made by telegram or trunk telephone with the adjacent aerodromes. All point-to-point traffic has to be passed on the same wave—900 metres—as used by aircraft in flight. Short-wave installations have been provided at Karachi, Delhi and Calcutta and in Burma at Rangoon, which partially relieve the aircraft wave of a certain number of

traffic messages at these main centres, but until the short-wave equipment now being installed at Jodhpur, Allahabad and Gaya is provided it will not be possible to effect the much-needed improvement of routing all point-to-point traffic on short wave, thus leaving the medium wave clear for communication with aircraft.

Assistance to air navigation on the trans-India route is afforded by Bellini-Tosi direction finding receivers, except at Karachi where an Adcock D. F. apparatus was provided some years ago. The Adcock D. F. apparatus very largely eliminates the errors experienced at night, and the Bellini-Tosi stations on the trans-India route are now being replaced by Adcock D. F. apparatus at all stations with the exception of Chittagong. When this conversion has been completed the route between Karachi and Calcutta may be regarded as equipped for regular night operation.

Continuous watch has not been necessary or justified in the past and watches have, therefore, been kept at routine times and at such other times as were necessary to meet the actual requirements of the aircraft operating regular services across India. With the increased staff available at the end of 1937 it was found possible to introduce regular watch-keeping for 18 hours daily throughout the trans-India route in anticipation of the increased traffic requirements under the Empire Air Mail Scheme. To meet occasional night-flying requirements watches are extended as necessary.

Dependent on the progress made with the aerodrome building programmes, it is hoped to accommodate all the short-wave receiving installations in the administrative buildings at the aerodromes on the trans-India route. The short-wave operator at the aerodrome will also assist with the disposal of traffic on medium-wave and will be in direct communication with the operator at the direction-finding station. In this way an operator will be in direct personal contact with the aerodrome control officer and this should result in a considerable improvement in the service given to aircraft. In the past, partly owing to the shortage of wireless operators at the aeronautical stations, the one operator on medium-wave watch has had to attend to all receptions and transmissions and in addition, he has also had to attend to the telephone to pass and receive the necessary communications with the aerodrome control officer and the meteorological office, which are normally both situated at a considerable distance from direction-finding station. At critical times this operator has had more than he can contend with and, as a temporary measure until the new dispositions are completed, the operator on medium-wave watch at the business stations has been reinforced by an attendant whose duty it is to deal with telephone communications.

The radio organisation for the seaplane route has been mentioned earlier in this Section. In order to meet the new requirement of the seaplane services additional short-wave watches have been provided at Karachi and Delhi for communication with Raj Samand and Gwalior.

Feeder routes.—Heretofore none of the aircraft employed on the feeder routes has been equipped with wireless and until recently no wireless stations have been brought into regular service for point-to-point communication. Communications have been effected as necessary by telegram and trunk telephone. With the expansion of services under the Empire Air Mail Scheme improved facilities were necessary on the South India route. Medium-wave radio stations have therefore been established at Ahmedabad, Bombay and Hyderabad (Deccan) for point-to-point communication and were brought into service in December 1937; the existing coast station at Madras has also been brought into this system and to meet the requirements of the extension of Tata's service to Ceylon communication between Madras and Colombo takes place on the wave-length employed for shipping. The station at Bombay is also occupied in meeting shipping as well as aircraft requirements. Tata's aircraft employed on the Karachi-Bombay section of the route are of larger type, to deal with the increased loads under the Empire Air Mail Scheme, and these aircraft are fitted with wireless. Adcock D. F. stations have been established at Ahmedabad and Bombay in order to afford these aircraft navigational assistance but until a channel for aeronautical work separate to that employed for ships can be provided, the service cannot be regarded as entirely satisfactory. During the 1938 monsoon Tata's service will be diverted from Bombay to Poona as in the past, but opportunity will be taken to carry out experimental flights to Bombay. In this way it will be possible to ascertain whether the regular service *via* Bombay can in future be maintained when the wireless facilities proposed on this section of the route are complete, or whether additional wireless aids may not be necessary to enable this to be done.

Experiments in the use of radio-telephony will also be carried out by Tata's aircraft with the stations at Bombay, Ahmedabad and Karachi. Operation by radio-telephony will be undertaken by the pilot of the aircraft and will thus result in a saving of payload through a separate operator not having to be carried. This method may prove satisfactory for operation under fair weather conditions. Under monsoon conditions a separate operator and the use of wireless telegraphy is considered essential.

On the Karachi-Lahore route no radio stations will be established for the present and communication on the telegraph and telephone lines will continue.

Burma.—The aeronautical stations in Burma were transferred to the control of the Director-General of Posts and Telegraphs, Burma as from the 1st April 1937. No improved facilities are being provided on the route east of Calcutta except for additional watches maintained by the short-wave station at Rangoon for meteorological purposes and to meet point-to-point requirements.

Experimental work.—In order to test the usefulness under Indian conditions of a directional type aircraft radio receiver with visual indication for homing purposes, the Directorate met a part of the cost of purchasing the receiver and the expenses of experimental flying. The results suggested that the range and accuracy would be unduly influenced by atmospheric conditions, but they cannot be accepted as conclusive. One result of the trials was to show that if the claims of the makers are to be realised such apparatus must be installed and adequately serviced by the makers. The expenditure was borne by the Petrol Tax Fund.

Meteorological Services.—Further developments of importance took place during the year in the meteorological arrangements for aviation, which are organised by the India Meteorological Department. By far the most outstanding of these was the daily preparation, with effect from 1st April 1937, of an afternoon weather chart at the Meteorological Office, Poona—a development of considerable significance to aviation in southern India. Another new item was the issue of synoptic data twice daily from the aeronautical wireless stations at Karachi and Calcutta. Later on, similar regional issues will be made from Delhi and Poona, so that anyone picking up all four will be able to draw quite detailed weather charts of India both morning and evening. Another decision of great importance to aviation taken by the Government of India during the year was to re-open a forecast centre at Delhi.

The routine arrangements for the exchange of weather reports along the trans-India air route worked satisfactorily. On the establishment of aeronautical wireless stations on the Karachi-Madras air route, the 'routine' system was partially extended to that route also and from 1st December 1937 upper wind reports as well as current weather observations taken at fixed hours at principal observatories on this route are being distributed daily by W/T to the main aerodromes on it. The system has also been extended in a very limited form to the Madras-Colombo route but is restricted there to the issue of Madras and Trichinopoly morning data from the Madras wireless station to Colombo.

The introduction of the Empire Air Mail Scheme and associated developments in internal air services involved considerable extensions in facilities. Thus, current weather stations were started at Raj Samand and Gwalior for the benefit of the flying boats and

sanction was received to expand these stations into pilot balloon stations from 1st April 1938. The schedules of supply of meteorological reports on the Bahrein-Karachi route and on the feeder route between Karachi and Lahore were suitably revised in order to fit in with the new time-table and also the increased frequency of the services consequent on the inauguration of the Empire Air Mail Scheme. Arrangements were made for the supply of weather reports on the new Madras-Colombo, Trivandrum-Trichinopoly and Bombay-Delhi air routes opened by Tata Sons Limited.

Of other improvements effected during the year may be mentioned the installation of standard lamps for visibility measurements at night and of searchlights for cloud height measurements at a few more stations, the starting of night balloon and current weather work at Bahrein, Sharjah and Gwadar in the Persian Gulf and at Juhu, the shift of the pilot balloon station from Bellary to Bhuj to serve better the needs of the Karachi-Ahmedabad air route and the introduction of arrangements for current weather work by aerodrome personnel at Multan and Cawnpore. Arrangements were also made during the year to receive at Gaya the weather reports and forecasts relating to the Allahabad-Calcutta route and for their exhibition at that aerodrome.

From 1st July 1937, the newly started Burma Meteorological Service took over the responsibility of forecasting for air routes in Burma. With the opening of a forecasting centre at Basrah under the Iraq Meteorological Service, the responsibility for issue of forecasts west of Jask/Sharjah was taken over by Basra from 1st March 1938.

As in the past years, candidates for pilot's 'B' licence were trained and examined in meteorology.

During the calendar year 1937, 7848 aviation forecasts were issued in India, out of which 4053 were supplied by Karachi, 2395 by Calcutta and 862 by Poona. The number of special current weather reports supplied to aircraft in flight and of warnings of adverse weather and improvement thereof are given in the table on the next page.



Special Current Weather Reports, Warnings of adverse weather and improvement thereof.

Station.	Number of SPEMET Reports supplied.		Number of DANMET and IMPMET Reports supplied.	
	1936	1937	1936	1937
Bahrein	365	510	11	9
Sharjah	158	206	82	58
Gwadar	15	101	76	49
Drigh Road	658	768	106	75
*Barmer	..	†	..	10
Jodhpur	411	217	37	38
New Delhi	143	101	48	36
Allahabad	525	374	22	20
*Gaya	..	235	..	10
*Asansol	..	1†	..	2
Calcutta	491	612	102	105
Chittagong	378	529	48	83

*Current weather observations were started at

Barmer in August 1936,

Gaya in March 1937, and

Asansol in August 1936.

† This station does not ordinarily supply SPEMETS.

NOTE.— SPEMET =Special meteorological report.

DANMET =Dangerous weather conditions.

IMPMET =Improvement of dangerous conditions.

SECTION IV. ADMINISTRATION.

A. CIVIL AVIATION BUDGET.

India.—The actual expenditure of the Directorate of Civil Aviation in India (excluding expenditure of a capital nature against Grant No. 48—Capital) in 1936-37, the budget estimates and the final appropriation for 1937-38 and the budget estimates for 1938-39, are tabulated below :—

	Actuals* 1936-37.	Budget 1937-38.	Final appro- priations. 1937-38.	Budget 1938-39.
1	2	3	4	5
1. Direction, Operation and Inspection	6,83,877	7,74,300	7,26,300	8,18,500
2. Works	2,52,661	3,15,000	3,30,000	3,86,400
3. Wireless Services	6,23,793	5,92,000	5,45,000	7,70,000
4. Grants to Flying Clubs	1,45,128	1,40,000	1,38,500	1,40,000
5. Other grants for aviation purposes	3,60,021	6,80,700	3,15,200	10,52,100
6. Expenditure in England on overseas pay, leave salary, scholarship, etc.	1,13,040	1,02,000	88,710	1,12,000
7. Deduct—Probable savings	..	-1,00,000	..	..
Total	21,78,520	25,04,000	21,43,710	32,79,000

*The figures for 1936-37 are inclusive of expenditure incurred in Burma.

Direction, Operation and Inspection includes the Directorate, i.e., the Headquarters organisation and all Aerodrome and Aircraft Inspection staff, together with certain services of a miscellaneous nature. Further expansion of the Aerodrome and Inspection staff during the year accounts for the increased expenditure.

Works provides for the maintenance of aerodromes and the maintenance and operation of lighting and other equipment at the aerodromes and the air routes. Expenditure on these services naturally increased with the progress of new works under the Capital Works Programme, including the aerodrome and air route lighting. Details of the expenditure will be found in Section III.

Wireless Services denotes payments for the radio facilities provided by the Posts and Telegraphs Department. The reduction of the final appropriation for the year as compared with the actuals for 1936-37 is due to the separation of Burma. Taking India alone, the final appropriation for 1937-38 showed an increase of Rs. 1,05,000 over the last year's actuals, resulting from the opening of additional W/T stations and increased traffic.

Grants to Flying Clubs (sub-head 4) includes Rs. 21,000 of expenditure from the Petrol Tax Fund.

