

The Journal of the Royal Aeronautical Society

INCORPORATING THE INSTITUTION OF AERONAUTICAL ENGINEERS AND THE HELICOPTER ASSOCIATION OF GREAT BRITAIN

VOLUME 65

JANUARY 1961

NUMBER 601

The Sixteenth British Commonwealth Lecture

The Story of Indian Air Transport

BY

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The Sixteenth British Commonwealth Lecture, *The Story of Indian Air Transport*, by Mr. J. R. D. Tata, Chairman of Air-India International, was given before a distinguished audience on 18th November 1960 at the Institution of Mechanical Engineers, Birdcage Walk, London, S.W.1.

The President of the Society, Dr. E. S. Moulton, C.B.E., B.Sc., F.R.Ae.S., M.I.Mech.E., presided at the meeting. Before introducing the Lecturer the President explained that hitherto the election of Fellows had been initiated by the Council and announced once a year but, under the new By-Laws, Fellowship was to be regarded as a position which could be attained by any qualified member who had reached a position of eminence and responsibility in the profession of aeronautics. At the same time it had been decided that the announcement of such elections should be made not just once a year, but on occasions such as this.

The names of 22 members who had been elected to Fellowship since May 1960 were then read out by the Secretary. (These names were published in the December Journal—Ed.)

After congratulating the new Fellows, Dr. Moulton said that the British Commonwealth series of lectures started at the end of the War in 1945, and had continued annually until the present day. Throughout the years they had had a series of outstanding lectures on subjects associated with aeronautics in the Commonwealth, given by most distinguished lecturers. The stature of this lecture was set for all time in 1954 when His Royal Highness The Duke of Edinburgh addressed them on "Aviation and the Development of Remote Areas". Now they were to hear about the growth of aviation in one of the great members of the Commonwealth. Air Transport in India was now thirty years old and there was no one more suited to tell the story of that thirty years than their lecturer, Mr. J. R. D. Tata.

Mr. Tata had been actively associated with this development all his working life. Indeed, it was true to say he had had a major part in it. He learned to fly in 1929 and personally flew the first scheduled transport service in India in 1932. He had been associated with aviation throughout all these years and a few years ago was president of I.A.T.A., the International Air Transport Association; he was now Chairman of Air-India International. He had great pleasure in asking Mr. Tata to give the Sixteenth British Commonwealth Lecture, "The Story of Indian Air Transport."

THE STORY of Indian Air Transport can conveniently be divided into three periods. First, the early days up to and including the Second World War, then the stormy post-war years from 1946 to 1953 when the industry showed the greatest development and vitality while flying headlong towards its own ruin, and finally the present era since nationalisation in August 1953.

PART I

The Early Beginnings

While some in India may claim that passenger air travel, although admittedly on a somewhat limited scale, really began with the Flying Gandharvas of Hindu Mythology, I shall content myself with the historical fact that this great business of air transport, which today plays such a vital rôle in world commerce, travel and communications, was born in India when, on the 18th of February 1911, and therefore about four months before the first mail flight took place in England from Hendon to Windsor Castle as part of the

celebrations for the coronation of King George V, Mr. Henri Piquet, flying a Humber bi-plane, carried mails by arrangement with the local postal authorities from the exhibition grounds at Allahabad to Naini Junction, some six miles away. The mails were duly delivered in thirteen minutes. It is worth noting, incidentally, that this flight was organised by the same Captain Wyndham, later Commander Sir Walter Wyndham, who was responsible for the subsequent Coronation mail flight and was thus the real founder of the air mail.

This commendable piece of pioneering enterprise on the part of the Indian Postal authorities, coupled with the passing in the same year of an Act regulating in considerable detail the flight of aircraft over Indian territory at a time when the motor car was still a novelty, shows that the Government of India was then one of the most air-minded Governments in the world. It also seems to have been exhausted by this twin effort for, except for adherence to the International Convention on Air Navigation in October 1919, nothing remotely connected with air transport happened in India until after the First World War. Proposals for



By courtesy of Mr. J. S. Parakh

A post-card carried on the World's First Air Mail flight.

FIGURE 1 (below): 18th February 1911: Mr. Henri Piquet in the Humber biplane in which he carried, from Allahabad to Naini, the World's First Air Mail.



establishing an air service between Cairo and Karachi were then the subject of discussion between London and Delhi, and India agreed to contribute half the cost of maintaining aerodromes at Bushire, Bunder Abbas and Chahbar. The abandonment of this scheme, because of unsettled conditions in Arabia and Iraq at the time, saved the country expenditure of no less than £200 per year representing half the amount originally committed.

Things were pleasantly quiet again for some years, until in 1925 the British Air Ministry contracted with Imperial Airways to operate regular services between London and Karachi. The first segment to Cairo was inaugurated early that year and the time for India to become a vital link in Empire and Commonwealth communications was suddenly near at hand.

The Indian Air Board, an advisory committee of senior officials of the Government of India, which had, it seems, distinguished itself mainly by total inaction since its formation in 1920, was galvanised into feverish

Allahabad.
18th Feb 1911
my dear Harry
I am sending
you this postcard so
that it may be
conveyed by the
first Postal Aerial
Service in the
world many messages
& letters have been
sent by Aeroplane,
but never under
the auspices of the
Postal Service
Yrs Sincerely
H. Piquet

activity. In 1926 it submitted to Government a remarkable memorandum which also happened to be its swan song as its own dissolution was one of its recommendations. The Board's memorandum, entitled "The Past History and Future Development of Civil Aviation in India," although written thirty-four years ago, makes fascinating reading to this day. After contrasting India's neglect of commercial aviation up to then with her admirable suitability for the development of "Aerial Transport" and her strategic geographical position as "an all important link in future air communications in any air route between Great Britain and her Eastern Dominions," the Board made a number of specific recommendations, aimed at ensuring the rapid development of civil aviation within India and its participation in external air services. These included proposals for:

- establishing landing grounds and other ground facilities;
- the whole-time appointment of a Director of Civil Aviation;
- a systematic survey of main trunk routes; and
- the inauguration of an air service between Calcutta and Rangoon and the grant of a subsidy to the Company entrusted with its operation.

The most remarkable recommendation, however, although in my view not the most sensible was that Government should, from the start, "put forward its claim to participate as a principal in contracts for external air services and intimate their readiness to share in the financial liabilities of such contracts." The Board predicted that unless Government was prepared to take positive action on those lines, "the whole of aerial

transportation in India would fall and be concentrated in foreign hands, Indian capital and enterprise would be ousted, and effective control of Indian interests would be difficult or impossible to achieve." "Unless India," warned the Board in a refreshing departure from 'officialese,' "to some extent pays the piper, she will not be able to call even part of the tune."

The Board's recommendations were approved by Government and the Indian Legislative Assembly in February 1927, and Mr. Francis Shelmerdine (later Sir Francis and D.G.C.A. in England) was appointed in 1927 India's first Director of Civil Aviation. Among the approved recommendations was the decision that India must participate "as a principal," i.e. operationally and financially, in any British through service across India. This brave but impractical decision failed to take into account the technical, administrative and economic realities of long range international air operations. It seems obvious today that the Imperial route to Australia, 12,000 miles long, cutting across four Continents and as many seas, could not be split up into separate pieces under separate ownership and control without a great deal of trouble, complications and loss of efficiency.

A puzzling aspect of the matter was Britain's acceptance of India's insistence on full participation over the Indian sector of the through route to Australia, because such participation could not be achieved without interfering with the efficient operation of this great imperial air route and without ultimately leading to a denial to the British airline on this route of facilities and rights which would have to be granted sooner or later to other European carriers. This did in fact happen with the Dutch in 1930 and the French in 1931, both of whom were allowed to operate through India with normal traffic rights, their services to Indonesia and Indo-China respectively. That such a situation was allowed to be created at a time when Britain's control over India was supreme, does credit to the democratic and liberal spirit of the British administration in both countries in those days, but not to their judgment. Viewed in retrospect, it provides an interesting flashback to imperial policies of the time and to the strains involved in an attempt to make bed-fellows of liberalism and colonialism.

Not having access to the original files and correspondence between London and Delhi, I can only attempt an intelligent guess as to what subsequently happened. Committed up to the hilt to the principle of active operational and financial participation, the painful moment for action came to the Government of India on 7th April 1929, when Imperial Airways' London-Cairo service was first extended to Karachi, and the Imperial line to Australia thus reached the shores of India. The extension of the service to Delhi

as a first step towards Calcutta and Singapore could no longer be delayed.

Government had already created, at least on paper, an entity called the Indian State Air Service, but had failed up to then to cover its bones with the flesh of organisation and equipment. It would seem that, faced with the dilemma of either admitting a mistake and seeking a reversal of policy from the then Legislative Assembly or going ahead with the project and finding money for it, the Government of India evaded both alternatives by resorting to the somewhat transparent device of sub-contracting to Imperial Airways the extension to Delhi under a charter arrangement which was entered into initially for a period of two years. While under this arrangement operations were in the name of the Indian State Air Service, all technical and operational control was left comfortably in the hands of Imperial Airways, who also provided the aircraft. In this form I.S.A.S. began to function, if not to operate, on 20th December 1929.

Neither the Legislative Assembly nor the public was deceived by this bit of camouflage under which India paid the piper without calling the tune. A storm was raised in press and parliamentary debates and Government had no alternative but to proceed with plans to give the Indian State Air Service a fleet and an administration of its own. Four Avro X aircraft were ordered and a start made on building up an organisation. The project was, however, promptly abandoned in 1931 on the providential recommendation of a Retrenchment Committee of the Assembly, owing to the economic blizzard which hit India along with the rest of the world.