Other grants (sub-head 5).—The final appropriation (Rs. 3,15,200) includes expenditure of Rs. 20,000 from the Petrol Tax Fund as shown in the following paragraph. The grants-in-aid to operating companies consist of (a) remission of excise and customs duty on petrol and oil, and (up to the date of introduction of the Empire Air Mail Scheme) on aircraft stores and spares for the trans-India service, (b) remission of housing and landing charges on the contract mail services, (c) special assistance to Indian National Airways.

These grants, amounting to Rs. 2,95,300, coupled with grants to flying clubs (sub-head 4), may be taken as representing the extent of subsidy assistance granted by the Government of India—approximately Rs. 4 1/3 lakhs. The large increase in the Budget estimates for 1938-39 is attributable mainly to the increased operations consequent on the Empire Air Mail Scheme.

Petrol Tax Fund.—From the Road Tax (2½ annas per gallon) paid on petrol consumed for aviation purposes, a sum of Rs. 98,000 was made available for expenditure for specified Civil Aviation purposes in the budget for 1937-38. The actual expenditure (in round figures) incurred against the grant was :—

	Rs.
(1) Subsidy to flying clubs (included in sub-head 4 of Budget table)	21,000
(2) General expenditure (included in sub-head 5 of Budget table)	20,000
(3) General expenditure (expenditure in England on items (a) and (b) below)	3,000
	44,000

Among the more important items of expenditure were :—

(a) Continued financial assistance to an Indian research student in England to develop a slot and flap device invented by him	1,000
(b) Financial assistance for training of an Indian pilot in England as first officer for Indian Trans-Continental Airways	2,000
(c) Scholarships for training as wireless operators in India	2,800
(d) Advanced training of commercial pilots on multi-engined aircraft	4,300
(e) Training of two 'B' pilots as pilot-instructors	900
(f) Provision of an experimental heat absorbing ceiling in the new hangar at the Civil Aerodrome, New Delhi	800
(g) Provision of Sturtevant message tubes in the Willingdon Air Station, New Delhi	3,200
(h) Experimental work with directional radio receiving apparatus	400
(i) Construction of an experimental pontoon for sea-plane operations	2,400
(j) Installation of obstruction light on the top of the Qutab Minar	1,200
(k) Maintenance and operation of Avro X (VT-ACT) for a temporary period in connection with (d) above, by Indian National Airways Ltd.	1,800

The growth in the annual revenue to the Petrol Tax Fund and the expenditure from the Fund is illustrated in the Graph overleaf. The total expenditure from 1931-32 to 1937-38 amounted to Rs. 2,67,373, comprising—

	Rs.
Flying Clubs	54,000
Research	18,007
Training	59,262
Experimental—	
Aircraft	9,909
Lighting	1,10,904
W/T	2,948
Miscellaneous	12,343

Burma.

The expenditure on civil aviation in Burma in 1937-38 and Budget Estimates for 1938-39 are as follows. Figures for expenditure on minor works are excluded as details are not available.

	Budget Estimates, 1937-38.	Final Appropriation, 1937-38.	Budget Estimates, 1938-39.
1. Direction, etc.	82,680	94,080	1,07,070
2. Wireless	2,26,000	2,00,000	2,00,000
3. Grants-in-aid for aviation purposes	1,33,000	52,000	95,600
4. Special grants from Petrol Tax Fund	15,000	Surrendered	..
5. Expenditure in England (Overseas Pay, leave salary, scholarship, stores etc.)	9,320	4,520	5,000
6. Works Capital outlay on Civil Aviation	1,47,000	43,810	1,01,700

The grant of a subsidy to a flying club from the tax on petrol consumed for aviation purposes, for which a sum of Rs. 15,000 was proposed, was not sanctioned and the amount was accordingly surrendered. The construction of a hangar at Rangoon for which Rs. 1,01,700 was proposed in 1937-38 was not proceeded with. A similar sum has been included in the Budget Estimates for 1938-39.

B.—ORGANISATION.

Headquarters organisation.—No major changes took place in the Headquarters organisation. The permanent strength of the subordinate staff (excluding inferior servants) is 74, all of whom are Indians.

Aerodrome organisation.—Details of the organisation were given in last year's Report. There have been no major changes, except those consequent on the separation of Burma.

The present strength of the gazetted aerodrome staff in India consists of the Chief Aerodrome Officer, one Electrical and Mechanical Superintendent, eight Aerodrome Officers and seventeen Assistant Aerodrome Officers. The services of one Aerodrome Officer

and four Assistant Aerodrome Officers were permanently transferred to the Government of Burma from 1st April 1937, on separation.

Assistant Aerodrome Officers have in the past been posted to aerodromes immediately on joining, as their services were urgently required. Such training as the men have received during the course of their duties has, in the nature of things, been haphazard and lacking in the technical foundation which can be derived only from an ordered system of instruction and study.

A scheme for providing proper and equal training facilities to all probationers was therefore submitted for the consideration of the Government of India at the close of the year under report. The scheme provides for the establishment of a training class at Karachi Airport under the supervision of the Chief Aerodrome Officer. The actual training will be entrusted to one of the senior Aerodrome Officers.

In order to ensure the maintenance of an adequate technical standard certain minimum qualifications have been laid down for Assistant Aerodrome Officers before they can be eligible for promotion. The first promotion examination under this scheme was held in April 1938.

Inspection organisation.—The organisation was described in last year's Report. No new offices have been opened.

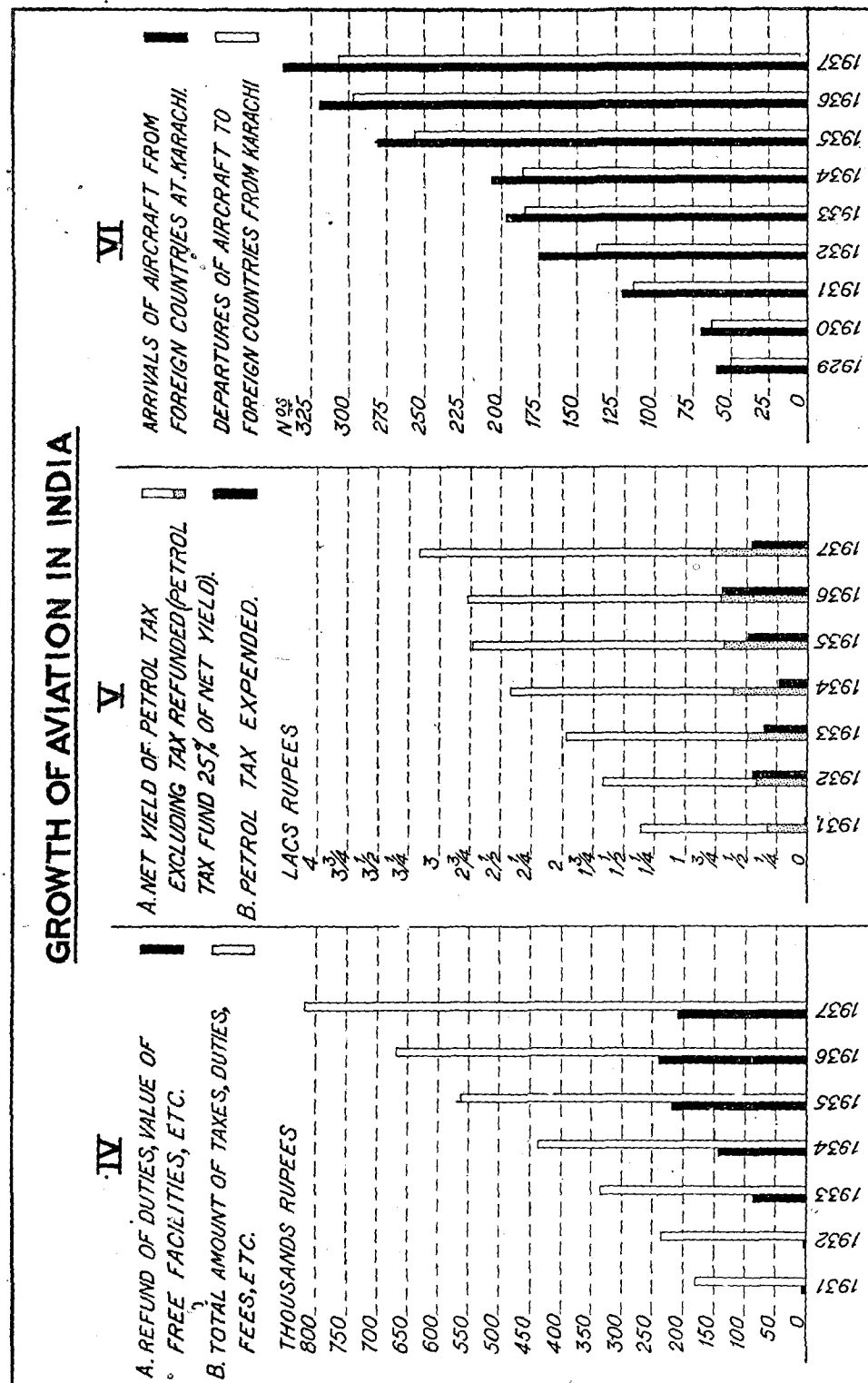
One Aircraft Inspector was seconded to the Government of Burma, on separation, and has acted as Assistant Director of Civil Aviation. Two Aircraft Inspectors were recruited in England and joined shortly after the end of the year. One of these is an Engine specialist.

The services of two Assistant Aircraft Inspectors, Grade I, terminated during the year. The vacancies are being filled by simultaneous recruitment by the High Commissioner and the Federal Public Service Commission. Two Indian students are under training in England with a view to appointment as Assistant Aircraft Inspectors, Grade II.

Posts for three additional examiners have been established from 1st March 1938, making a total of nine, of which the original six posts have been filled. One of the examiners was deputed to England for further training in July 1937 and another will follow him shortly. This training is intended to equip them for eventual promotion to higher grades.

Another Indian was selected for special training in aircraft electrical, wireless and instrument equipment. He was one of the four scholars whom Government had assisted to train as wireless operators at the Aeronautical Training Centre of India. After a short period of attachment to the Delhi Inspection Office, when he was given a short course of flying instruction with the Delhi Flying Club, he proceeded to England in April 1938.

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Arrangements with Air Registration Board.—In the United Kingdom the duty of supervision of the airworthiness of civil aircraft in operation, formerly conducted by the Air Ministry, has devolved upon the recently created Air Registration Board. The responsibility is thus placed directly on the aviation insurance organisations and aircraft operators. It has been necessary to define the relationship between the Government of India inspectional system and that administered by the Board. The following arrangements have therefore been made for a period of three years :—

(a) The Air Registration Board will undertake on behalf of the Government of India the inspection of Indian registered aircraft used on the Empire Air Services in connection with the continuous overhaul of these aircraft for the annual renewal of their Certificates of Airworthiness ; they will also undertake the supervision of maintenance inspection and other work required in connection with Indian registered aircraft in England and on the route between England and India where the Board have resident staff.

(b) The Government of India inspection staff will supervise the maintenance inspection and any other work arising in connection with British registered aircraft in India.

(c) The Air Registration Board would agree to the attachment of an Indian Officer of the inspection staff to their organisation at Croydon for the purpose of training and experience. This Inspector would be employed as an effective Surveyor, thus securing the fullest advantage in the development of his experience. The costs incurred would be borne by the Government of India.

(d) The Air Registration Board will delegate to the Director of Civil Aviation in India the function of the supervision and examination of British licensed ground engineers in India.

Inspection on behalf of Ceylon Government.—At the request of the Government of Ceylon, and on payment of appropriate charges, the Government of India have agreed to permit an Aircraft Inspector or Assistant Aircraft Inspector of the Civil Aviation Directorate to visit Ceylon periodically for the purpose of carrying out the examination of aircraft and of ground engineers for the issue and renewal of certificates of airworthiness and of licences under the Ceylon Air Navigation Regulations. There will be two visits a year to Ceylon, normally during the months of April and November. The first visit took place in May 1938.