Then came a brief interlude, not without a touch of humour when, in January 1932, the little Delhi Flying Club came to the rescue. With one Gipsy Moth loaned by the Government and one Indian pilot, it took over from mighty Imperial Airways the Karachi-Delhi service and operated it most efficiently until July

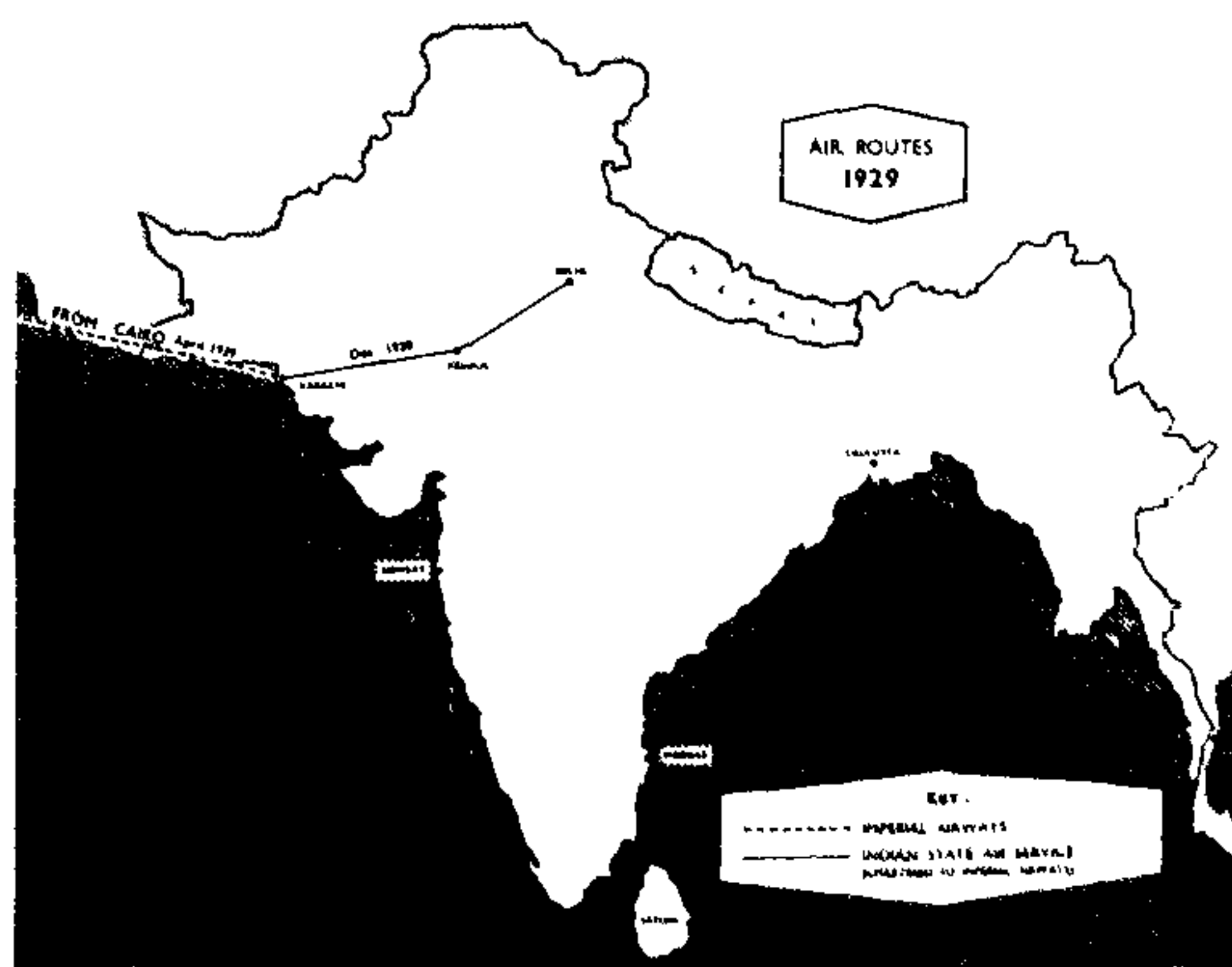


FIGURE 2. Air Routes in 1929.

1933. Obviously, however, this could only be a stop-gap arrangement. Apparently still anxious, and understandably so, to back-pedal out of a troublesome and costly commitment which they did not have the means to implement, the Government of India, once again found an ingenious, but hardly ingenuous, solution to their problem. By agreement with the British Air Ministry, they sponsored early in 1933 an Indian company—called Indian Trans-Continental Airways—to operate the Karachi-Singapore sector of the U.K.-Australia route in partnership with Imperial Airways.

From the point of view of carrying out the spirit of the undertaking given to the Legislature in 1927, the arrangement was perhaps a little better than the original charter agreement with Imperial Airways, but it blatantly violated the specific assurance given by Government to the Legislature in 1929, that 75 per cent of the voting rights in any company formed to operate the Trans-India route would be in Indian hands. In fact, 51 per cent of the capital of I.T.C.A. was allotted to Imperial Airways, the balance being held jointly by the Government of India and Indian National Airways, a new Indian airline, of which more anon.

Ignoring the moral aspects, the scheme was operationally a practical and sensible one and it did endeavour to assuage Indian feelings by offering training facilities for Indian staff and a subsidy from Britain for a period of six years, thus relieving the Government of India from any financial risk. In addition, India was permitted to settle postal charges for the carriage of air mail on the whole of the England-Australia route in sterling instead of gold francs.

Prudently, the creation of I.T.C.A. and its capitalisation were not disclosed to the Indian Legislature until the end of September 1933, nearly three months after the company had actually started operations. The scheme was naturally opposed, but it would seem that the members of the Indian Legislature had exhausted their interest in aviation and their pugnacity on its behalf in the 1927 debates, for the I.T.C.A. scheme was in the end somewhat tamely approved.

Indian Trans-Continental Airways bought or took over from Imperial Airways two Armstrong Whitworth XV Atalanta aircraft. Every alternate service on the Karachi-Delhi-Calcutta-Rangoon-Singapore sector of the route to Australia was operated under the Indian Flag

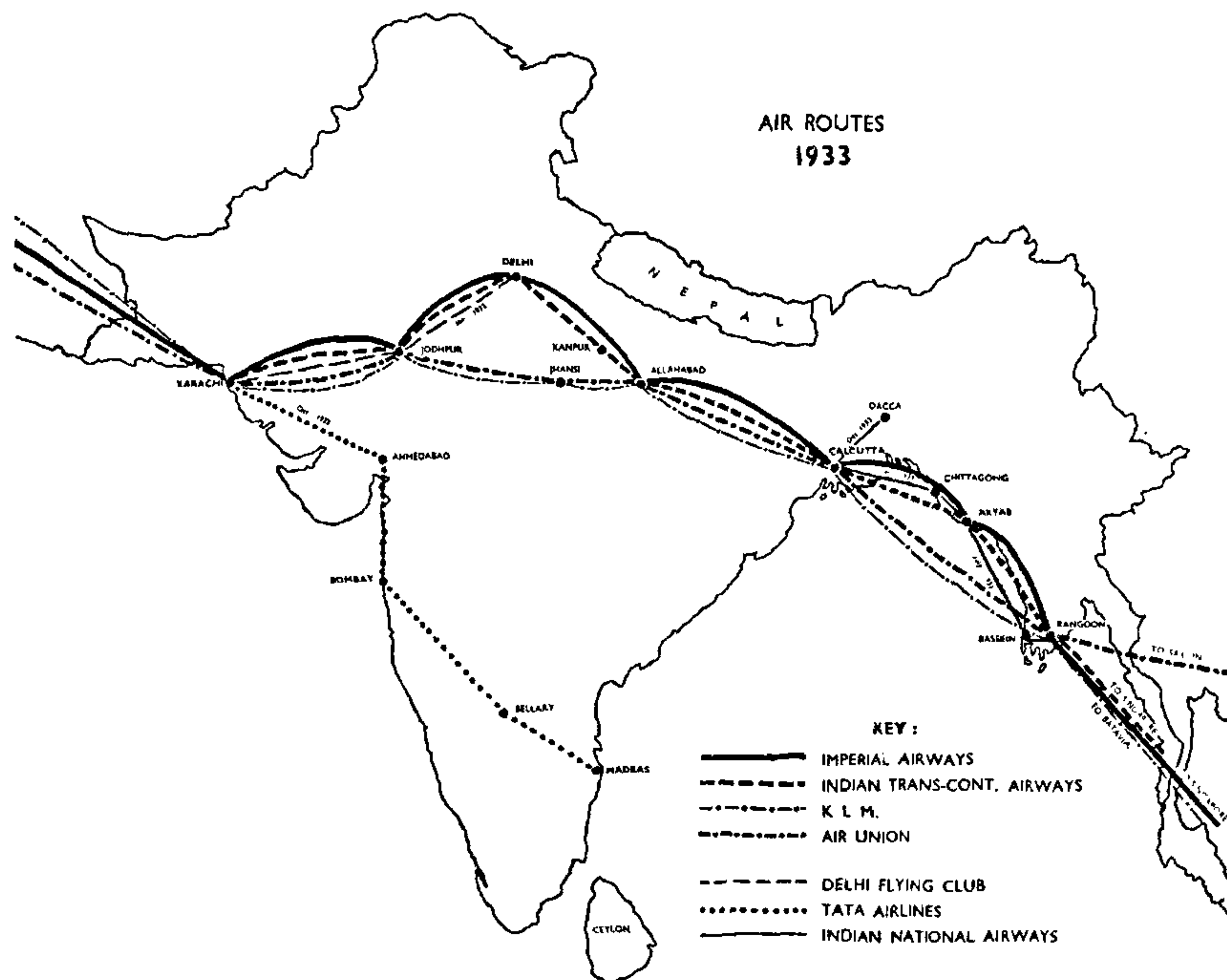


FIGURE 3. Air Routes in 1933.

FIGURE 4. 15th October 1932: The start of Indian Scheduled Air Transport. The author having flown the first leg of the inaugural Karachi-Madras flight, hands over to Mr. Nevill Vintcent at the Bombay "airport" (Juhu mud flat).



and in the name of Indian Trans-Continental Airways, but in fact, by Imperial Airways who provided the crews, management and all technical services.

The Birth of Indian Air Transport

The eastern extensions, in one guise or another, of the London-Karachi service described above was never an Indian operation except during the brief Delhi Flying Club episode. Indian scheduled air services, in the real sense, began in 1932. They had their origin in the lone vision and efforts of a far-sighted and immensely able man whose name was Nevill Vintcent. After a fine career in the R.A.F., Vintcent and an associate, J. S. Newall, came to India in 1929 in two First World War D.H.9's on a "barnstorming" tour, in the course of which they flew over the greater part of India and surveyed a number of possible air routes. Vintcent realised from the start the immense potentialities of commercial aviation in India and, in order to get the necessary backing for his scheme, he joined the firm of Tatas in a happy and fruitful association which lasted until his death in 1942. While returning from a mission to England in connection with a Tata project for the manufacture of military aircraft in India, he was lost at sea in an R.A.F. Bomber presumed to have been shot down off the coast of Spain. I had the privilege of being associated with Nevill Vintcent from the beginning of his career in India and cannot pass over this opportunity of paying tribute to the memory of a gallant and resourceful man who was undoubtedly the founder of Indian air transport.

The plans prepared by Vintcent for Tatas in 1929 for a service between Karachi-Bombay-Madras to connect with the Imperial Airways service at Karachi failed at first to secure the approval of the Government of India, at the time preoccupied with the problems of the Trans-India service mentioned earlier. Pending a more favourable response to the Tata scheme, and to gather experience, Vintcent accepted the managership of the Indian State Air Service in 1930 but returned to Tatas as soon as the project was abandoned in 1931.

The proposal for the Karachi-Ahmedabad-Bombay-Bellary-Madras mail service was finally approved in 1932 when, after prolonged negotiations with Government, Tatas finally agreed to operate it without any guarantee of mail revenue or subsidy. The service was inaugurated on the 15th October 1932, with a Puss Moth, which I flew from Karachi to Bombay via Ahmedabad, and which Vintcent took over at Bombay for the rest of the flight to Madras via Bellary. Tata Airlines consisted then of one Puss Moth, one Leopard Moth, one palm-thatched shed, one wholetime pilot,

assisted by Vintcent and myself, one engineer on a part-time basis, two apprentice-mechanics and unlimited optimism. Both ex-apprentices, incidentally, are still in Air-India today, one of them in a high management post.