Administration of Civil Aviation in Burma.—In pursuance of the arrangement made with the Government of Burma, supervisory control over the administration of Civil Aviation in Burma during 1936-37 was exercised by the Director of Civil Aviation in India. The arrangement was terminated at the end of the year. In May 1938, the Government of Burma appointed the Chief Engineer, Roads and Buildings Branch, Public Works Department, to carry out the duties.

C.—LEGISLATION AND RULES.

Minor amendments were made to the Indian Aircraft Rules, 1937.

International Commission for Air Navigations.—India was represented at the 25th Session of the International Commission for Air Navigation held at Paris in June 1937, by Mr. J. A. Shillidy, C.S.I., I.C.S., assisted technically by Mr. C. L. Gandy, Deputy Director of Civil Aviation in India, who was on leave in England at the time.

Notices to Airmen.—108 Notices to Airmen were issued during 1937. The Air Pilot, India and Burma, is still under revision.

Instructions to Aerodrome Officers.—42 Instructions to Aerodrome Officers were issued.

Notices to Aircraft Owners and Ground Engineers.—31 Notices were issued during the year.

D.—LICENCES AND CERTIFICATES.

Comparative figures of the number of new licences and certificates issued in India and Burma during the last three years and also the total number current at the end of each year are given in the following table :—

Licences and Certificate.	*Issued during			Current on		
	1935.	1936.	1937.	31st Decr. 1935.	31st Decr. 1936.	31st Decr. 1937.
Pilots' 'A' licences	104	98	97	234	227	236
Pilots' 'A-1' licences (Limited Commercial Pilot)	8	6	10	8	6	8
Pilots' 'B' licences	20	38	24	52	62	69
Pilot-instructors' licences.	1	4	4	13	11	14
Wireless Operators' licences	2	4	2	2	6	5
2nd Class Navigators' licences	1	2	4	2	2	6
Ground Engineers' licences	30	18	40	71	73	105
Certificates of Airworthiness	31	30	31	66	71	84
Certificates of Registration	31	35	34	110	127	147

* New licences and certificates issued during the year, excluding renewals or re-registrations.

Personnel.—The total licensed personnel, having remained stable in 1935 and 1936 at about 387, increased in 1937 to 443, a large part of the increase being in the ranks of licensed ground engineers. The steady annual advance in the percentage of Indians licensed in all categories was accelerated during 1937. At the end of the year, the percentage of Indians holding licences of all types rose to 64 per cent. from 58·5 per cent. in 1936 and 56 per cent. in 1935. Details of the number and percentage of Indians holding licences in each category are as follows :—

NUMBERS AND PERCENTAGES OF INDIANS LICENSED.

	Total licensed.	Percentage Indians.
Pilots' 'A' licence—		
Europeans	84	
Indians	152	
	236	64·4
Pilots' 'A-1' licence—		
Europeans	2	
Indians	6	
	8	75
Pilots' 'B' licence—		
Europeans	28	
Indians	41	
	69	59·4
Navigators' licence—		
Europeans	2	
Indians	4	
	6	66·6
Wireless Operators' licence—		
Europeans	3	
Indians	2	
	5	40
Pilot-instructors' licence—		
Europeans	9	
Indians	5	
	14	35·7
Ground Engineers' licence—		
Europeans	30	
Indians	75	
	105	71·4
Total licences current on 31st December 1937—		
Europeans	158	
Indians	285	
	443	64

The fall in the number of pilots' 'B' licences issued in 1937, from 38 to 24, is explained by the fact that the British pilots employed by Imperial Airways and who require Indian pilots' licences for flying the Indian registered aircraft remain stationed in India for longer periods than before. There are thus less frequent changes with a consequent reduction in the number of Indian licences which have to be issued.

More pilots are coming forward to qualify themselves for the 2nd Class Air Navigators' licence. Four licences of this type were issued in 1937 as against two in 1936. At the last joint examination in Karachi, seven candidates attended.

The number of Wireless Operators' licences issued during the year shows an apparent falling off. Two were issued in 1937 as against four in 1936. In fact, however, some of the students who were under training were not ready to qualify for their licences before the end of the calendar year and have since been licensed and found employment.

Of the 40 new ground engineers who were granted licences during the year—compared with 18 in 1936—11 were trained wholly or in part at the Aeronautical Training Centre. At the end of the year, out of 105 ground engineers holding licences, 96 were in active employment, and of the total licensed 75 were Indians.

The arrangements have been further extended for renewal of pilots' licences by Aerodrome Officers, a facility that has proved a great convenience to flying club members in particular. The Aerodrome Officers at Delhi, Karachi, Bombay, Madras, Calcutta, Cawnpore and Rangoon, have powers to renew pilots' licences, which means that pilots of all categories may have their licences renewed locally with a minimum of delay.

During the year, the licence forms and certificates of competency were brought into line with the pattern specified by the International Commission for Air Navigation.

Aircraft.—The number of aircraft on the Register increased from 127 at the end of 1936 to 147 at the end of 1937 (with a total horse power of 37,600). Among the new registrations are four Armstrong Whitworth A. W. 27 'Ensign' aircraft (total horse power 12,400) which on completion are to be placed in service by Indian Trans-Continental Airways, Ltd. The following table shows the number of aircraft of different types and classifications which held certificates of registration and certificates of airworthiness at the end of 1937.

TYPES OF AIRCRAFT WHICH HELD CURRENT CERTIFICATES OF REGISTRATION AND CERTIFICATES OF AIRWORTHINESS ON THE 31ST DECEMBER 1937.

Types.	Aircraft Registered.					Holding Certificates of Airworthiness.
	Regular Air Service.	Miscellaneous commercial flying.	Flying Clubs and training.	Private flyings.	Total	
DH 60 Moth .	..	1	19	12	32	19
DH 80 Puss Moth	..	..	1	4	5	2
DH 82 Tiger Moth	..	..	5	3	8	7
DH 83 Fox Moth	2	4	1	1	8	6
DH 84 Dragon Moth . . .	2	..	..	..	2	1
DH 85 Leopard Moth . . .	..	3	3	4	10	8
DH 87 Hornet Moth . . .	..	..	1	2	3	3
DH 89 Dragon Rapide . .	4	..	..	..	4	4
DH 90 Dragonfly	..	..	..	3	3	3
Airspeed Courier	1	..	..	..	1	1
Avro Avian .	..	..	..	2	2	..
Avro Commodore	..	..	..	1	1	..
Avro X . . .	..	2	..	..	2	1
Avro 642 . . .	..	..	..	1	1	1
A. W. XV Atalanta	2	..	..	..	2	2
A. W. 27 Ensign	4	..	..	..	4	..
Blackburn Bluebird . . .	..	..	2	..	2	1
Cierva Autogiro .	..	..	..	1	1	..
Comper Swift .	..	..	1	1	2	1
Curtiss Rambler .	..	..	..	2	2	..

TYPES OF AIRCRAFT WHICH HELD CURRENT CERTIFICATES OF REGISTRATION AND CERTIFICATES OF AIRWORTHINESS ON THE 31ST DECEMBER 1937—contd.

Types.	Aircraft Registered.					Holding Certificates of Airworthiness.
	Regular Air Service.	Miscellaneous commercial flying.	Flying Clubs and training.	Private flying.	Total	
Desoutter Mono-plane	..	..	..	1	1	..
Heath Monoplane	..	..	..	1	1	..
B. A. Swallow	..	1	2	3	6	4
B. A. Eagle	..	..	..	1	1	..
Miles Hawk	..	..	1	2	3	2
Miles Merlin	2	..	..	..	2	2
Miles Hawk Trainer	..	..	1	..	1	..
Monospar Monoplane	..	..	..	3	3	1
Percival Gull	1	..	..	1	2	..
Percival Vega Gull	3	1	1	1	6	4
Short Seion Senior	2	..	..	..	2	1
Spartan Cruiser	..	..	..	1	1	..
Stinson Reliant	..	..	..	1	1	1
B. A. C. Super-Drone	..	1	..	..	1	..
Flying Flea	..	..	..	6	6	..
Airspeed Envoy	..	..	..	2	2	1
Waco	9	..	..	1	10	7
Lockheed 12-A	..	..	..	2	2	2
Taylor Cub	..	..	..	1	1	..
Total 1937	32	13	38	64	147	85
Total 1936	20	16	34	57	127	71

There were 62 registered aircraft not in possession of Certificates of Airworthiness on the 31st December 1937. Included in this number were those whose certificates were for some reason in abeyance, as well as some of the private aircraft which are not required to be certified as airworthy. Four are the A. W. 27 "Ensign" aircraft for which no applications for certificates of airworthiness have yet been made. Five were of foreign design, three of which were of a type that would not be accepted as complying with Indian standards of airworthiness. Six were "Flying Fleas" which could not be granted certificates of airworthiness.

There were 34 aircraft of 13 different types added to the Register during 1937. The total horsepower of these aircraft is 19,062. For 1936, the comparative figures were 35 aircraft of 4,922 horsepower. The new aircraft registered in 1937 are shown in the following table. 24 of these machines are of British construction and 10 American.

AIRCRAFT ADDED TO REGISTER 1937.

Number of Aircraft.	Type of Aircraft.	Regd. H. P.	Total H. P.
1	DH 60 Moth (Gipsy II)	105	105
1	DH 60 Moth (Gipsy Major)	118	118
1	DH 82A Tiger Moth (Gipsy Major)	118	118
2	DH 85 Leopard Moth (Gipsy Major)	118	236
2	DH 87B Hornet Moth (Gipsy Major)	118	236
3	DH Dragon Rapide (2 Gipsy VI)	360	1,080
1	DH 90 Dragonfly (2 Gipsy Major)	236	236
4	A. W. 27 Ensign 4 (Armstrong Siddeley Tiger)	3,100	12,400
4	Percival Vega Gull (Gipsy VI)	180	720
2	Percival Vega Gull (Gipsy VI Series II)	195	390
1	Miles Hawk (Gipsy Major)	118	118
1	Taylor Cub (Continental)	40	40
2	Lockheed 12A (2 P. W. Wasp Junior)	800	1,600
6	Waco (Jacobs L-4)	225	1,350
1	Waco (Jacobs L-5)	285	285
1	Flying Flea (Scott)	20	20
1	Flying Flea (Perman Ford)	10	10
34			19,062

Aerodromes.—The provisions of the Indian Aircraft Rules, 1937 which introduced the system of aerodrome licensing have functioned smoothly. The certificates of approval formally issued have been replaced by licences. During 1937, aerodrome licences issued comprised :—

Aerodromes, Public	2
Aerodromes, Private (permanent)	3
Aerodromes, Private (temporary)	6
Water aerodromes, Private.	3

The licences issued to Imperial Airways for the water aerodromes at Karachi and Calcutta raised a number of new points, since the Port authorities were intimately concerned. In principle, the licencees, i.e., Imperial Airways are held responsible under the conditions of the licences for the control of all seaplane operations in the licensed area.

At Raj Samand and Gwalior permission to use the lake is derived from a permit issued by the State authorities on the advice of the Director of Civil Aviation.

In Burma, two licences in the private category have been issued to Imperial Airways Ltd. for the water aerodromes at Akyab and Rangoon. As a temporary measure, Irrawaddy Flotilla and Airways, Ltd., have been granted an exemption from the Rules in order to permit them to operate on the unlicensed water areas which they have hitherto used, until such time as the administrative organisation for civil aviation is more advanced and complete information has been collected regarding the water areas for which licences will eventually be required. One licence has been issued for a private landing ground.

E.—CUSTOMS AND HEALTH SERVICES.

Six new customs aerodromes were appointed during the year in India and two in Burma. The customs aerodromes in India at the end of the year were as follows :—

For aeroplanes—

Karachi Airport, Drigh Road.
Calcutta Airport, Dum Dum.
Bombay Airport, Juhu.
Madras Airport, St. Thomas Mount.
Trichinopoly Landing Ground.
Ahmedabad Army Landing Ground.

For seaplanes—

Karachi Harbour.
Bally Reach (Calcutta).

In Burma the following were the appointed customs aerodromes at the end of 1937-38 :—

For aeroplanes—

Akyab Aerodrome.
Rangoon Airport, Mingaladon.
Victoria Point Aerodrome.

For seaplanes—

The seaplane stations at Akyab and Rangoon.

The growth in customs traffic will be gathered from the figures in Appendices 2 and 3. 641 aircraft were cleared by the Customs at the Karachi Airport on arrival or departure, as compared with 614 in 1936, passengers on scheduled services numbered 1,890 as against 1,377 and the value of goods imported and exported amounted to Rs. 1,05,51,759 as against Rs. 82,55,356.

Further progress was made during the year 1937-38 in developing Karachi Airport as an anti-amaryl aerodrome in view of the great danger of the introduction of yellow fever from Africa to India by aeroplanes.

The Health Staff at the airport consists of one Airport Health Officer, one Sub-Assistant Surgeon, one Sanitary Inspector and one clerk. Intensive work was carried out during the year to prevent the breeding of mosquitoes within the aerodrome area and a certain amount of control is also exercised over the land outside. During the year the Isolation Hospital for the reception of yellow fever suspects or cases was completed and contains 12 beds. Plans were approved for a dispensary in connection with the airport.

The introduction of seaplane traffic made it necessary to set up an organisation for the inspection of passengers at the seaplane port at Keamari. All seaplanes are regularly inspected by the Port Health Officer, Karachi on arrival and departure. Any yellow fever suspect or case on arrival at Keamari will be conveyed in a mosquito proof ambulance to the Isolation Hospital at Drigh Road. A medical inspection room and small mosquito proof detention room have been provided at the seaplane port and surveys are being conducted to determine the extent to which mosquitoes are breeding in the vicinity.

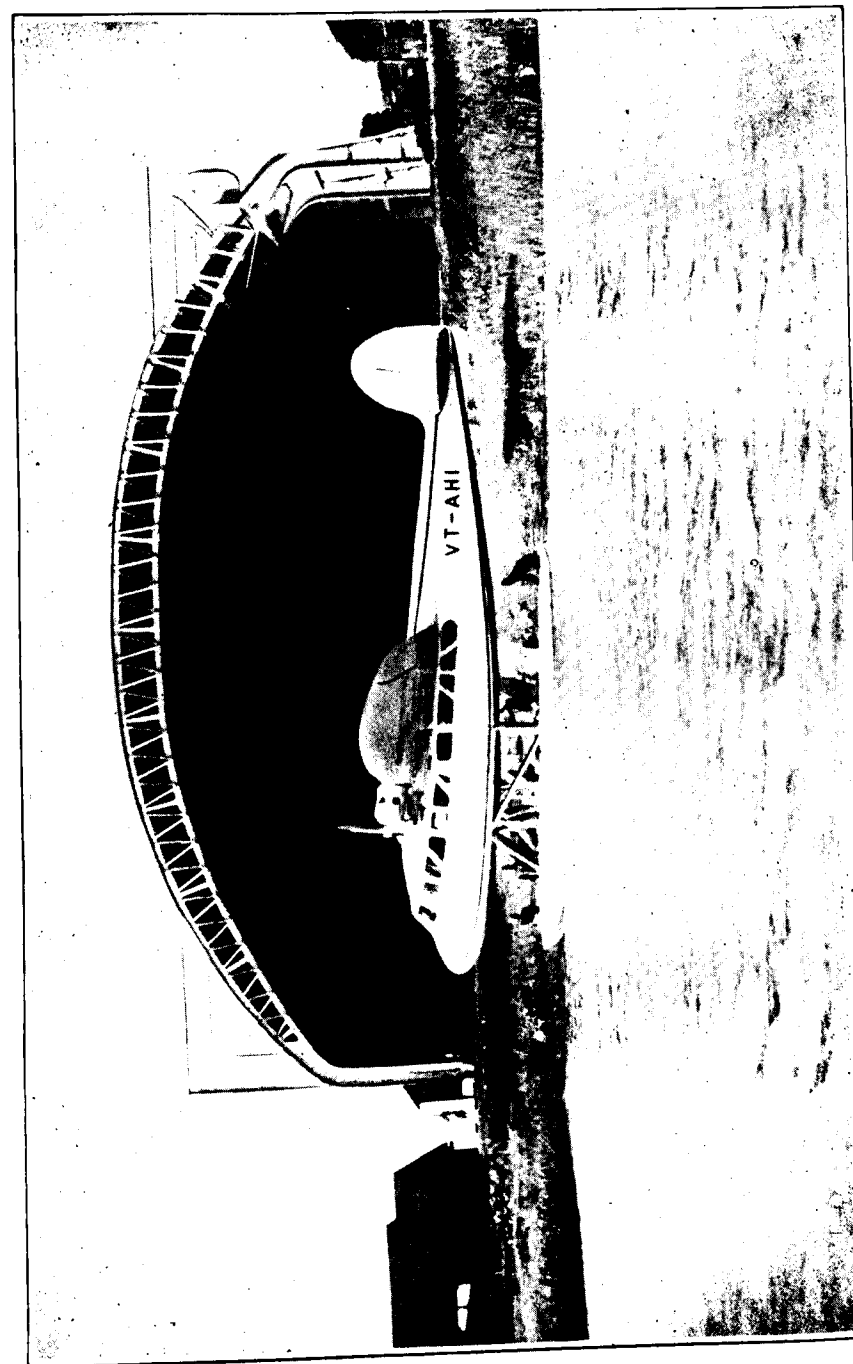
A system of coded health reports has been arranged for use by east bound aircraft approaching Karachi. The report is sent by radio at least two hours before arrival with the object of accelerating sanitary clearance after landing.

The draft Rules based primarily on the International Sanitary Convention for Aerial Navigation, with alterations to suit local conditions, are still under the consideration of the Government of India, and it is hoped that they will be published in the near future.

The following table shows the aircraft, crews and passengers inspected during the year at Karachi Airport and Seaplane Port :—

	Airport.	Seaplane Port.
<i>Westbound—</i>		
Aircraft	283	17
Crews	1,071	100
Passengers	1,425	86
<i>Eastbound—</i>		
Aircraft	317	19
Crews	1,158	114
Passengers	1,366	111

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Rangoon.—Irrawaddy Flotilla and Airways' Short Seion Senior Seaplane and the new hangar, constructed at Pazundaung Creek, Rangoon.

SECTION V. ACCIDENTS.

A.—GENERAL ANALYSIS.

A total of 18 notifiable accidents, of which 15 were flying accidents and three were ground accidents, occurred in 1937. The corresponding totals for 1935 and 1936 were 22 and 30 respectively, all of which were flying accidents. The 18 accidents comprised :—

Flying.—(Indian 14 ; non-Indian one)

13 flying accidents to Indian aircraft in India or Burma.

One flying accident to an Indian aircraft abroad.

One flying accident to a British aircraft in India.

Ground.—(Indian two ; non-Indian one)

Two ground accidents to Indian aircraft in India or Burma.

One ground accident to a British aircraft in India.

Statistical information on accidents, their causes and distribution, is given in Appendices 16, 17 and 18. When comparing the accident and fatality rates with those given in previous Reports a point to be noted is that the statistics of hours and mileage flown have been modified by the exclusion of flying by aircraft owned by Imperial Airways Ltd., on the Karachi-Singapore route. Only the flying on this route by Indian registered aircraft owned by Indian Trans-Continental Airways, Ltd., is now included in Appendices 17 and 18. The figures for the years 1934—1937 have been revised accordingly.

Fatalities in all accidents during 1937 numbered six, but of these three only were caused by flying accidents to Indian aircraft and are consequently of the category which figure in the fatality and accident rates in Appendix 18. Of the remainder, one life was lost in an accident to a British private aeroplane flying in India and two deaths resulted from ground accidents, both due to fires in hangars, one involving an Indian aircraft and the other a British aircraft.

It will be seen from Appendix 18 that in 1937, 782,000 miles were flown for every fatality in a flying accident to an Indian aircraft and 469,000 miles for every serious injury or fatality. The comparative figures for the previous three years combined were 272,800 miles and 176,000 miles respectively.

The foregoing rates apply to all civil aviation activities—flying instruction, private flying, regular air transport, charter flying, etc. For the passenger by a regular air service operated by an Indian company the standard of safety is very much higher. For example, the total hours flown in 1937 by Indian registered aircraft (excluding

private flying for which no figures are available) amounted to 26,562 hours. Of this flying, 10,684 hours were performed in regular air transport. Out of the 18 notifiable accidents, however, only two occurred in regular air transport and no passengers were involved. No passenger has been killed or injured by an accident to an Indian aircraft engaged on a regular air service since the services began.

The damage sustained by Indian aircraft involved in 16 accidents. (14 flying, 2 ground) is analysed as follows :

Flying accidents—

- 5 were written off.
- 2 required complete overhaul.
- 7 required the replacement of major components.

Ground accidents—

- 1 written off.
- 1 required complete overhaul.

B.—NATURE OF ACCIDENTS.

The following analysis of the causes of the 14 flying accidents to Indian aircraft in 1937 is based on the N. A. C. A. form of Report first adopted in the United States of America and now used in other countries. Comparison is made with the three preceding years. Ground accidents are not included in the analysis.

FLYING ACCIDENTS TO INDIAN AIRCRAFT.

Class	Nature of accident.	1937.	1936.	1935.	1934.
A	Collisions in full flight with other aircraft	..	..	1	..
B	Collisions in full flight with objects other than aircraft	2	6	2	3
D	Spins or stalls without engine failure	1	..	4	5
E	Forced landings	..	6	3	1
F	Landing accidents	5	10	4	3
G	Take-off accidents	3	5	2	6
H	Taxying accidents	*1	1	1	2
I	Fire in the air	1	..	..	..
N	Structural failure	..	..	1	..
Y	Indeterminate and doubtful	1	..	1	..

*Occurred to an Indian aircraft flying abroad.

As is the general rule, the most prolific cause of accidents in 1937 was that classified under F—Landing Accidents, comprising accidents caused by the pilot's error or faulty judgment while in the act of making a voluntary landing, generally through stalling in landing, or in one case in 1937 by allowing the aircraft to swing round after landing.

The causes of the six accidents, including flying and ground accidents, which involved fatalities are described below :—

(1) *Indian registered aircraft (Flying accidents).*—A pilot, flying a mail aeroplane on the Lahore-Karachi route, crashed in circumstances suggesting complete loss of control while preparing to make a forced landing. The pilot, flying solo, was killed. It was not possible to determine the height at which he was flying, the accident having occurred in a deserted locality. The cause of the accident, after exhaustive enquiry, remains undetermined.

(2) The passenger in a club aeroplane was killed through the aircraft stalling and diving into the ground while flying at a very low altitude. The pilot was seriously injured.

(3) A woman was killed while crossing an aerodrome as an aeroplane was taking off.

(4) *Indian registered aircraft (Ground accident).*—A club aeroplane was destroyed by fire while being serviced in a hangar. The engine, contrary to all normal practice, was being cleaned with petrol. The petrol was ignited by a spark when the engine was turned with the contact breaker cover removed and the high tension leads disconnected. The cleaner died from burns. Regulations were issued to prevent a recurrence.