No doubt air mail services were being operated at the time in other parts of the world with single-engined aircraft, but none, I should think, with less support from the ground as the early Indian services received. Taking Tata's Karachi-Madras 1,300 mile route as an example, with the exception of Karachi, which had radio and night landing facilities of a sort, the rest of the route was totally devoid of any aid whatever and Bombay, the principal base of the airline, did not even have an all-weather aerodrome. The Bombay "airport" was a dried mud flat near the sea serviceable only during eight months of the year. At high tide during the monsoon the "aerodrome" was more or less at the bottom of the sea! The airline had then to transfer operations bodily to a small landing strip at Poona next to Mahatma Gandhi's favourite residence, the Yeravda Jail. As there were no lighting facilities at any of the airfields on the route no night flying was possible and with a night stop at Bellary the average speed from Karachi to Madras was a snappy 40 miles an hour. The route crossed 5,000 ft. high hill ranges, deserts, swamps and parts of the country which received up to 300 inches of rain a year, all concentrated in four months. Apart from heavy monsoon rains, the route was subject to thunder storms, sand storms and severe turbulence. Notwithstanding these somewhat unhelpful conditions, Tata Airlines, during its first year of operation, flew 160,000 miles with an unbroken record of regularity.

While Tatas were the first to operate scheduled air services in India on a permanent basis, the honour of providing the first indigenous air transport operation must go to the Delhi Flying Club, which, as stated earlier, temporarily flew the mails between Karachi and Delhi for the Government of India from December 1931, when the charter arrangement with Imperial Airways lapsed.

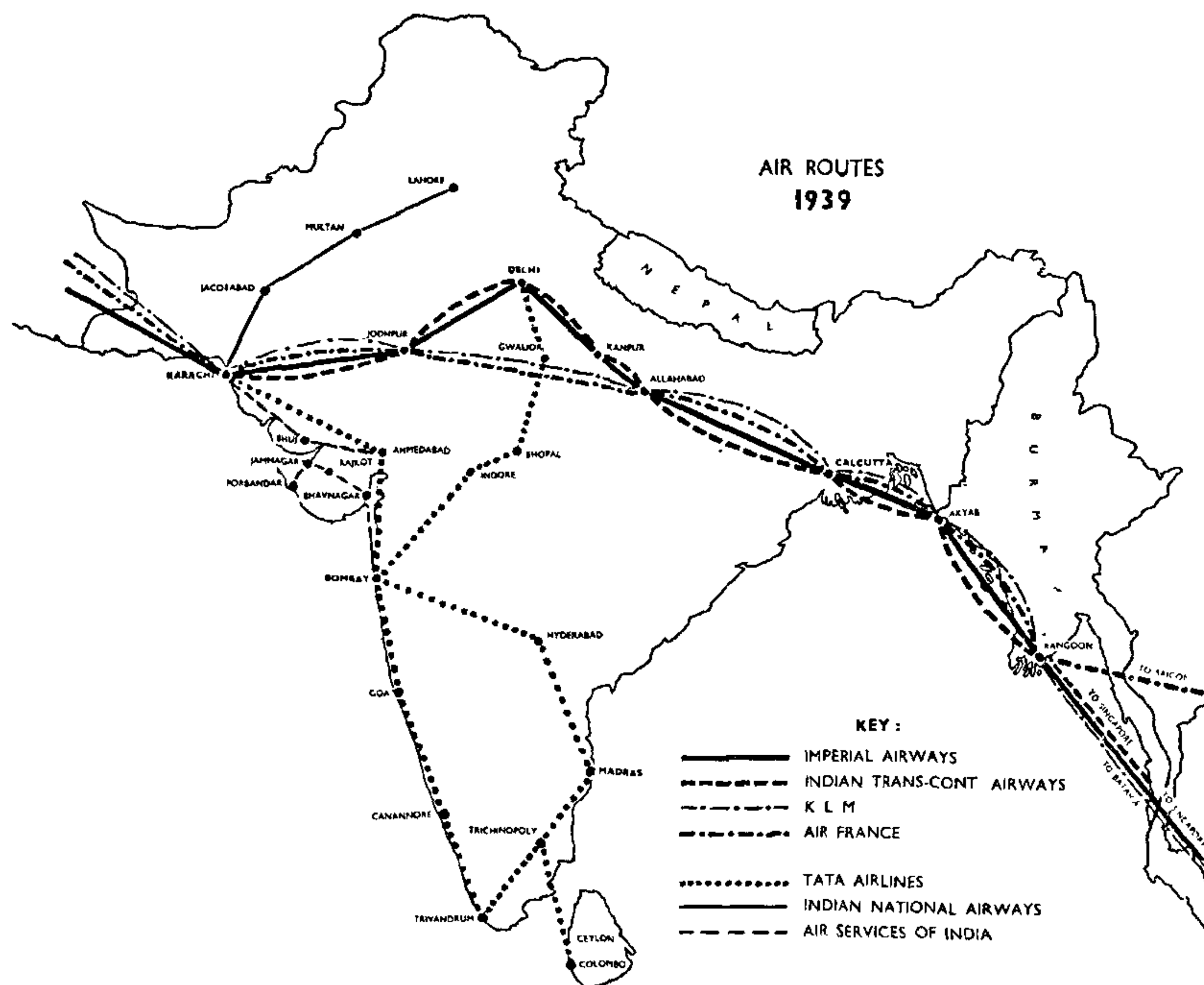


FIGURE 5. Air Routes in 1939.

In 1933 Tata Airlines were followed on the Indian air transport scene by Indian National Airways, a company based at Delhi, and formed with the dual purpose of operating services of its own and participating along with the Government of India as one of the two Indian minority shareholders in Indian Trans-Continental Airways. I.N.A. began operations of their own on 1st December 1933, when they inaugurated a weekly passenger, mail and freight service between Calcutta and Rangoon and between Calcutta and Dacca, now in Pakistan, with de Havilland Dragon aircraft.

A third airline, Air Services of India, came on the scene in 1937 to operate passenger services between Bombay and some of the Indian States in Kathiawar and between Bombay and Kolhapur to the south east. Its fleet consisted of de Havilland Fox Moths, Percival Gulls and D.H. Dragons. A point of interest is that this company decided to charge only a little over second class rail fares. As costs, even at 100 per cent load factor, must have been well above first class rail fares, the operation was not exactly profitable and the services closed down within two years.

In the meantime, Tata Airlines and Indian National Airways made unspectacular but steady progress. Apart from increasing the frequency of their main Karachi-Madras route, Tata Airlines introduced new services to Delhi in the north and Trivandrum in the south with modest financial assistance from the Governments of the then autonomous States served by the route. As shown in Appendix I, total operations grew from 154,000 miles in 1933 to nearly 600,000 miles in 1937. Except in the first year of operations, Tata Airlines never failed to make a profit until, after its incorporation under the name of Air-India, its position began to deteriorate in the early post-war years and it shared in the ultimate debacle.

Empire Air Mail Scheme

With the introduction of the Empire Air Mail Scheme, came the opportunity for a big step forward. Until then, only mail bearing a surcharge was carried within India or between India and other countries. In 1934, the British Post Office formulated a revolutionary scheme under which all first class mail between Empire

or Commonwealth countries served by the U.K.-Australia and U.K.-Africa routes was to be carried by air without any postal surcharge and at only a minimal increase in ordinary overseas postage rates. It unfortunately took three years for this bold and imaginative scheme to fructify, and it was inaugurated on the London-Cairo sector of the U.K.-India-Australia route only in June 1937 and across India in February 1938.

Apart from the immense saving of time it afforded at practically no cost to users in the participating countries, the scheme greatly stimulated both the operation of airlines in the areas in which it was in force, and the development of larger and faster aircraft. In India itself it galvanised the young air transport industry. Tata Airlines and Indian National Airways were granted ten-year contracts with guaranteed minimum payments for the carriage of first class mail on the Karachi-Colombo and Karachi-Lahore routes. On the basis of these contracts, the two airlines were able to effect a striking expansion of their operations and to renovate their fleets. In fact, within one single year, there was an increase of operations greater than that in the four preceding years. Total miles flown increased two and a half times, passenger miles over three times, mails over four times and freight nine times (Appendix I).

One of the most noteworthy facts about the Empire Air Mail Scheme was that, contrary to expectations, postal revenues earned almost equalled expenditure incurred during the very first year of operations and there was every indication, when the War intervened, that they would soon surpass it. Although the life of the scheme was cut short by the War, it will retain its place in the history of world air transport as a striking landmark for which British Postal and Civil Aviation authorities of the mid-thirties deserve the greatest credit.

Air Transport Goes to War

As in most other countries, the outbreak of the Second World War profoundly affected the operations of air transport in India. On the international scene, the Empire Services were drastically curtailed. The "all-up" air mail scheme was abandoned, the England-India-Australia service was reduced to two flights a week, heavy surcharges were imposed on mails, and passenger traffic was wholly controlled. The entry of Italy into the War and the fall of France closed down the flying boat route through the Mediterranean which was replaced by the famous "Horseshoe" route around Africa. On the entry of Japan into the War in December 1941, the normal route to Australia, east of Rangoon, had to be abandoned and by February 1942, as a result of the Japanese occupation of the Netherland East Indies, Calcutta became the eastern terminus of all services from the west. However, somewhat precarious air communications were later re-established with Australia by way of Colombo, using Consolidated "Catalina" amphibious flying boats and involving for a time the longest non-stop route sectors in the world.

On the Indian domestic scene, all air transport was geared to war needs. A number of air services were suspended in order to meet changing war requirements,

the 1938 mail contracts were suspended and new contracts entered into under which the entire operating capacity of the two airlines was placed at the disposal of Government, only spare capacity, if any, being available for commercial traffic. A flexible basis of payment was adopted under which Government paid all fixed standing charges plus an agreed rate per mile, and shared with the companies any commercial revenue earned. Under this agreement operations could be expanded, curtailed or modified to any extent in accordance with changing requirements without affecting the financial stability of the airlines.

While the War disrupted and curtailed some services, it also created opportunities for expansion and diversification. The airlines were given many special assignments, such as the survey of the South Arabian route on behalf of the R.A.F., the carriage of supplies to Iraq, the transport of civilian refugees from Burma and the overhaul and maintenance of R.A.F. equipment.

As was to be expected, however, the airlines' greatest problem during the War was the availability of transport aircraft. Government requisitioned all multi-engined equipment consisting mainly of de Havilland 89's and 86's for anti-submarine and other duties, and left the airlines with only their older single-engined obsolescent aircraft of small capacity with which to maintain their services. Tata Airlines, however, succeeded in supplementing their four-seater Wacos with Stinson tri-motor aircraft bought second-hand from an American airline. Relief came towards the end of the War when Government loaned to the two Indian companies some Lend-Lease twin-engined Beechcraft Expeditors and finally a few DC-2's and DC-3's.

As in other countries, one sphere in which the War brought far reaching and long term benefits to civil aviation was in the construction of many new aerodromes equipped with long concrete runways and in the notable expansion of meteorological services, radio communications and landing aids. India was particularly fortunate in this respect, as it emerged from the War with no less than forty-four such aerodromes and a network of radio ranges and beacons.