(5) *British registered aircraft (Flying accident).*—The pilot was engaged in taking photographs on a private flight at a low altitude near an aerodrome, when one wing-tip touched the ground on a turn and caused the death of the pilot and serious injuries to the passenger.

(6) *British registered aircraft (Ground accident).*—A fire destroyed a transport aeroplane during maintenance operations inside a hangar when a can of cleaning fluid was upset while the engine was being turned. No detailed investigation was made by the Government of India. An inspector employed by the company who attempted to extinguish the fire was badly burned and died later as the result of his injuries.

SECTION VI. PROGRESS IN INDIAN STATES.

The chief events of the year were the opening of air services on the routes Porbandar-Jamnagar-Rajkot-Bhavnagar-Bombay and Delhi-Gwalior-Bhopal-Indore-Bombay and the establishment of seaplane stations at Udaipur (Raj Samand) and Gwalior which gave these later States direct connection with the Empire seaplane service between England and Australia.

Continuous progress is being made in the use of air transport by the Ruling Princes for their personal tours and for rapid communication on official business. Their Highnesses the Maharaja of Jodhpur and Kashmir have each acquired an American Lockheed 12A air liner for personal use. In performance, these aircraft are the most advanced in India, with a cruising speed of 200 miles an hour.

Five new landing grounds were established in Indian States during the year, 14 landing grounds were reconstructed or substantially improved and eight States began investigations with a view to establishing landing grounds. The Director of Civil Aviation, on his visit to Kathiawar States in connection with the inauguration of the Bombay-Kathiawar air service, inspected and gave advice on the improvement and future development of the landing grounds and ground organisation. During the year nine other States were also assisted with technical advice on the selection and planning of landing grounds.

The following are details of the more important activities reported by the States :—

Athgarh.—A fresh example of the value of an aeroplane in an emergency was given in August 1937 when the river Mahanadi flooded and inundated a number of villages. On the approach of the flood, the Ruling Chief, who is the owner of a Puss Moth aeroplane, made a survey of the situation by air so that arrangements could be made to supply foodstuffs to the threatened villages and get people and cattle into places of safety. The progress of the flood and work of relief were watched from the air by the Ruling Chief who was thus able to send help where most needed.

Bhavnagar.—A comprehensive scheme for the development of Bhavnagar landing ground has been sanctioned and work is being pressed forward on the construction of a runway, taxi strip, a hangar and an office building, together with improvements to the landing area generally.

As an instance of the saving of time effected by the Bombay-Kathiawar air service, it may be mentioned that Bombay may be reached from Bhavnagar by air in 1½ hours as compared with 19¼ hours by rail.

Baroda.—The first stages in the construction of an aerodrome have been completed at a cost of Rs. 1,15,000 and the ground is fit for use under fair weather conditions. Further developments will be undertaken as required by traffic. Among the plans under consideration, some of which have been sanctioned at an estimated cost of Rs. 2,95,000, are a night lighting installation, a hangar and wireless communication. With a view to connecting other districts of the State with Baroda, proposals are also being considered for the construction of landing grounds at Navsari, Amreli and Okha.

Bhopal.—An agreement was made with Messrs. Tata Sons Limited in connection with the Delhi-Bombay air service. Support is being given to the service by the State to the extent of a subsidy of Rs. 15,000 a year and the provision of a landing ground. The Kali Parade ground was levelled and extended to serve as a landing ground temporarily. A site for a permanent aerodrome has been selected provisionally and plans and estimates for the work of construction are being considered.

Bikaner.—Two landing grounds are maintained and were used by visiting Princes and other guests, members of the Delhi and Northern India Flying Clubs and also by Royal Air Force aeroplanes co-operating with the State army manoeuvres.

Cutch.—The development of Bhuj landing ground is actively in progress in order to render it serviceable under all weather conditions and suitable for night operations by Tatas' aircraft flying on the Karachi-Colombo air mail service. For the present, until a runway has been completed, the call at Bhuj is omitted when the aerodrome is unserviceable during the monsoon. Three runways are contemplated one of which will be completed in 1938. Lighting equipment will be installed with the assistance initially of the Government of India who will supply a mobile floodlight beacon and give training to an operator employed by the State.

Dharampur.—The existing landing ground being small and unsuitable for extension, efforts are being made to find a larger area for development. The State has announced that it is prepared to award scholarships for training in aviation but so far no suitable candidates have come forward.

Dholpur.—The State landing ground is regularly maintained and is used occasionally by visitors. Permission was granted to the Indian Aviation Development Company, Limited, to conduct passenger flights.

Gwalior.—The selection of Madho Sagar Lake as a permanent station for seaplanes operating on the England-Australia air mail route and the ground organisation now installed or in train have already been under remark in Section III. It may be added that on westbound services, Gwalior is a night stop for seaplanes and passengers stay the night at the excellent State Hotel.

A new aerodrome site was specially prepared in time for the opening of the Bombay-Delhi air service, which is further supported by the payment of a subsidy by the State.

Hyderabad.—The Civil Aviation Board formed in 1933 continued to function until January 1938 when it was finally dissolved and the management of the proposed commercial air services and the technical side of the Aero Club was entrusted to the Railway Administration. Other civil aviation matters remained in charge of the Army Secretariat.

The Government intends maintaining a progressive policy towards the development of civil aviation. A capital expenditure of Rs. 5,14,331 was sanctioned in addition to a subsidy of Rs. 56,201 for the Aero Club. Subsequently a further Rs. 20,000 was granted for the purchase of an aeroplane for instructional purposes.

At Hyderabad (Begumpet) aerodrome, lighting equipment is being installed and extra land is being acquired to extend all the main runways to an effective length of 1,200 yards. The airport building and a hangar have been completed. Wireless communication has been provided by the Government of India. A provision of Rs. 2,20,000 was made for the preparation of aerodromes at district headquarters and emergency landing grounds along the main air routes. Sites have been surveyed for aerodromes at Raichur, Gulbarga, Aurangabad, Bidar, Mahboobnagar and Warangal and for emergency landing grounds at Osmanabad, Adilabad, Devarkonda and Kolapuram.

The intention is to have a first class ground organisation within the State with a view to attracting air traffic. In this connection proposals for raising the status of some of the Meteorological Observatories in the State will be considered at a later date.

The State Aero Club trained 10 pupils for the pilots' 'A' licence and one 'A' licence was renewed. Other details concerning the Club will be found in Appendix 15. There is no definite scheme of scholarships for the present but two pupils are being trained for ground engineers' licences and when the projected commercial air services begin, it is proposed to give training to subjects of the State as probationary pilots and ground engineers with a view to qualifying them for more responsible duties.

The services of an Aeronautical Consultant have been obtained from England to assist the State with the development of its plans.

Indore.—Arrangements were completed with Messrs. Tata Sons Limited for Indore to be included as a regular stop on the Delhi-Bombay air service. The Bijasani landing ground, which was constructed by removing a top layer of cotton soil to uncover a uniform surface of laterite, is behaving excellently. Two hangars

of permanent construction have been completed at a cost of Rs. 40,000 and arrangements have been made for the installation of refuelling stations.

The staff at the aerodrome has been organised and an Aerodrome Officer appointed. Two State scholars have completed their training, one of whom has been appointed pilot and Assistant Aerodrome Officer. The employment of the other as pilot and ground engineer is under consideration.

Jaipur.—The State now owns three aircraft, viz., an Airspeed Envoy, a Vega Gull and a Tiger Moth. The Vega Gull was flown to India from England by the State pilot in October and is intended as a reserve machine for the use of His Highness the Maharajah, who travels by air on nearly all his tours. The total flying time of the State aircraft during the year amounted to 132 hours. The main landing ground at Sanganer has been greatly improved. Two all-weather runways have been provided and the landing area has been enlarged. The landing grounds at Sawai Madhopur, Malpura and Jhunjhunu have also been improved and a new landing ground is being constructed at Bairath. Owing to the absence of the State pilot in England, little flying was done by the State Aero Club. Instruction was given to four members.

Jath.—A landing ground was opened in October at the capital of the State. It has excellent approaches and is well situated at a short distance from the town. Accommodation for visitors is available at the State Guest House not far away. It is felt by the State authorities that the foundation for civil aviation has been well laid and in view of the natural and climatic attractions which the State enjoys, an early development of flying is in prospect.

Jodhpur.—877 machines landed at Jodhpur aerodrome during the year as compared with 756 in 1936. Among works of improvement carried out are the widening of the main runway to 200 ft. and of another runway to 120 ft. and the building of extra quarters for aerodrome staff. Three new aeroplanes were purchased during the year: a Lockheed machine for the personal use of His Highness, a Leopard Moth purchased by Lt.-Colonel Sir Donald Field, C.I.E., Chief Minister, for his private use, and a B. A. Swallow purchased by the Jodhpur Flying Club.

One pupil was trained by the Club for the pilot's 'A' licence and six 'A' licences were renewed. Particulars of the membership, the hours flown and other details will be found in Appendix 15.

Four private landing grounds at Madri, Gudah, Sambhar and Ladnun were constructed for the use of State officials. The landing ground at Phalodi having become dangerous owing to drift sand was abandoned.

Kashmir.—An aerodrome 1,000 yards in diameter with extensions to provide runways of 1,400 and 1,500 yards in the direction of the prevailing winds has been constructed at Damodar Karewa at a distance of about six miles from Srinagar. One hangar has been built for State use. The Satwari Military Parade ground at Jammu is used as a private landing ground for the State aircraft only. A small hangar has been constructed there for housing His Highness's aeroplane. Expert advice is being obtained with regard to the provision of wireless and meteorological facilities at the Srinagar landing ground and on the route between Srinagar and Jammu with a view to considering the possibilities of establishing an air service to Kashmir in the near future.

Kolhapur.—The Darbar are contemplating the construction of a new landing ground and with this object in view have engaged the services of an aeronautical consultant. At present the old race course at Kolhapur is available as a temporary landing ground.

Loharu.—The Loharu landing ground has been further improved. A small rest house has been constructed near the landing ground and a pucca road has been provided connecting the ground with the town. Visitors to the landing ground included the machines of Indian National Airways, Tatas, the Delhi Flying Club and several private owners.

Mayurbhanj.—The State owns a Dragonfly 5-seater aeroplane and a Tiger Moth. The use made of these machines and the excellent service obtained from them are of particular interest. For example, between May 1937 and February 1938, 84 journeys by air were made from the State landing ground at Baripada to various centres, including Calcutta, Allahabad, Delhi, Bikaner and Lucknow.

The following examples of the time-saving and convenience of air travel are quoted by the State: Baripada-Allahabad-Baripada, 815 miles in six hours, 25 minutes, returning in time for lunch. Bikaner-Delhi, 260 miles, in less than two hours as against 24 hours by train.

Facilities are being offered by the State to students who wish to be trained in aviation and an Aero Club has been formed further to encourage flying in the State.

Nawanagar.—Aviation in the State enjoys the active interest and support of His Highness the Maharaja Jam Saheb and his brother, Colonel Rajkumar Shri Himatsinghji, Military Secretary and Home Member. The Jamnagar landing ground has been much improved and enlarged and is a regular stopping place of the Bombay-Kathiawar air service.

There were 184 arrivals and departures of aircraft during the year. An Aerodrome Officer, mechanic and chowkidar have been stationed at the aerodrome, which is now equipped with a small hangar, workshop, guardroom, telephone and tute-well water

supply. With the increase in traffic now in prospect a scheme to build a large hangar, office building and all weather runways is under consideration.

Panna.—Whilst no set policy for aviation development has yet been laid down, a landing ground has been established and is regularly maintained for the reception of visiting aircraft.

Porbandar.—Regular air transport began in the State with the inauguration of the Bombay-Kathiawar air service. The Porbandar landing ground has been provided with a rest house and fuel store. A metalled runway is under consideration and further improvements will be taken up as the needs of traffic enlarge.