PART II

Post-War Era: The Tymms Plan

Civil Aviation in India was restored to commercial status on 1st January 1946. The Indian air transport industry, which then consisted only of Tata Airlines and Indian National Airways, although relatively small, was well organised, experienced in the handling of modern aircraft, and financially sound. It could look forward to great opportunities ahead with every assurance that the development of civil aviation after the War would be on sound lines as well as extensive. For, as early as 1943, the Government of India had shown commendable foresight in placing Captain F. C. Tymms, M.C. (Later Sir Frederick Tymms), who had succeeded Sir Francis Sheldermine as Director of Civil Aviation in 1931, on special duty to prepare post-war plans for

civil aviation in India. Armed with vast technical and administrative experience and an alarming capacity for work, Sir Frederick submitted by September 1943, a series of carefully thought out papers on all aspects of post-war aviation.

Of special interest to us was the one in which he made detailed and specific recommendations covering the establishment, operation, regulation and financial support of air services within India and to countries abroad. He estimated that the total capacity required to be provided in the initial post-war period would be something under 20 million ton miles, requiring in all less than 40 aircraft of the DC-3 type. Based on these estimates, he made the vital recommendation that scheduled air services should be entrusted for operation to a limited number of private airline companies, not exceeding four, each with adequate route mileage and scope for development so as to ensure efficient and economic use of aircraft, ground equipment and manpower. The companies were to operate on a commercial basis, backed by an ingenious system of subsidies under which operators failing to achieve certain costs and/or revenue targets would incur losses and those beating the targets would make a profit.

These proposals were coupled with the recommendation that all scheduled services should be licensed by an autonomous Licensing Board. The Government of India generally approved of Sir Frederick's recommendations and amended the Indian Aircraft Act and rules to provide for the licensing of air transport services.

Air Transport Licensing Board

The basic Tymms Plan was eminently sound and, properly implemented, would have ensured the safe and orderly development of the industry. In fact, it was doomed from the start as the interim Government, formed in September 1946, proceeded to discard the one recommendation essential to its success, namely, that the number of airlines operating scheduled air services should be limited to three or at the most four. I am quite sure that if Sir Frederick had known in advance that this indispensable condition would be thrown overboard, he would have recommended the alternative of a single State Corporation, the relative merits of which he had, incidentally, carefully discussed in his report.

The post-war boom atmosphere engendered by the pressure of large funds seeking investment, combined with the almost unlimited availability of war-surplus Dakota aircraft at absurdly low cost, led entrepreneurs as well as Government, both sadly ignorant of the economic realities of airline operations, to believe that Sir Frederick Tymms had grossly under-estimated the potentialities of air transport and the vast opportunities it offered for making a fortune. The careful calculations and sound reasoning embodied in the Tymms Plan were cast to the winds and the Licensing Board, established solely for the purpose of ensuring sound and orderly development, was made the very instrument of chaos. In fairness to its hapless members, it must be said that the Board, although constituted as an auto-

nomous body, was in fact never allowed to function as such and from the start had to bow to ministerial interference and pressures aggravated, incidentally, by the conflicts and passions generated by the impending partition of India.

By the time the Board was ready to consider applications, no less than twenty-one companies with a total authorised capital of over £30 million (Rs. 40 crores) were registered and well over a hundred Dakotas acquired by their sponsors from American war-surpluses. Within six months of the Air Transport Licensing Board starting work, it had over a hundred applications for some 96 routes covering the whole of India. By the middle of 1947, the Tymms post-war Plan was reduced to a shambles, when provisional licences had been granted to eleven companies over 51 routes. The scene was well and truly set for the ultimate and inevitable debacle.

The situation was further complicated by the partition of India in August 1947. Karachi, up to then the western air-gateway of undivided India, suddenly became the capital of a hostile foreign country, with which India found itself all but at war. The air routes previously operated in the transferred areas had to be abandoned by the Indian operator concerned, while one of the new airlines transferred its allegiance to Pakistan and its headquarters to Karachi.

The newly licensed airlines were deficient in organisation, equipment, training and operational standards, while many of the routes for which licences were sought and granted lacked traffic potential and were therefore totally uneconomic. In the absence of enough remunerative routes to allot to all the airlines, the Licensing Board resorted to the fatal device of licensing a number of operators on the same or substantially the same route—on the Bombay-Calcutta route as many as three operators were licensed simultaneously—each restricted to a single daily flight. As a result, all airlines were deprived of the chance of a reasonable utilisation of their equipment and staff, and costs sky-rocketed.

One of the main serious consequences of this state of affairs was that, operating on a shoe string, most airlines were unable to maintain the high standards essential to an industry so closely concerned with safety, nor could they provide for later re-equipment with modern aircraft. Furthermore, none of the new entrants could afford to establish the repair and overhaul facilities necessary to make the industry self-supporting. They depended for such facilities on the Government-owned factory of Hindustan Aircraft at Bangalore, the only one in the country. In the event of an emergency which would have required Hindustan Aircraft to concentrate its resources on serving the Indian Air Force, at least half of the Indian air transport industry would have ground to a halt within a few weeks for want of overhaul and repair facilities.

The economic pressures on the industry were partially relieved during 1947 by a fortuitous demand for air transport for the evacuation of refugees from Pakistan and for a military airlift to Kashmir. These operations afforded valuable but fleeting relief to operators, and by 1948 the first signs of disintegration

appeared with the failure of two of the new Licensees.

Government and the Air Transport Licensing Board now found themselves caught in a trap of their own creation. Up to then, only provisional licences had been granted by the A.T.L.B. Bad as it was, the situation would eventually have retrieved itself if Government had allowed the natural, although admittedly harsh, process of contraction which had already begun, to continue until only three or four strong companies survived, each with adequate route mileage and traffic potential to ensure economic and efficient operation. Unfortunately, Government, being themselves largely responsible for the deplorable state of the industry, were not prepared to face the uproar which might have followed the failure, one after another, of airlines which they had so recently encouraged to come into being. On the instructions of Government, ten-year licences were granted in July 1949 by the A.T.L.B. to most of the domestic operators which up to then had operated on provisional licences. The die was cast.

Contributory causes of the industry's difficulties were the heavy duty on petrol which amounted in 1949 to

17 pence (15 annas) per imperial gallon, equivalent to 33 per cent of the total cost of fuel, and the fact that fares and freight rates were fixed by the Licensing Board at totally uneconomic levels in relation to costs of operation. They were in fact the lowest in the world as they still are today, while operating costs were far from being also the lowest.

While they were unable or unwilling to bring order out of chaos by drastic means, Government, realising the critical situation into which the policy of indiscriminate licensing had placed India's air transport industry, granted minor concessions. They first permitted small increases in fares in 1947 and 1948, and in the next year they allowed an increase in the permissible "all-up" weight of the Dakota—a measure of doubtful soundness from the safety point of view in a country where aircraft performance was severely affected by high temperatures and of little value to most of the airlines which operated at pitifully low load factors and had, therefore, no use for the extra payload. Further relief measures followed in March and April 1949 in the form of a rebate of 10 pence

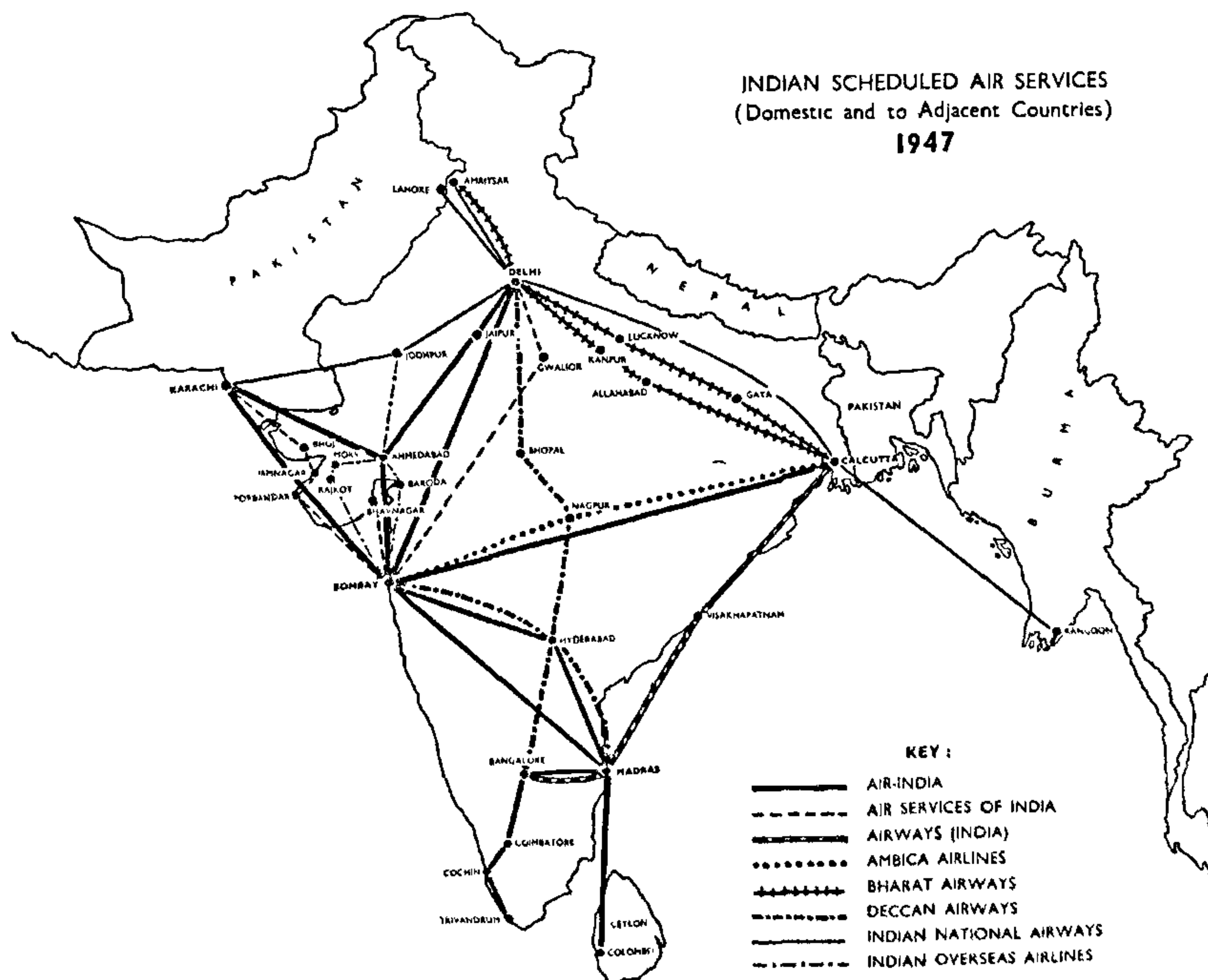


FIGURE 6. Air Routes in 1947.

(Tata Airlines became a public company in 1946 with the new name Air-India—Ed)

(9 annas) on the customs duty on aviation fuel and by the introduction of an "all-up" mail scheme under which all domestic mail between centres served by air was carried without surcharge.

The benefits which accrued from these measures were, however, largely offset by a substantial rise in fuel prices and the extremely low rate of payment for the carriage of mail. Such little benefit as did remain was far outweighed by the calamitous effect of the introduction of the Night Air Mail Service in January 1949.

Night Air Mail Service

This scheme provided one of the most controversial landmarks in the brief history of Indian post-war transport up to nationalisation in 1953. As illustrated in Fig. 7 it consisted of a cross-shaped service, connecting Calcutta, Bombay, Delhi and Madras, via a common central point at Nagpur in the geographical centre of India. Four Dakota aircraft were to start from each of these four cities sometime before midnight and to meet at Nagpur where, after exchanging mail with each other, they would continue to one of the other three terminal points or return to base, according to the particular pattern dictated by technical considerations at the time. Thus, mails posted at each of these stations late in the evening would reach their destination at dawn next morning.

Considered entirely by itself and given certain essential pre-requisites, the scheme was a practical and imaginative solution to the problem of rapid mail deliveries between these four cities. But under the conditions existing in 1949 it was both operationally and economically unsound, as well as ill-timed and it did much to aggravate the disastrous situation in which the industry was already floundering. The safe operation of such a night service throughout the year, including the difficult monsoon season, would have required four-engined aircraft, the highest standards of pilot training and aircraft maintenance, suitably located emergency landing grounds equipped with night landing facilities, and adequate navigational and approach radio-aids in all four sectors. All or most of these elements did not exist or were deficient in 1949.

From the economic point of view, while such a service might be self-supporting, particularly under an "all-up" air mail scheme, this could only be at the expense of the existing services, as was forcibly argued during the somewhat heated discussions which preceded the adoption of the scheme. Airlines licensed on routes connecting two or more of the four cities proposed to be served by the night air mail pointed out that, while heavy additional expenditure would have to be incurred on the operation of the new service, it would generate little fresh revenue and merely divert existing mail revenues from the day services, which were already losing money. The scheme was also strongly opposed, and quite rightly so, on grounds of safety. The then civil aviation authorities and the Ministry concerned were, however, determined to push the scheme through against all opposition. In the end, the licence went to an airline which, technically and financially perhaps the

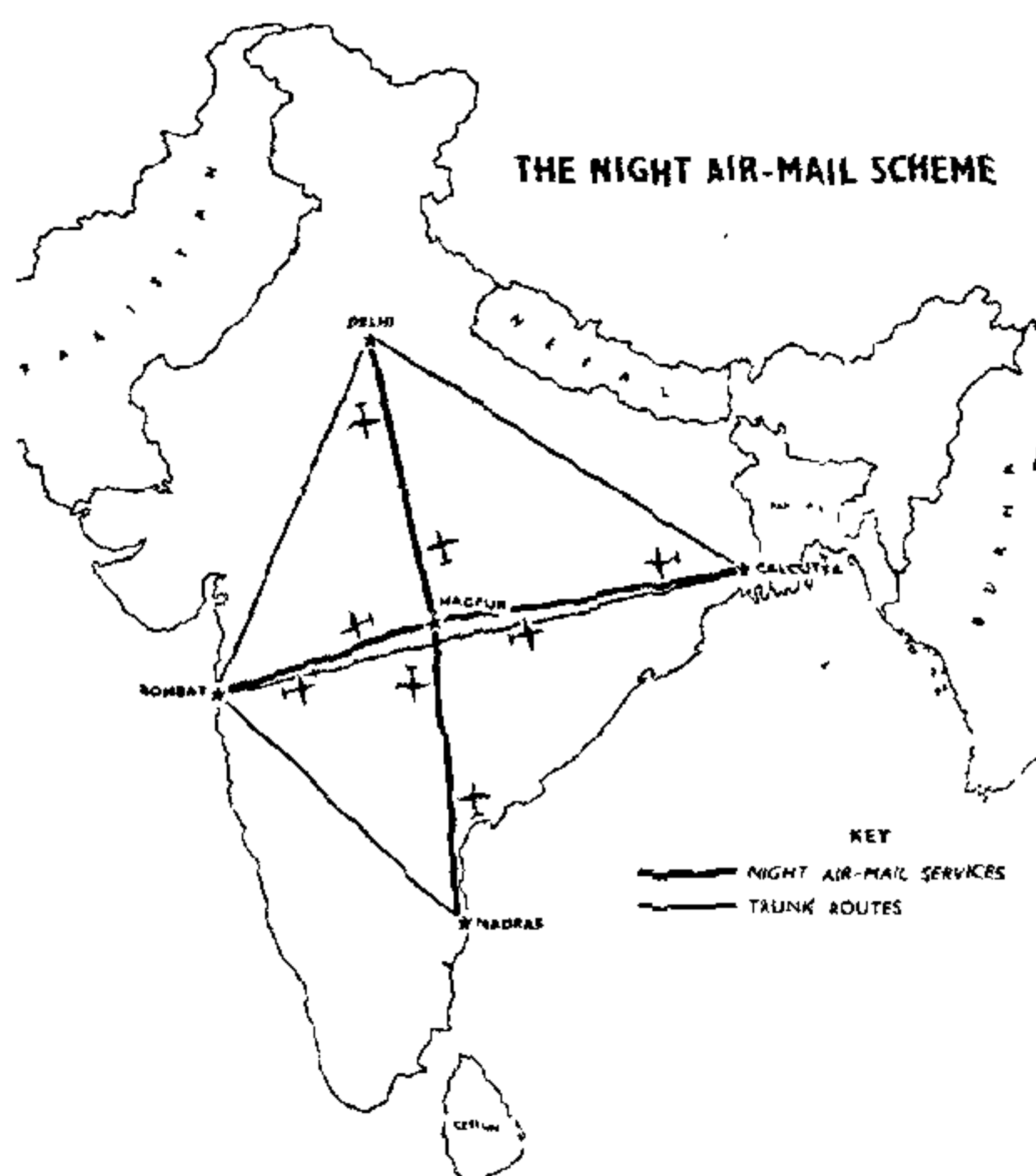


FIGURE 7. The Night Air Mail Scheme.

weakest of all the airlines in the country, was willing to risk operating the service without any guaranteed mail revenue or subsidy. The Night Air Mail was inaugurated on the 31st January 1949, and by May its Licensee had got into such serious financial difficulty that he had to suspend operations. Two other airlines came temporarily to the rescue to keep the night air mail service flying until the outbreak of the Monsoon, when it was suspended for the next four months.

During the summer of 1949, further negotiations between the civil aviation authorities of the Government of India and the scheduled airlines failed, whereupon Government resorted to the extraordinary step of giving the licence from October to a small non-scheduled operator. They thus added a further licensed operator to the excessive number already licensed in the country and made things worse for everybody.

As I personally took a leading part in the negotiations and public controversy concerning the Night Air Mail Service in 1948 and 1949, of which I have vivid recollections, some not devoid of humour, my judgment may be somewhat suspect. With the lapse, however, of some eleven years since those stormy days, I think I am able to view the matter philosophically and certainly with complete freedom from the heat and passions generated at the time. I believe today, as I did then, that the night air mail scheme, while theoretically a good and practical one, was unsound and unsafe at the time and should have been postponed for two or three years until it could be undertaken with complete safety and the calamitous economics of the air transport industry had been straightened out. Today, under totally different conditions, the night air mail operates extremely well and safely with four-engined aircraft and

plays a most useful rôle in the overall pattern of the country's air transport system.

International Operations

In the chaotic and sombre picture of the post-war history of Indian air transport the only bright spot was the creation and solid success of Air-India International. Apart from Indian Trans-Continental Airways, of unlamented memory, which was merely a subsidiary of Imperial Airways and later of B.O.A.C., Indian scheduled external air services had, up to 1948, been limited to flights to India's neighbours: Pakistan to the west, Ceylon to the south, and Burma to the east.

During the War, Nevill Vintcent and I had prepared tentative post-war plans of development of our own which included in the last stage the operation of external services westwards and, if possible, all the way to England. In so far as they related to developments within India, these plans were largely fulfilled when Tata Airlines was converted into a public company in August 1946 under the name of Air-India and embarked on a large programme of development of its internal services. By the beginning of 1947 Air-India turned its attention to the international scene. B.O.A.C. had continued to operate services to India throughout the War while K.L.M. and Air France were in the process of resuming normal services to Indonesia and the Far East. America was entering the field in a global way and with the added advantage of having war-surplus DC-4 aircraft made freely and immediately available to them. By 1947 both Pan-American Airways and T.W.A. had opened services through and to India respectively.

It was clear that if India were at all to enter the field of long range international services she must do so quickly as, once foreign airlines were solidly entrenched on all the world's best air routes, India's entry would become a difficult and financially risky enterprise.

By then international air transport had settled down to a pattern largely influenced by the so-called Bermuda Agreement between Britain and the U.S.A. and regulated wholly by bi-lateral treaties between countries. Apart from her own growing importance as a great trade and travel centre, India had a commanding strategic position astride the only practical air route from Europe to the Far East and Australia. She was thus in a strong bargaining position *vis-a-vis* other countries which operated services to or through India or intended to do so.

Air-India had a detailed plan ready to take advantage of this happy situation and in the summer of 1947, submitted comprehensive proposals to the newly-formed, post-independence Government of India. It was proposed to create a new Company to be called Air-India International Limited, in the capital of which the Government of India, Air-India and the public would participate, which would be managed and technically assisted by Air-India Limited, and would operate, initially, regular services between India and the U.K. with modern, long range pressurised aircraft. Government were at first somewhat cool towards this proposal as they were inclined to prefer a scheme for an airline

wholly owned and managed by themselves. When, however, they realised that the Air-India scheme would save both money and valuable time because of the ready-made organisation and technical facilities placed from the start at the disposal of the project, they readily accepted the proposal and gave it from then on their full and enlightened support.

At Air-India's request, Government agreed to limit their capital participation to 49 per cent subject to an option to acquire at any time a further 2 per cent from Air-India. Air-India were appointed Technical Managers on a ten-year contract under which all services were provided at cost and a small fee charged on a decreasing scale at a certain rate per mile flown. Air-India were also appointed Air-India International's Chief Sales Agents within India on standard I.A.T.A. terms.

An important feature of the project was that Government undertook, for an initial period of five years, to make up any loss incurred by the Company, in the form of subsidies repayable out of 50 per cent of future net profits. While any such subsidy remained outstanding, dividends, if any, were to be restricted to 3½ per cent.

In order to make the earliest possible start, Air-India had some months earlier placed a provisional order for three Lockheed Constellation aircraft and arranged for the training of pilots and other staff. By a stroke of luck delivery of the aeroplanes was advanced by nearly six months, thanks to the cancellation of an order by another purchaser. Thus it was that Air-India International, although formally incorporated only on the 8th of March 1948, was able to inaugurate its Bombay-London service by 8th June of the same year.

The scheme proved from the start a highly successful experiment in joint State and Private enterprise, in which the public interests as well as Government's and Parliament's desire for control were fully safeguarded by specific provisions in the agreement between Government and the Company, while day-to-day management was left to experienced private enterprise.

Air-India International inaugurated its operations with a weekly service between Bombay and London on the 8th June 1948, since when it has never looked back. By 1952, when the decision to nationalise air transport was taken, it had in four brief years more than doubled the 1949 level of its operations and from its first full year made a profit each year except for one minor setback in 1952. I shall revert later to its subsequent history and progress.