Rajkot.—Plans for the extension of Rajkot landing ground and the construction of a rest house have been prepared and it is hoped to commence the work after the monsoon. No aircraft have been purchased by the State as the machines of Air Services of India Limited serve present purposes.

Sirohi.—It is the policy of the State to attract visitors by air and to encourage the use of the two State landing grounds. One, at Sirohi itself, is suitable for use by all types of aircraft and the other, at Abu Road, is available for light machines.

Travancore.—The State remarks that encouragement given to aviation and the expenditure incurred in affording landing facilities is proving its worth in the growing recognition of the utility of flying and increasing traffic. Besides the Bombay-Trivandrum weekly air mail service which has been operated in the fair weather months since October 1935, a number of other aircraft landed at Trivandrum during the year. The time taken on the regular service for the flight between Trivandrum and Bombay was reduced in 1937 to seven hours, 50 minutes, a saving of one hour on the previous schedule.

Improvements to the landing ground at Trivandrum included perimeter fencing, wind indicators and the supply of first-aid and fire equipment. A temporary retiring room with the necessary furniture has also been provided for the convenience of air travellers. The fencing of Quilon landing ground will follow.

Udaipur.—Raj Samand Lake, 40 miles from Udaipur, has been equipped as a seaplane station and licensed to Imperial Airways Limited for the use of seaplanes operating on the Empire Mail Service. Details with regard to the organisation and facilities are given in Section III of the Report.

A fair weather landing ground with a small hangar continues to be maintained by the State at Udaipur.

Wankaner.—A landing ground has been constructed and is now available for use. Assistance in the form of a loan has been granted to an aviation student to enable him to train for a pilot's 'B' licence.

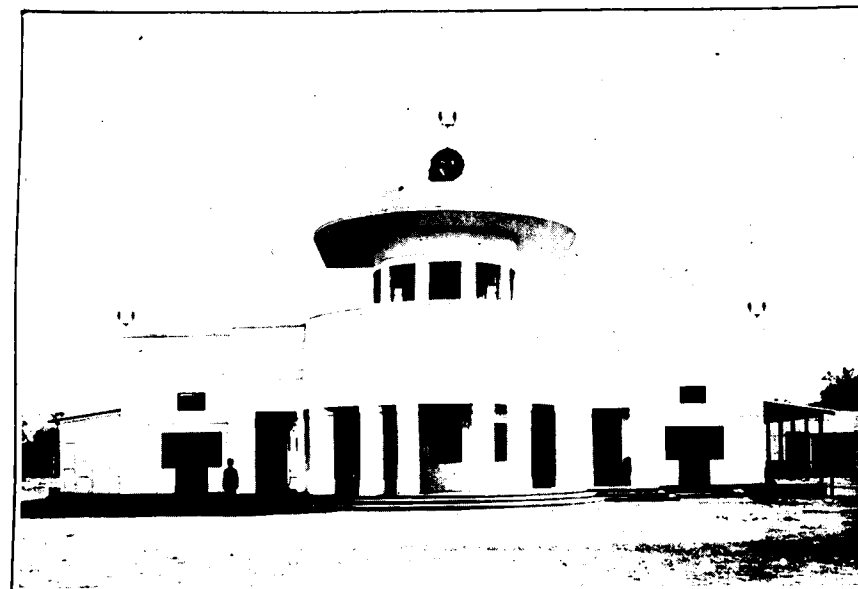
A list of the aerodromes and landing grounds in Indian States corrected up to the end of 1937, is given below. Landing grounds which are regularly maintained are shown on a map appended to the report :—

AERODROMES AND LANDING GROUNDS IN INDIAN STATES.

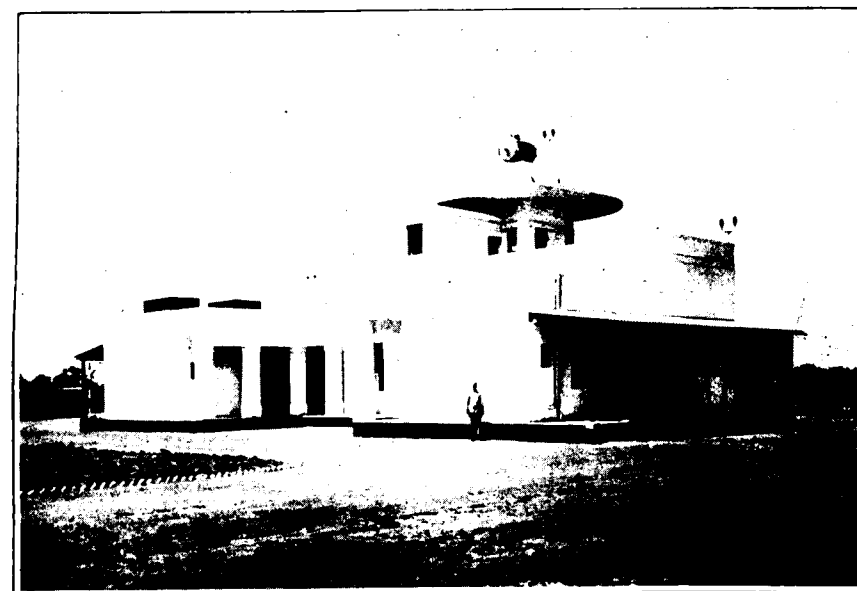
State.*	Aerodromes and landing grounds normally maintained in good condition.	**Other landing grounds.
Athgarh	1	..
Aundh	1	..
Baroda	1	..
Bhavnagar	1	..
Bhopal	1	..
Bikaner	2	..
Cutch	1	..
Dharampur	1	..
Dholpur	1	..
Gwalior	1	..
Garrauli	1	..
Hyderabad (Deccan)	1	1
Idar	1	..
Indore	1	..
Jaipur	4	2
Jath	1	..
Jind	1	..
Jodhpur	13	..
Junagadh	2	..
Kashmir	1	1
Kollhapur	..	1
Limbdi	1	..
Loharu	1	..
Mayurbhanj	1	..
Nawanagar (Jamnagar)	1	..
Panna	1	..
Patiala	1	1
Porbandar	1	..
Radhanpur	..	1
Rajkot	1	..
Rajpipla	1	..
Rampur*	..	1
Rewa	..	1
Sirohi	2	..
Travancore	2	..
Udaipur	1	..
Wankaner	..	1
	51	10

NOTES.—*Permission to use the landing grounds in certain States is subject to application being made in advance.

** This list includes grounds which may not necessarily be maintained in good condition or may be of a temporary nature.



Front.



Rear and Side.

Cawnpore.—The new office building in the first stage of development. An example of the smaller type of control and administrative office erected at aerodromes where volume of traffic is not large. The building is so designed that at a later date side-wings can be added to provide further accommodation.

APPENDIX 1.

Air Mails carried by all Scheduled Air Services to and from India and Burma.

(1) Air Mails to India and Burma.

	Imperial Airways and Indian Trans-Continental Airways, Ltd.		K. L. M.		Air France.		Total.
	From the West.	From the East.	From the West.	From the East.	From the West.	From the East.	
1929 (9 months)	lbs. 21,967	lbs. ..	lbs. ..	lbs. ..	lbs. ..	lbs. ..	lbs. 21,967
1930 . . .	39,364	..	96	..	..	..	39,460
1931 . . .	45,632	..	1,047	No record.	318	No record.	46,997
1932 . . .	45,111	..	3,216	1,366	458	79	50,230
1933 . . .	55,195	No record.	4,731	1,319	834	268	62,347
1934 . . .	65,795	1,395	4,977	4,454	936	588	78,145
1935 . . .	90,297	5,791	7,111	6,896	747	655	111,497
1936 . . .	105,701	17,265	10,338	1,841	1,101	736	136,982
1937—							
March quarter	28,623	4,750	3,692	492	438	277	38,272
June quarter	29,023	5,990	3,360	514	523	199	39,609
Sept. quarter	31,220	7,288	3,706	586	681	300	43,781
Dec. quarter	34,279	5,684	4,056	572	1,095	230	45,916
Total for 1937	123,145	23,712	15,014	2,164	2,737	1,006	167,578

(2) Air Mails from India and Burma.

	Imperial Airways and Indian Trans-Continental Airways, Ltd.		K. L. M.		Air France.		Total.
	To the East.	To the West.	To the East.	To the West.	To the East.	To the West.	
1929 (9 months)	lbs. ..	lbs. 20,171	lbs. ..	lbs. ..	lbs. ..	lbs. ..	lbs. 20,171
1930 . . .	..	34,015	..	..	..	..	34,015
1931 . . .	..	40,474	..	..	..	..	40,474
1932 . . .	..	42,407	117	..	14	..	42,538
1933 . . .	No record.	54,178	1,460	..	424	..	56,062
1934 . . .	3,537	66,753	428	47	586	108	71,459
1935 . . .	6,677	93,859	57	111	1,087	124	101,915
1936 . . .	11,785	107,592	115	136	677	133	120,438
1937—							
March quarter	3,879	30,522	41	6	111	51	34,610
June quarter	4,208	31,196	37	7	110	36	35,594
Sept. quarter	4,661	31,926	45	12	102	51	36,797
Dec. quarter	3,802	30,905	58	19	118	51	34,953
Total for 1937	16,550	124,549	181	44	441	189	141,954

APPENDIX 2.

Flights performed and Passengers and Freight carried by all Scheduled Air Services to and from India.

(i) Karachi Air Port.

	*No. of flights.	Passengers.		Freight (including bullion).	
		To India.	From India.	To India.	From India.
<i>Imperial Airways.</i>				lbs.	lbs.
1929 (9 months)	80	No record.	No record.	No record.	No record.
1930	105	78	70	No record.	No record.
1931	104	80	74	5,489	313
1932	105	150	142	5,073	266
1933	109	216	211	9,410	5,029
1934	104	280	326	10,232	4,988
1935	208	455	528	23,811	31,560
1936	210	450	569	17,305	23,391
1937—					
March quarter	52	108	101	4,132	8,575
June quarter	52	107	148	7,246	8,135
September quarter	53	127	102	5,442	7,478
December quarter	51	130	97	5,670	9,534
Total for 1937	208	472	448	22,490	33,722
<i>Foreign Air Services.</i>					
1931	106	32	18	628	43
1932	190	16	30	1,231	2,686
1933	222	59	64	4,045	380
1934	209	31	71	7,662	780
1935	266	186	198	9,388	4,179
1936	312	314	404	10,310	5,152
1937—					
March quarter	77	81	78	3,352	1,801
June quarter	78	94	126	5,272	1,463
September quarter	78	177	162	4,154	1,743
December quarter	101	136	116	4,209	1,646
Total for 1937	334	488	482	16,987	6,653

* Duplicate services are not counted as separate flights.

APPENDIX 2—contd.

Flights performed and Passengers and Freight carried by all Scheduled Air Services to and from India—contd.

(ii) Rangoon Air Port.

	*No. of flights.	Passengers.		Freight.	
		To India.	From India.	To India.	From India.
<i>Imperial Airways and Indian Trans-Continental Airways.</i>				lbs.	lbs.
1933 (December quarter only).	2	..	3	..	..
1934	105	45	55	2,249	5,361
1935	130	52	46	3,696	3,909
1936	210	92	81	6,283	10,906
1937—					
March quarter	52	35	26	1,112	3,281
June quarter	52	19	21	1,250	3,265
September quarter	53	13	25	928	580
December quarter	51	23	40	294	201
Total for 1937	208	90	112	3,584	7,327
<i>Foreign Services.</i>					
1932	190	41	28	128	1,351
1933	212	108	77	100	34
1934	208	42	27	4,346	6,061
1935	265	86	56	285	861
1936	312	160	120	262	915
1937—					
March quarter	77	51	40	524	186
June quarter	78	45	27	5	144
September quarter	78	43	17	57	442
December quarter	101	41	44	229	210
Total for 1937	334	180	128	815	982

* Duplicate services not counted as separate flights.