Although it was the intention at first to treat Air-India International as India's sole chosen instrument for the operation of long range international services, an exception was made in 1949 in the case of one of the domestic airlines which, having acquired Skymaster aircraft, were permitted to undertake services to the east of India. They inaugurated services to Bangkok in May 1949, to Singapore in 1950 and to Jakarta in 1952. These services are now part of Air-India International's route system.

Reverting to domestic air transport operations, the situation reached by 1950 is reflected in Appendix II.

While in five post-war years, route mileage, miles flown and traffic carried had shown a phenomenal growth, the industry as a whole was operating at a heavy loss of about £800,000 (or Rs. 1.10 crores), of which about £280,000 (or Rs. 37 lakhs) were met from a subsidy in the form of a rebate on petrol duty. The situation was in fact worse than disclosed by these figures as most of the airlines were unable to provide for any depreciation of their assets, let alone for replacements.

Air Transport Inquiry Committee

Faced with this situation the Government of India, early in 1950, decided, mainly at the request of Air-India, to institute an independent enquiry into the state of the air transport industry and on the 8th February 1950 they appointed the Air Transport Inquiry Committee headed by a distinguished High Court Judge. The Committee were charged with the task of reviewing the existing state of the industry and of advising Government on the measures required "to ensure that the operation of air services is placed on a firm economic

footing and that the future development of air transport proceeds on sound and healthy lines." A high technical officer of Trans-Australian Airlines was appointed Adviser to the Committee.

The Committee's report, submitted in September 1950, largely vindicated the case of the air transport industry by confirming that the unsatisfactory condition of the industry as a whole was due principally to the unsound and indiscriminate working of the licensing system under which licences to too many operators resulted in wasteful competition, increased costs and reduced revenues for all. Dealing with the future, the Committee expressed itself in favour of only four operators being licensed, thus conforming with the original recommendation made by Sir Frederick Tymms six years earlier. It recommended that some of the airlines should be merged and that the licences of two of them should not be renewed. These, interestingly enough, were the very two which had in the past received special support from Government in connection with the Night Air Mail Scheme.

The Committee worked out standard costs and

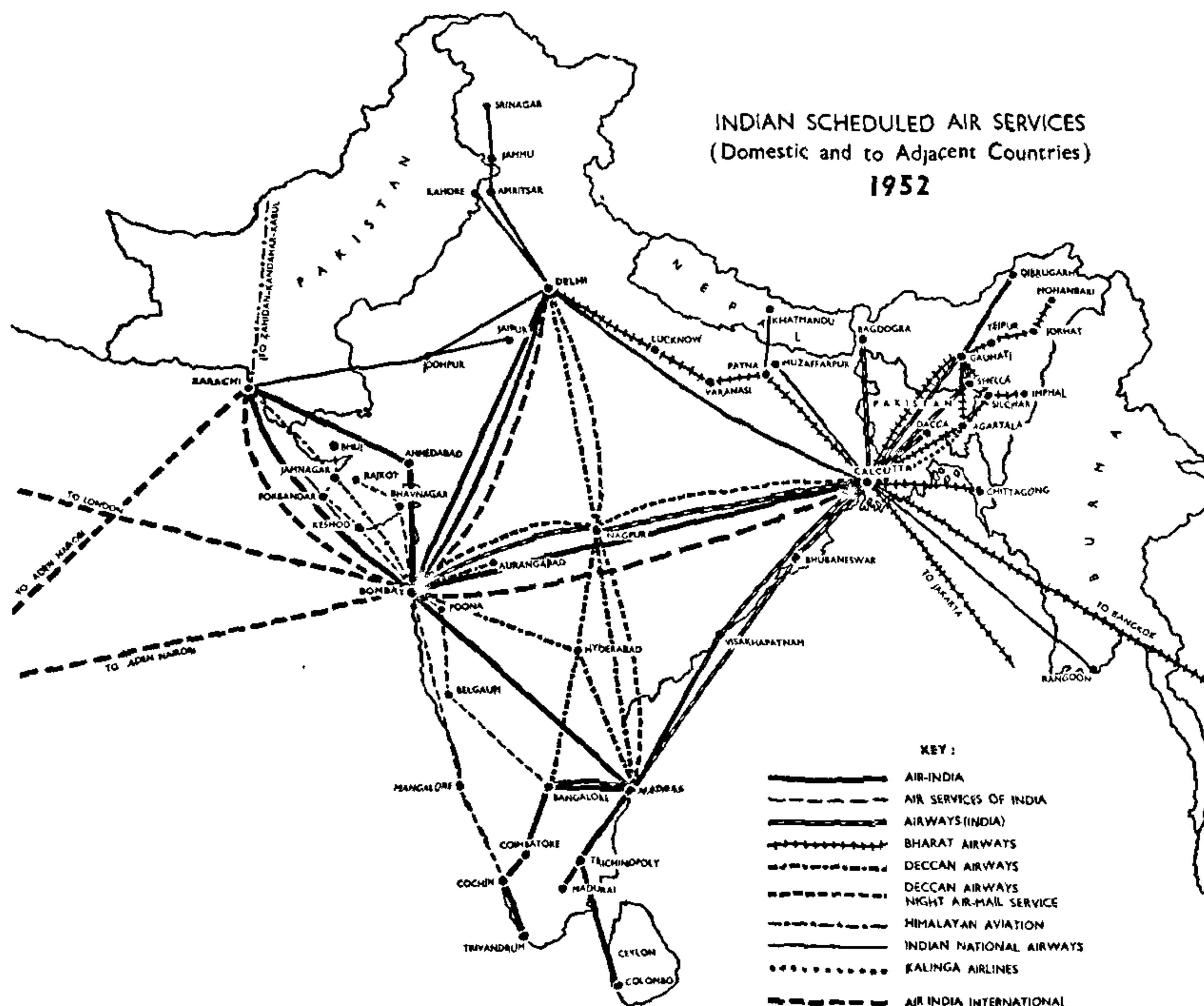


FIGURE 8. Air Routes in 1952.

recommended a system of subsidies very similar in concept to those proposed in the original Tymms Plan, under which airlines meeting or beating their targets would make a profit and those failing to meet the targets would make a loss. The Committee discussed the alternative of nationalisation in great detail and recommended the "status quo." By and large, the recommendations of the Committee were eminently sound and, if implemented, would have not only brought much needed relief to the industry as a whole but would also have ultimately resulted in the development of a sound and dynamic air transport system. In fact, the report was totally disregarded by Government! The reasons for this were never publicly explained. My own view is that the Minister concerned at the time had already made up his mind in favour of nationalisation and, for tactical reasons, decided to do nothing to strengthen the industry in the meantime. It must be admitted that, in the circumstances then existing, nationalisation did offer the easiest and quickest solution from Government's point of view with the added advantage that, while satisfying ideological aspirations in some quarters it would forever still further controversy over its past aviation policies.

By 1952, the condition of all the airlines, except one, had, in varying degrees, deteriorated to an extent where action could no longer be delayed. The exception was a company based at Calcutta which, beginning as one of the smallest of the licensed operators in 1946, had by 1951 become the largest operator in the country in terms of ton-miles flown and was, in addition, the only one which did not operate at a loss. The favourable position of this company, in contrast with the rest of the industry, was due to the combination of exceptionally low costs and exceptionally favourable route licences which enabled it to derive the maximum benefit from the enormous traffic which had artificially developed in the Bengal/Assam region as a result of the loss of surface means of communications between the two areas resulting from partition. While this company deserved credit for controlling rising costs more effectively than its colleagues in the industry, its low costs, as pointed out by the Air Transport Inquiry Committee, were achieved, partly, through the adoption of unacceptably low standards. There were also some unusual factors working in favour of this operator, a reference to which would serve no purpose today.

In 1952, the Planning Commission recommended the merger of all scheduled airlines into a single Corporation, in the capital of which the existing companies would participate *pro-rata* in exchange for their holdings, while the Central Government would acquire a share large enough to exercise effective control. Government did not accept this recommendation and also refused even to discuss alternative proposals put up by myself on behalf of Air-India for the integration of the industry into two strong companies in which the State would have an important or controlling share. Government had irrevocably decided upon complete nationalisation and the only two issues they were prepared to discuss were the basis of compensation and the question whether there should be two separate corporations to

take over domestic and international services respectively, or only one to take over the lot. Government at first favoured a single corporation but later accepted my strong recommendation in favour of two.

PART III

Nationalisation

In March 1953 India's Parliament passed the Air Corporations Act, which received the assent of the President on the 20th of May. The main provisions of the Act were that "there shall be two Corporations to be known as Indian Airlines and Air-India International," and that "there shall be transferred to and vested in—

- (a) Indian Airlines, the undertakings of all the existing air companies (other than Air-India International Limited), and
- (b) Air-India International, the undertaking of the Air-India International Limited."

The provisions of the Act followed substantially the corresponding British enactments and the two Corporations themselves were largely patterned on the B.E.A./B.O.A.C. concept. The Corporations were to consist of not less than five and not more than nine members, all of whom were to be appointed by the Central Government. In practice, Government have throughout appointed the maximum number of members, of whom seven are common members of both Corporations and five are officials of Government, including two Air Force Officers. One of the four non-officials represents the leading labour movement in the country.

In the matter of the price to be paid on acquisition, the Government of India, naturally much against the wishes of the companies concerned, decided to ignore the market value of the acquired assets and to pay only the depreciated book value of such assets. As at the time, and for some years thereafter, the market value of secondhand transport aircraft was at a much higher level throughout the world, the Government of India in effect acquired the principal assets of the nationalised companies at as little as 20 per cent of their true value. The companies naturally felt, not it would seem without cause, that they had been unfairly treated.

The will of Government and Parliament naturally prevailed and the provisions for compensation finally incorporated in the Act were in accordance with Government's view. The Act provided further that, except for 10 per cent payable in cash, the acquisition price was to be paid in the form of 5 per cent Five-Year Bonds of the Corporations which were duly redeemed in 1958. Since then, the capital requirements of the Corporations have been provided wholly by Government and treated half as equity and half as loan capital.

Nationalisation brought to a close an eventful era of twenty-one years marked first by pioneering endeavour and slow but solid growth, followed by a phenomenal but chaotic expansion and finally by controversy, confusion and collapse. If, in the course of this dismal post-war chapter, I have, more than once, criticised Government, I should make it clear that such

criticism has been directed solely at its policies and not at Government departments responsible for carrying them out and particularly those providing and maintaining the ground organisation, the airports and the meteorological, radio and other services, all of which functioned throughout with great efficiency despite a shortage of funds and trained manpower and many other difficulties. I would like to take this opportunity to thank, and pay tribute to, the band of able and devoted men who in these various Government departments rendered great services to Indian aviation and were always most helpful to the airlines before and after nationalisation. I am happy to record also that once the causes of stress, conflict and controversy were removed on nationalisation the Government of India's policies and actions and their attitude towards the Boards of the two Corporations could scarcely have been more correct and helpful.