APPENDIX 3.

Value of Imports and Exports by Air—Karachi and Rangoon Air Ports.

Period.	Aircraft.		Imports by Air.			Exports by Air.		
	Arrivals from foreign.	Departures for foreign.	General merchandise.	Precious stones.	Bullion and currency notes.	General merchandise.	Precious stones.	Bullion and currency notes.
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Karachi.</i>								
1931—33	493	456	24,67,756	35,66,407	3,17,902	63,620	..	13,02,700
1934	192	183	5,25,941	38,78,355	1,06,638	10,026	..	1,03,930
1935	278	260	8,31,480	25,08,941	1,23,635	80,935	77,350	45,900
1936	317	297	7,87,384	70,27,503	1,72,799	1,11,481	23,200	1,32,989
1937—								
March quarter	82	73	1,39,310	19,34,624	1,18,647	63,214	1,000	..
June quarter	82	81	2,16,764	21,39,802	93,798	47,543	1,515	5,475
September quarter	78	71	1,70,227	24,67,321	35,240	67,516	5,350	1,37,700
December quarter	100	84	1,73,346	26,88,127	..	35,210	2,660	7,500
Total for 1937	342	309	6,09,647	92,29,874	2,47,685	213,483	10,505	1,50,675
<i>Rangoon.</i>								
1931—33	272	290	5,505	..	..	225	..	27,13,353
1934	172	182	9,890	..	..	612	..	..
1935	208	220	27,036	..	..	625	..	..
1936	274	275	25,655	..	..	251	..	..
1937—								
March quarter	65	74	6,394	..	1,11,562	2,168	..	11,375
June quarter	68	72	7,315	3,095	..	5,529	..	..
September quarter	75	75	13,001	3,500	..	1,728	..	..
December quarter	83	84	11,295	8,204	..	2,353	..	30,870
Total for 1937	291	305	38,005	14,799	1,11,562	11,778	..	42,245

APPENDIX 4.

Regularity and punctuality of scheduled air services to and from India—Karachi Air Port.

Services and Period.	Eastbound Arrivals.				Westbound Departures.			
	Sche- duled.	Punc- tual.	Delay.			Punc- tual.	Sche- duled.	Delay.
			1 day.	2 days.	3 days or more.			
1932—								
Imperial Airways	53	36	6	7	4	50	52	..
K. L. M.	52	32	13	6	1	43	51	1
Air France	43	33	7	3	..	31	43	..
1933—								
Imperial Airways	52	45	4	2	1	50	52	..
K. L. M.	52	36	12	3	1	49	53	2
Air France	52	42	8	2	..	49	52	..
1934—								
Imperial Airways	52	44	8	..	..	46	52	..
K. L. M.	53	49	4	..	..	49	52	..
Air France	52	35	10	6	1	47	52	..
1935—								
Imperial Airways	104	87	13	2	2	91	104	1
K. L. M.	81	63	10	5	3	76	81	1
Air France	53	40	13	..	..	45	6	..
1936—								
Imperial Airways	105	62	34	4	5	94	105	2
K. L. M.	103	91	10	1	1	100	104	..
Air France	52	39	11	2	..	53	53	..
1937—								
Imperial Airways	104	81	15	2	..	95	104	1
K. L. M.	117	108	7	2	..	113	114	..
Air France	51	43	7	..	1	51	52	..

APPENDIX 5.
Air Mails carried by Trans-India Air Service.
Imperial Airways, Ltd. and Indian Trans-Continental Airways, Ltd.

Period.	East bound.				West bound.				Grand Total.
	*To India and Burma from the West.	*From India and Burma to the East.	†Within India and Burma.	Transit mails.	Total.	*To India and Burma from the East.	*From India and Burma to the West.	†Within India and Burma.	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1933 (July to December).	No record.	No record.	No record.	No record.	7,797	No record.	No record.	No record.	21,685
1934	21,020	3,537	994	12,734	38,285	1,395	34,367	1,527	84,448
1935	40,278	6,677	2,246	48,623	97,824	5,791	44,555	3,533	192,983
1936	49,105	11,785	4,478	No record.	65,368	17,265	52,879	6,580	141,302
1937—									
March quarter	13,566	3,879	1,556	No record.	19,001	4,750	14,277	2,163	40,191
June quarter	11,634	4,712	1,278	Do.	17,624	6,911	12,449	1,209	38,193
September quarter	12,555	5,330	1,649	Do.	19,534	8,474	13,001	1,753	42,762
December quarter	13,343	4,398	1,532	Do.	19,273	6,849	13,619	1,894	41,635
Total for 1937	51,098	18,319	6,015	Do.	75,432	26,984	53,346	7,019	162,781

* Figures from June quarter 1937 relate to India only (exclusive of Burma).

† Figures from June quarter 1937 relate to Indian internal mails (exclusive of Burma internal mails) and mails between India and Burma.

APPENDIX 6.
Regularity and Traffic Statistics of Trans-India Air Service—Karachi-Calcutta-Rangoon-Singapore.
Imperial Airways, Ltd. and Indian Trans-Continental Airways, Ltd.

Period.	Services.			Aircraft mileage.	Passenger-ton-miles.	Freight-ton-miles.	Mail-ton-miles.
	Scheduled.	Completed.	Percentage regularity.				
1933 (July to December)	51	50	98	97,748	12,311	1,521	12,869
1934	106	106	100	381,469	78,375	14,159	71,429
1935	208	208	100	580,127	117,180	24,650	209,556
1936	210	210	100	768,528	139,603	25,127	302,915
1937—							
March quarter	51	51	100	187,426	41,355.2	8,100.1	87,638.0
June quarter	52	52	100	193,426	34,594.4	8,322.2	92,788.8
September quarter	53	53	100	185,482	39,349.0	8,350.8	96,818.3
December quarter	52	52	100	204,571	35,962.8	10,722.6	114,801.4
Total for 1937	208	208	100	770,905	151,261.4	35,495.7	392,046.5

APPENDIX 7.
Karachi-Bombay-Madras Air Mail Service.
(Tata Sons, Limited.)
Operational Statistics.

Period.	Services.			Aircraft mileage.	Mails.		Passengers.		Freight.	
	Sche- duled.	Com- pleted.	*Per- centage re- gularity.		South- bound.	North- bound.	No.	Passenger miles.	Weight.	Ton- miles.
1932 (15th Oct. to 31st Dec.)	23	23	100	35,720	lbs. 1,464	lbs. 1,510	1	660	lbs. 53	No record.
1933	104	104	100	137,280	10,346	13,139	8	5,285	293	No record.
1934	105	105	100	138,600	18,071	23,416	14	8,245	111	45
1935	207	204	98.5	287,610	33,548	34,077	40	26,005	364	137
1936	210	208	99.1	301,926	40,665	40,339	69	38,635	983	344
1937—										
March quarter	51	51	100	71,820	11,154	12,443	37	25,095	500	157.6
June quarter	52	52	100	72,100	11,546	12,957	26	16,815	957	359.1
September quarter	53	52	98.1	74,200	11,870	13,421	3	1,055	1,147	407.7
December quarter	52	52	100	71,880	14,412	14,098	43	25,950	916	380.3
Total for 1937	208	207	99.5	290,000	48,982	52,919	109	68,915	3,520	1,304.7

* Journeys completed of journeys commenced.

APPENDIX 8.
Karachi-Lahore Air Mail Service.
(Indian National Airways, Ltd.)
Operational Statistics.

Period.	Services.			Aircraft mileage.	Mails.		Passengers.		Freight.	
	Sche- duled.	Com- pleted.	*Per- centage re- gularity.		South- bound.	North- bound.	No.	Passenger miles.	Weight.	Ton- miles.
1934 (4th to 31st December)	8	8	100	5,328	lbs. 1,529	lbs. 1,015	..	..	lbs. ..	..
1935	208	203	97	147,174	12,693	13,005	2	900	75	22.3
1936	209	209	100	155,313	14,732	14,733	3	1,864	29.5	9.1
1937—										
March quarter	52	51	98.1	37,232	3,894	4,065	3	1,666	..	..
June quarter	52	52	100	38,124	3,968	4,225	5	3,728	168	53.5
September quarter	53	53	100	37,948	4,399	4,372	1	716	..	..
December quarter	51	50	98.0	37,948	5,071	4,801	4	2,864	..	..
Total for 1937	208	206	99.0	151,252	17,332	17,463	13	8,974	168	53.5

* Journeys completed of journeys commenced.

APPENDIX 9.

Bombay-Trivandrum Service.

(Tata Sons, Limited.)

Operational Statistics.

Period.	Services.			Aircraft mileage.	Mails.		Passengers.		Freight.
	Scheduled.	Completed.	*Percentage regularity.		South-bound.	North-bound.	Number.	Passenger miles.	
1935-36	51	51	100	39,282	lbs. 140	lbs. 69	32	20,700	lbs. . .
1936-37	51	51	100	42,444	157	37	21	13,903	..
1937-38—									
October to December 1937 .	19	19	100	14,934	133	36	18	13,366	..
January to April 1938 .	31	31	100	25,366	137	79	33	19,681	179
Total for 1937-38 .	50	50	100	40,300	270	115	51	33,047	179

* Journeys completed of journeys commenced.

APPENDIX 10.

Bombay-Delhi Air Service.

(Tata Sons, Limited.)

Operational Statistics.

Period.	Services.			Aircraft mileage.	Mails.		Passengers.		Freight.
	Scheduled.	Completed.	*Percentage regularity.		South-bound lbs.	North-bound lbs.	No.	Passenger miles.	
1937-38—									
8th November to 31st December 1937	32	30	94.0	24,955	50	56	29	22,045	..
1st January to 9th May 1938	73	71	97.2	57,960	18	37	74	46,725	54
Total for 1937-38 .	105	101	96.2	82,915	68	93	103	68,770	54

* Journeys completed of journeys commenced.

APPENDIX 11.

Bombay-Kathiawar Service. (Air Services of India, Ltd.)

Operational Statistics.

Period.	Services.			Aircraft mileage.	Passengers.		Freight.
	Scheduled.	Completed.	Percentage regularity.†		No.	Passenger mileage.	
*November and December 1937	56	56	100	23,296	325	76,000	95
January to June 1938	163	162	99·4	67,808	608	149,152	162
Total	219	218	99·5	91,104	933	225,152	257

* Commenced operation from 1st November 1937.

† Journeys completed of journeys commenced.

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APPENDIX 12.

Irrawaddy Flotilla and Airways, Ltd.

Operational Statistics (All services).*

Period.	Services.			Aircraft mileage.	Passengers.		Freight.
	Scheduled.	Completed.	Percentage regularity.†		No.	Passenger miles.	
1936	166	91	55·5	55,414	249	60,541	20
1937—							
March quarter	56	48	85·7	28,791	198	39,955	242‡
June quarter	73	52	71·2	28,509	267	39,941	..
September quarter	75	36	48·0	14,162	111	18,639	437
December quarter	56	44	78·6	19,200	168	23,945	..
Total for 1937	260	180	69·2	90,662	744	122,480	679

*(i) Rangoon-Mandalay.

(ii) Rangoon-Yenangyaung.

(iii) Rangoon-Moulmein.

(iv) Rangoon-Tavoy.

† Journeys completed of journeys commenced.

‡ Mails carried.

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APPENDIX 13. Scheduled Air Services.—Traffic expressed in ton-miles.