The Post-Nationalisation Era

On the morning of the 1st of August 1953, the Indian Airlines Corporation took over as going concerns the assets and business of all air transport companies operating scheduled air services in India and between India and nearby countries, while the Air-India International Corporation took over Air-India International Ltd. Nationalisation opened a new and, thank goodness, a more orderly chapter in the story of Indian air transport. While at one stroke of the knife it excised the tumour that had laid it low, the task of rehabilitating domestic operations and making them healthy and strong was a formidable one.

The problems that faced the two Corporations differed materially in nature, magnitude and complexity. While I.A.C.'s main task was to integrate as rapidly as possible the organisations of eight airlines, A.I.I.'s task was largely the opposite one of disentangling the previously integrated organisation of Air-India Limited and Air-India International Limited, and to build a self-

contained airline with its own workshops, ground services and commercial organisation. This had to be achieved without a moment's interruption in both the external services of Air-India International and the internal services of Air-India Limited absorbed by I.A.C. The task was facilitated by the fact that the Boards of the two Corporations had a majority of common members, including the Chairman and General Managers of the two Corporations. A carefully thought out programme of action was jointly framed and completed on schedule, and both Corporations have made remarkable and uninterrupted progress since.

Air-India International

Taking Air-India first, Government's decision to create a separate Corporation for the operation of long range international services proved correct from the start. The complications, uncertainties and possible lowering of standards which complete and sudden integration with all the domestic airlines under a single Corporation might have entailed were avoided. Efficiency and morale remained unimpaired, while the retention of the original name preserved the valuable goodwill and reputation earned by the Corporation's predecessor both in India and abroad. Conditions have changed in the past seven years and there are now probably as many arguments in favour of merging the two Corporations. This question is in fact periodically under joint examination by both the Boards and Government.

The Corporation has continued to operate at a profit, albeit a small one, every year. In view of the continuous growth of both the Corporations and also the losses made by I.A.C., the Government of India has up to now waived the 4½ per cent interest on its loans and claimed no return on its equity investment in the Corporations.

The scale of operations and the route system of the Corporation have expanded continuously since 1953, when it took over the predecessor company's Bombay-London and the Bombay-Nairobi services. To these the Corporation added services to Singapore in July 1954, to Hongkong in August 1954, to Tokyo in May 1955, to Sydney in October 1956, to Moscow in August 1958, to New York in May 1960, and to Kuwait in October 1960.

From a total of three stations served in June 1948, the Airline now serves 28 cities in 21 countries, covering five Continents over an unduplicated route system of 24,671 miles (Figs. 9 and 10). From 1949, the full year of its operation, to 1959, available ton-miles have multiplied nine times, passenger miles seven times and operating revenues eight times. (Appendix IV.) In 1959, A.I.I. stood fourteenth among the eighty airline members of the International Air Transport Association. It has a capital employed of about £20.5 million (Rs. 27.28 crores), an annual turnover at the current rate of £14.4 million (Rs. 19.17 crores) and a current annual output of over 100 million ton-miles, which are expected to rise next year to £17.6 million (Rs. 23.50 crores) and to nearly 130 million ton-miles respectively. At the close of 1959, the Corporation had on its pay roll nearly



FIGURE 9. International Services in 1948.

4,600 employees with a somewhat low productivity rate of 12,950 A.T.M. per man. This figure has risen appreciably since the introduction of the Boeings and is expected to reach almost 20,000 A.T.M. per man next year.

A recent development of special interest is that A.I.I. has since April this year entered into a Revenue Pool with B.O.A.C. and Qantas. The Pool covers all its routes except the Bombay-Nairobi route over which B.O.A.C. and Qantas do not operate services and the Delhi-Moscow and Bombay-Prague services which Air-India already operates in Pool with Aeroflot and Czechoslovakian Air Lines (C.S.A.) respectively. The creation of the tri-partite Pool is in line with growing trends throughout the world outside the U.S.A. The Pool has enhanced the aggregate competitive power of the three partners and A.I.I. looks forward to a long, pleasant and mutually profitable association with its two great Commonwealth partners.

The fleet of four 749A Constellations taken over in 1953 has grown, six years later, to nine Lockheed 1049 Super-Constellations and three Boeing 707 inter-Continental jets with a fourth due early in 1961. A.I.I. has, from its inception, consistently followed the policy of standardising as far as possible on a single type of aircraft and engine. This policy could not be maintained during the transition to jet aircraft, but once the changeover is complete, the advantages of standardisation will become even more pronounced in view of the

relatively smaller number of units in use. The right policy for A.I.I. in the immediate future would, therefore, seem to lie in the enlargement of its present jet fleet with the same type of equipment, at least until the advent of supersonic aircraft.

The Airline entered the jet age on the 19th April 1960 when its Boeing 707's went into service for the first time on its Blue Ribbon route to London. It would have done so some five years earlier if the unfortunate history of the original Comets had not resulted in the abandonment of the Comet III, for which the Corporation had placed an order in 1953. A point of interest in regard to A.I.I.'s Boeing order is that it was the first airline in the world to specify Rolls-Royce Conway engines. The exceptional range and fuel economy of this combination of aircraft and engine rendered possible the first non-stop flight ever made between London and Bombay by a transport aircraft. This was achieved in February this year in the course of a delivery flight, when the distance of 4,850 miles was covered at an average speed of 600 miles an hour in exactly 8 hours and 5 minutes. As we landed at Bombay I recalled, somewhat nostalgically, that it had taken me that many days and hours to cover the same distance thirty years earlier, almost to the day, when I flew solo from Bombay to London in 8 days and 5 hours.

Indian Airlines Corporation

I.A.C.'s career has been a more chequered one, but its growth and progress has been equally remarkable.

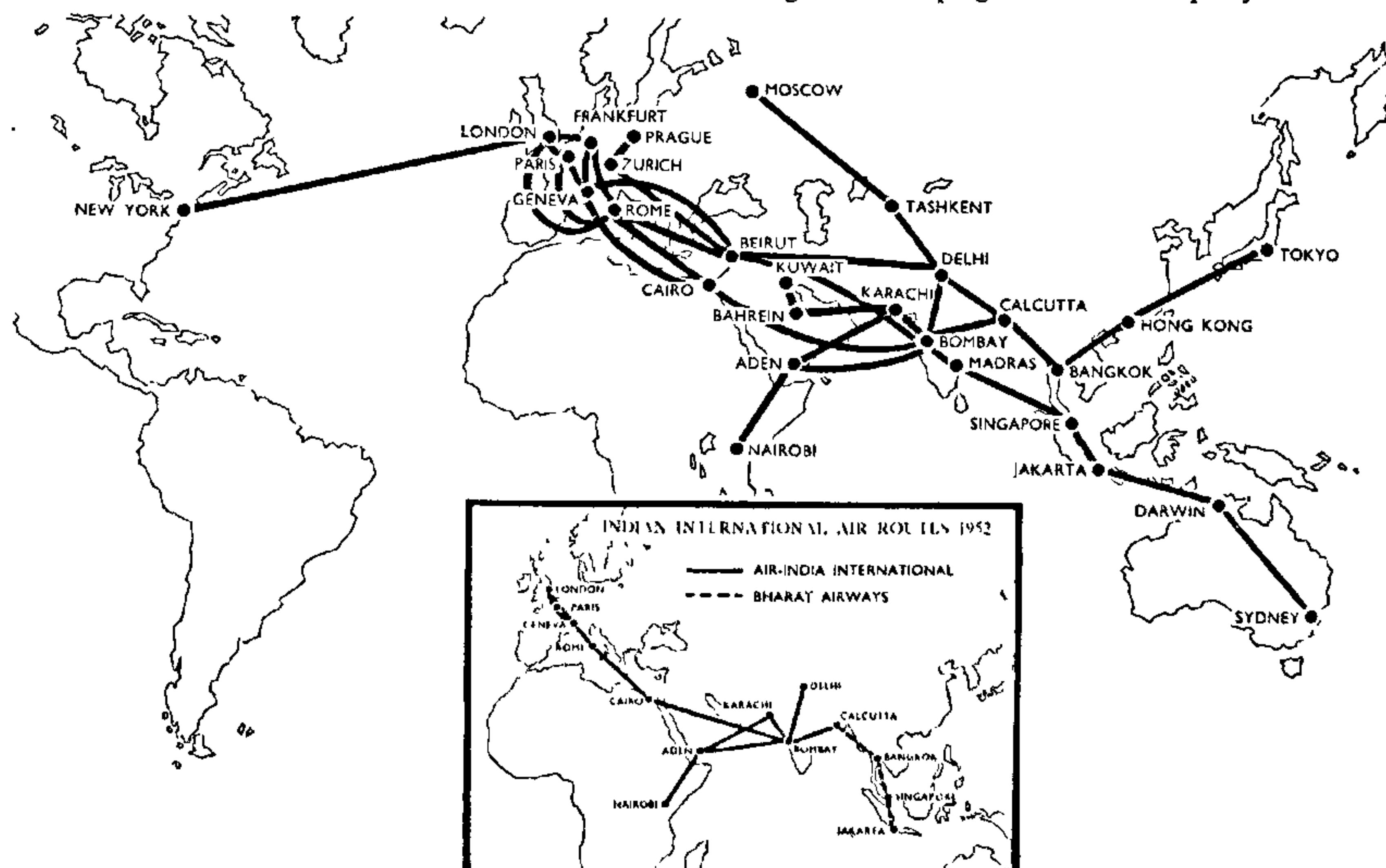


FIGURE 10. Indian International Air Routes, 1960.
(Air-India International).