Name of Company.	Route operated.	P. T. M.	M. T. M.	F. T. M.	T. T. T. M.	C. T. M.	Percent- age of T. T. T. M. to C. T. M. (Load factor).	Increase or decrease of Load factor over 1936.	Remarks.
Imperial Airways and Indian Trans-Con- tinental Airways, Ltd.	Karachi-Singa- pore.	151,261.4	392,046.5	35,495.7	578,803.6	744,398.1	Per cent. 77.8	+14.6	
Tata Sons, Ltd.	Karachi-Madras	6,867.41	42,128.33	1,312.06	50,307.80	88,427	57	+8	
"	Bombay-Trivani- drum.	1,943.49	88.57	..	2,032.06	9,724	22	-2	
"	Bombay-Delhi.	1,968.20	34.12	..	2,002.32	8,553	23	Nd.	This service is organised for the carriage of mails only and passen- gers are not car- ried, except in special cases.
Indian National Air- ways, Ltd.	Karachi-Lahore.	772.7	10,082.1	53.5	10,908.3	31,498.4	34.6	+5.6	The load factor of 81.3 per cent. for 1936 given in the last report was subsequently corrected by the company to 87.9 per cent. the capacity ton miles being in- creased to 2,009,937.
K. L. M.	Amsterdam- Batavia.	864,838	808,073	218,083	2,107,406	3,056,375	69	+1	
Air France	France-Indo- China.	173,428	114,521	70,394	358,343	542,872	66.1	not known.	

NOTE.—P. T. M. = Passenger-ton-miles.
F. T. M. = Freight and excess baggage-ton-miles.
M. T. M. = Mail-ton-miles.

C. T. M. = Capacity-ton-miles.
T. T. T. M. = Total Traffic-ton-miles.

APPENDIX 14.

Personnel employed and aircraft owned by aeronautical organisations in India, 31st December 1937.

Name of Organisation.	Administra- tive.		Pilots and W/T Operators.		Engineers licensed.		Engineers unlicensed.		Clerical.		Others.		Total.		Percentage of Indian Personnel.		Aircraft owned.
	E	I	E	I	E	I	E	I	E	I	E	I	E	I	E	I	
* Director of Civil Aviation (India). Imperial Airways and Indian Trans-Continental Airways, Ltd. Indian National Airways, Ltd.	16	34	..	..	..	..	..	..	..	..	38	16	216	..	93.1	..	Avro X, 1. B. A. C. Superdrone, 1. Total, 2. Atalanta, 4.
Tata Sons, Ltd.	1	21	1	5	1	7	..	..	..	..	14	3	59	..	95.2	..	DH 83, 2. DH 84, 2. Percival Vega Gull, 1. DH 80 A, 1. Percival Vega Gull, 1. Total, 7.
Air Services of India, Ltd.	..	10	1	2	..	6	..	4	..	..	6	1	28	..	96.6	..	Waco, 3. Leopard Moth, 1. Miles Merlin, 2. Total, 6.
Irrawaddy Flotilla and Air- ways, Ltd. Indian Air Survey and Trans- port, Ltd. Indian Aviation Develop- ment Co., Ltd. Aeronautical Training Centre of India.	1	..	3	..	2	..	1	..	..	..	2	7	2	..	22.2	..	Percival Vega Gull, 2. Dragon Rapid, 1. Atrspeer Courier, 1. Fox Moth, 2. Total, 6.
Subsidised Flying Clubs in India.	3	..	3	7	3	15	..	18	..	36	52	9	128	..	93.4	..	Short Scion Senior, 2. Leopard Moths, 2. Fox Moth (owned by Bengal Govt.), 1. DH 83, 1.
Indian States Flying Clubs..	2	1	3	1	3	2	..	2	..	7	19	8	32	..	80.0	..	DH 60, 1. Miles Hawk, 1. Miles Hawk Trainer, 1. Comper Swift, 1. Total, 4.
Total	43	101	28	22	38	50	10	90	3	242	8	322	130	837	86.4	68	DH 60, 18. DH 82, 2. DH 83, 1. DH 85, 3. DH 87, 1. BA. Swallow, 2. Blackburn Bluebird, 1. Total, 29. Percival Vega Gull, 1. Total, 29. Tiger Moth, 5. Leopard Moth, 1. Total, 6.

* Includes Aerodrome Staff.

E.—Europeans.

I.—Indians.

APPENDIX 15.

Summary of Training Results, 1935, 1936, 1937.

(The figures are for the calendar year.)

Flying Club.	Pilots trained.						Pilots 'A' Li- cences renewed.		Hours flown.			Members at end of year.						
	'A'		'AI'			'B'		1935.	1936.	1937.	1935.	1936.	1937.					
	1935.	1936.	1937.	1935.	1936.	1937.												
Bengal	11	8	2	...	...	...	1	...	...	16	26	17	1,064	633	531	238	237	230
Bombay	17	9	7	...	2	1	...	5	4	12	23	21	2,147	1,521	2,663	521	565	560
Delhi	8	16	12	...	...	3	...	2	2	12	18	18	816	1,350	1,859	185	149	132
Karachi	16	11	17	...	...	1	3	3	2	20	22	20	2,407	2,086	2,520	135	77	81
Madras	5	13	13	1	3	2	...	...	2	17	17	21	1,395	1,566	1,354	229	184	167
Northern India	6	13	12	1	...	1	...	...	...	4	8	8	628	755	1,008	116	142	151
United Provinces	8	3	1	3	1	...	...	2	2	9	8	12	1,399	841	748	186	201	185
Total subsidised	71	73	64	5	6	8	4	12	12	90	122	117	9,856	8,782	10,683	1,610	1,555	1,506
*Rangoon	6	...	...	1	...	...	...	...	...	...	...	7	744	161	215	36	30	30
Jodhpur	...	4	1	...	...	...	...	...	...	...	6	6	260	685	152	44	49	46
Hyderabad	...	6	10	...	...	...	...	...	...	...	...	1	...	360	809	...	41	67
Jalpur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	27	...	...	13
Aeronautical Training Centre of India, Limited, Delhi	...	...	7	...	...	1	...	...	2	...	1	5	...	348	1,732	...	...	...
Total unsubsidised	6	10	18	1	...	1	4	12	2	...	7	17	1,004	1,560	2,935	80	120	156
GRAND TOTAL	77	83	82	6	6	9	4	12	14	90	129	136	10,860	10,342	13,618	1,690	1,675	1,662

*The flying in 1936 and 1937 was done by the Rangoon Flying Syndicate. The membership is that of the Burma Flying Club.

APPENDIX 16.

Analysis of Causes of Accidents to Indian Aircraft.

	1937.	1936.	1935.	1934.	1937.	1936.	1935.	1934.	1937.	1936.	1935.	1934.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Personnel	85.0	71.8	88.7	85.0	...	74.4	82.4	73.8	...	...	...	...
	{ Errors of pilot				{ Error of judgment				{ Poor technique			
	{ Errors of other personnel				{ Errors of other personnel				{ Disobedience of orders			
	{ Power plant failure				{ Fuel system				{ Carelessness or negligence			
	{ Structural failure				{ Ignition system				{ Miscellaneous			
	{ Handling qualities				{ Lubrication system				{ Other personnel			
	{ Weather				{ Engine structure				{ Aircraft structure			
	{ Airport or Terrain				{ Handling qualities				{ Weather			
	{ Other				{ Weather				{ Airport or Terrain			
	{ Other				{ Other				{ Other			
	{ Undetermined				{ Undetermined				{ Undetermined			
Material	...	8.4	11.1	5.0	...	...	6.6	5.0	...	...	...	...
	{ Power plant failure				{ Fuel system				{ Ignition system			
	{ Structural failure				{ Lubrication system				{ Engine structure			
	{ Handling qualities				{ Aircraft structure				{ Handling qualities			
Miscellaneous	7.8	10.2	...	10.0	...	7.8	...	6.0	...	...	...	6.0
	{ Weather				{ Weather				{ Airport or Terrain			
	{ Airport or Terrain				{ Airport or Terrain				{ Other			
	{ Other				{ Other				{ Other			
Undetermined	7.2	3.6	5.2	...	7.2	...	5.2	...	7.2	...	5.2	...

* Poor surface on foreign aerodrome.

APPENDIX 17.
Summary of Accidents in India and Burma.
(Including accidents to aircraft of Indian registration outside India and Burma).

Class of Flying.	1937.			1938.			1939.			1940.		
	No. of Accidents.			No. of Accidents.			No. of Accidents.			No. of Accidents.		
	Unlicensed Pilot.	Licensed Pilot.	Total.	Unlicensed Pilot.	Licensed Pilot.	Total.	Unlicensed Pilot.	Licensed Pilot.	Total.	Unlicensed Pilot.	Licensed Pilot.	Total.
INDIAN AIRCRAFT. <i>Flying Clubs and Training Institutions.</i>												

Regular Air Transport . . .	...	2	2	*10,684	5,342	...	5	5	*9,489	1,898	...	4	4	*8,457	2,114	...	1	1	...
Miscellaneous Commercial . .	...	3	3	2,475	825	...	3	3	2,017	672	...	...	...	5,176	...	2	1	3	...
Private Flying . . .	...	3	3	Not known.	Not known.	1	3	4	Not known.	Not known.	...	...	3	Not known.	Not known.	1	4	5	...
Total Indian . . .	1	13	14	26,562	1,837	5	23	28	21,496	753	1	18	19	24,493	1,289	5	15	20	...
NON-INDIAN AIRCRAFT.																			
Hire or Reward . . .	...	...	...	...	...	...	1	1	...	...	...	1	1	...	...	...	...	...	...
Private Flying . . .	...	1	1	...	...	...	1	1	...	...	...	2	2	...	...	...	4	4	...
Total Flying . . .	1	14	16	...	...	5	25	30	...	...	1	21	22	...	...	5	19	24	...
GROUND ACCIDENTS.																			
Indian Aircraft—																			
Delhi Flying Club. . .	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rangoon Syndicate . . .	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Non-Indian Aircraft . . .	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
Total ground . . .	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
GRAND TOTAL . . .	1	14	18	...	...	5	25	30	...	...	1	21	22	...	...	5	19	26	...

* NOTE.—The hours shown in regular air transport include flying by aircraft owned by Indian Trans-Continental Airways, Ltd. on the Karachi-Singapore route. The flying by Imperial Airways' aircraft on this route, in former years combined with Indian Trans-Continental Airways' aircraft and included in this table, has this year been excluded. Thus the figures for 1955 and 1956 differ from those given in previous Annual Reports.

APPENDIX 18.

Fatality and Accident Rates in Respect of Major Flying Accidents to Indian Aircraft.

	1937.	1936.	1935.	1934.
(1) Aircraft hours flown	26,562	21,496	24,493	16,514
(2) Aircraft miles flown (Approx.)	2,346,000	1,934,000	2,088,000	1,434,000
(3) Accidents involving fatalities—				
(a) Crew	1	2	5	3
(b) Passengers	1	..	4	..
(c) Other persons	1	..	1	1
(4) Non-fatal accidents involving serious injuries—				
(a) Crew	2	1	..	2
(b) Passengers	..	2	..	..
(c) Other persons	..	1	..	..
(5) Number killed—				
(a) Crew	1	2	6	3
(b) Passengers	1	..	6	..
(c) Other persons	1	..	2	1
(6) Number seriously injured—				
(a) Crew	2	1	2	4
(b) Passengers	..	2	..	..
(c) Other persons	..	2	..	..
(7) Miles flown per fatality	782,000	967,000	149,000	359,000
(8) Miles flown per serious injury or fatality.	469,000	276,000	131,000	179,000

NOTE.—The figures in lines (1), (2), (7) and (8) above relate to flying by Indian aircraft only and differ from those given in previous Annual Reports to the extent stated in the footnote to Appendix (17).