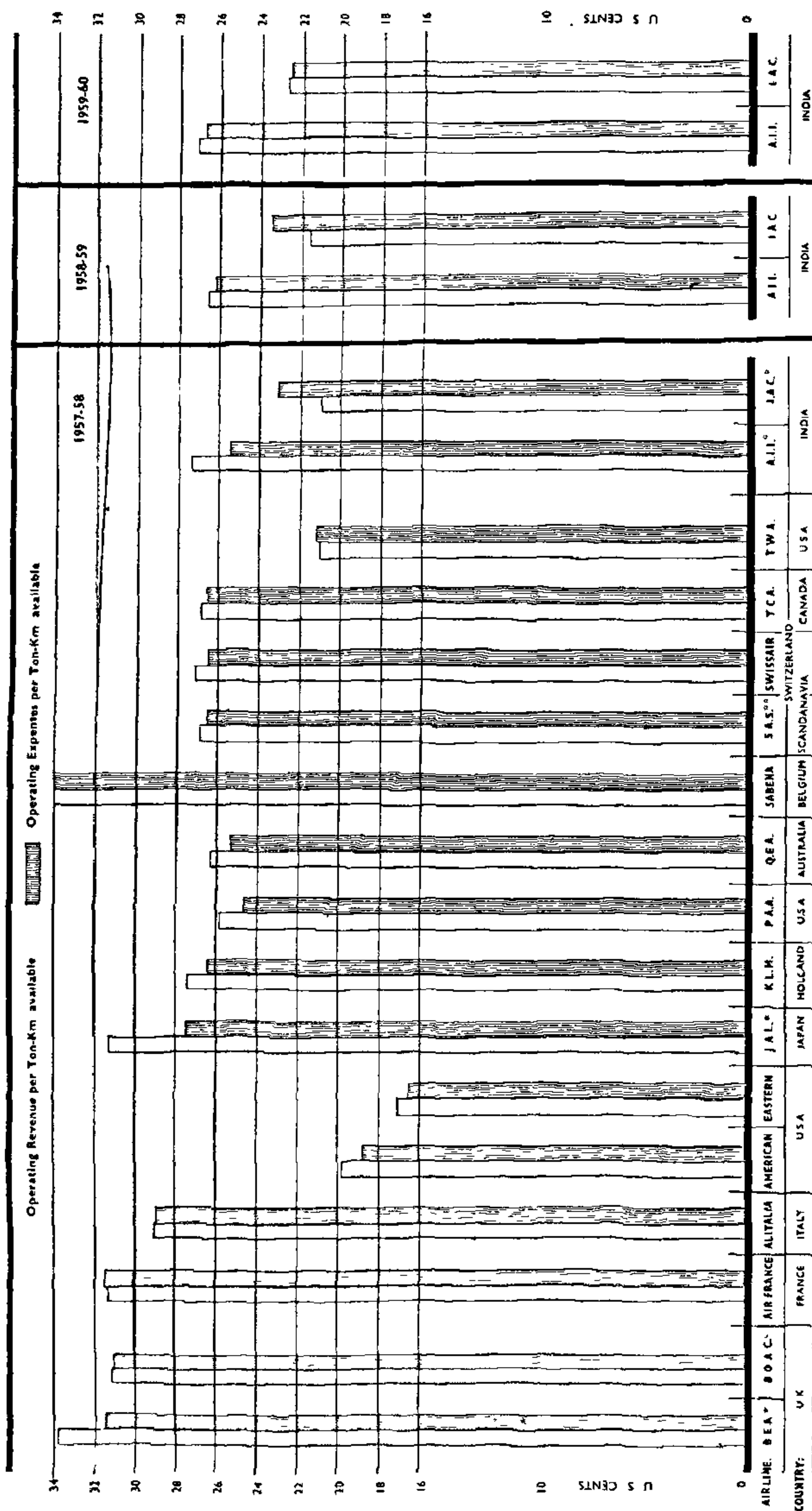


FIGURE 11. Operating Revenue and Expenses per ton-kilometre of Indian Airlines versus some Foreign Airlines, 1957.

At its birth in August 1953, I.A.C. had to absorb eight separate airlines with varying standards of organisation, operation and administration, a fleet of 99 aircraft, including 74 Dakotas, 12 Vikings and 3 Skymasters, with headquarters and maintenance bases in six cities, and a total of 7,017 men with widely varying scales of pay and conditions of work.

The task of moulding all these into one single organisation with common standards of operation and administration and uniform scales of pay and conditions of service, and at the same time to rationalise routes and ground organisation, reduce costs and improve efficiency all round, was a backbreaking one. Unlike A.I.I., which had no serious problem of organisation, personnel or morale, I.A.C. was faced also with the difficult task of fitting eight separate managerial and supervisory staffs into one organisation.

Considering the difficulties involved, the job was tackled with remarkable confidence and ability and pushed through with great determination. Now, seven years later, I.A.C. has been transformed into an homo-

genous and increasingly efficient organisation. Its route pattern has been rationalised so as to cut out unproductive flying, while Viscount aircraft have replaced Vikings and Skymasters on trunk routes. The management has been integrated and streamlined and operational standards and passenger amenities progressively raised.

Simultaneously, careful control has been exercised over costs and, as shown in Fig. 11, I.A.C. is today one of the world's lowest cost operators in spite of successive and heavy increases in wages, a preponderance of obsolete aircraft in its fleet, and a crushing burden of taxation on fuel which, in 1959-60, cost the Corporation no less than £800,000 (Rs. 106 lakhs). This, incidentally, is mainly responsible for the fact that I.A.C.'s fuel costs have ever since 1953 worked out to almost 35 per cent of its total operating expenses. This may be contrasted with the corresponding average of 17 per cent for the other airline members of ICAO. In fact, had fuel costs in India been no higher than the average ruling in the rest of the world, I.A.C. would have shown a profit every year since 1953.

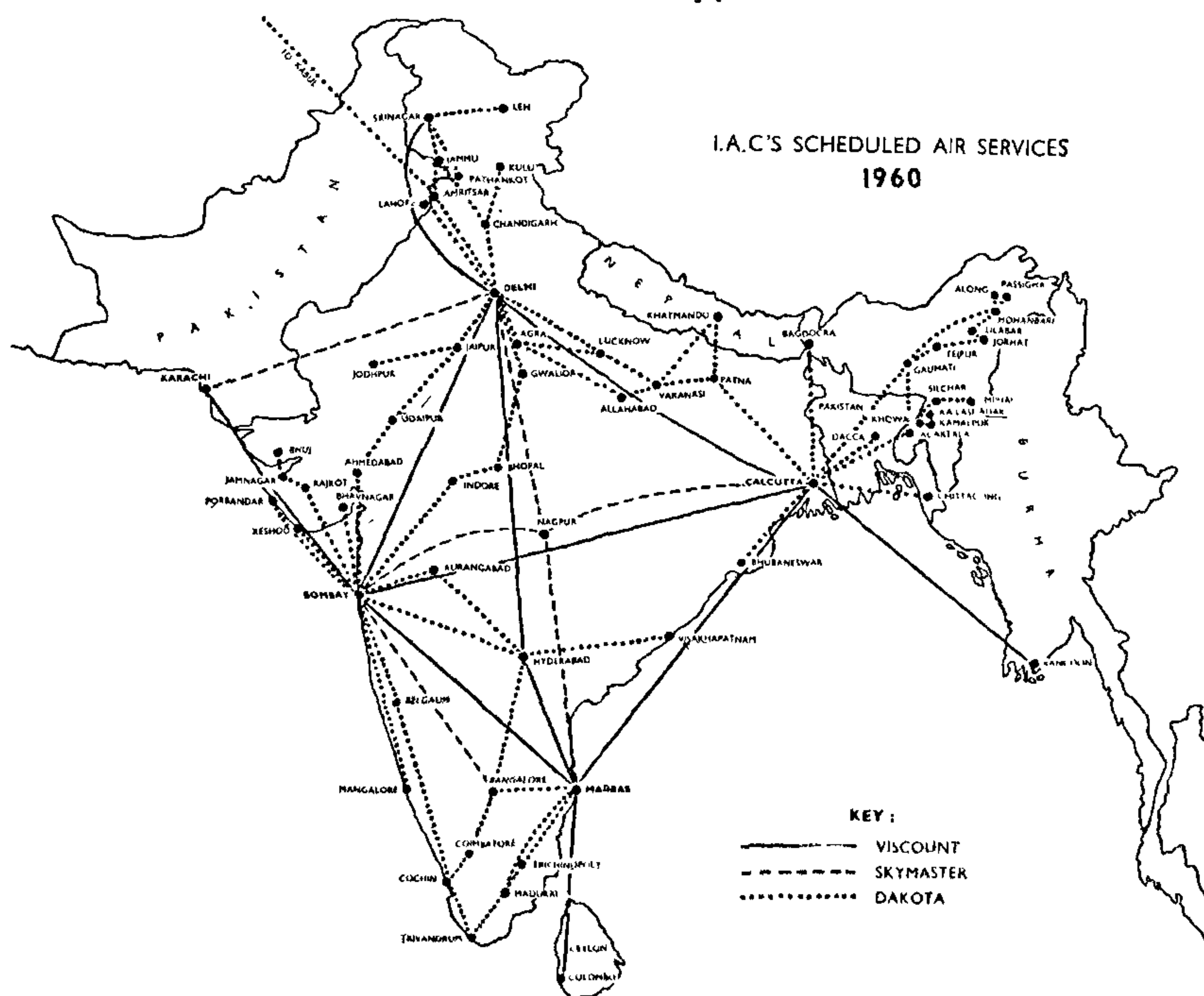


FIGURE 12. Air Routes of I.A.C. in 1960.

Notwithstanding this grievous burden and the excess of manpower from which it suffers in keeping with most industrial enterprises in India established in years gone by, I.A.C. has been able to reduce its operational expenses to an average of 31 pence (Rs. 1.75) per ton-mile. A remarkable achievement by any standards. As a result of these improvements and of a gratifying growth in traffic, as reflected in Appendix III, the Corporation has progressively reduced its operating losses annually until, in the year 1959-60, it made a small profit after providing for full depreciation and obsolescence, but without providing for interest on capital.

I.A.C.'s fleet today consists of ten Viscounts—to which four are expected to be added shortly—five DC-4/Skymasters, fifty-eight DC-3/Dakotas and three Herons, with five Fokker "Friendships" due for delivery next year. The Corporation's future re-equipment problem is a difficult one, both because of the country's foreign exchange crisis and of the fact that the Corporation must reconcile its natural desire to standardise as much as possible with the varying needs of the different types of routes and services it operates. Were it not for the severe shortage of foreign exchange, I.A.C. would, I believe, switch over in the near future to jet operations on its main trunk routes, the sector lengths of which happen to be ideally suited to the modern medium-sized jet. Over such distances, medium jets can operate as economically as propeller-driven aircraft, while offering great advantages of speed and comfort to the travelling public. On its secondary routes with relatively low traffic potential and well equipped in the matter of runways and other ground facilities, I.A.C. will probably have to continue using propeller aeroplanes of at least two types or sizes for some years to come. A possibility at present under consideration is for I.A.C. to take over some of the Super-Constellations at present operated by Air-India.

Non-Scheduled Operations

For reasons of space and time I have been compelled to restrict this story to scheduled operations only. As will be seen in Appendix VI, India, like other countries, has substantial non-scheduled operations undertaken not only by I.A.C. and A.I.I. but also by five private operators. It will be seen that while they have remained fairly static in recent years, they did keep pace with the growth of scheduled services in the early years. The reason for this phenomenon lies in the fact that immediately after partition surface transport was heavily disrupted in the eastern part of India and an abnormal demand arose both in the matter of passengers and freight.

It is to be remembered also that non-scheduled operations in India have had, and have today, a qualitative importance out of proportion to their quantitative magnitude. That is because of the social and strategic nature of these operations in the context of the partition of India, the Kashmir operations, refugee traffic, military operations in Kashmir and other frontier areas and inaccessibility of some of these areas.

Aerodromes and other Ground Facilities

A description of India's present domestic air transport operations would not be complete without a brief reference to the network of ground and meteorological and radio facilities provided by the Central Government. While a more detailed picture is available in Appendix VII, the essential facts are that the Central Government today maintains 85 aerodromes, 140 navigation and approach aids and 81 aeronautical radio communication stations, providing more than 540 aero mobile and point-to-point channels. Although still on a relatively small scale in comparison with other countries, expenditure on further development and expansion of ground facilities proposed to be spent during the next five year plan reaches the respectable figure of £18 million (Rs. 24 crores).

India's Operations compared with World Air Transport

I have up to now attempted to describe separately the progress and present status of the two Corporations. In view of the possibility that at some time in the future the two Corporations may be merged into one and in order to present a picture of Indian air transport as a whole, a composite statement combining the vital statistics of the two Corporations is shown in Appendix V. A breakdown of the available ton-miles produced by both external and internal scheduled services since nationalisation is offered in Fig. 13.

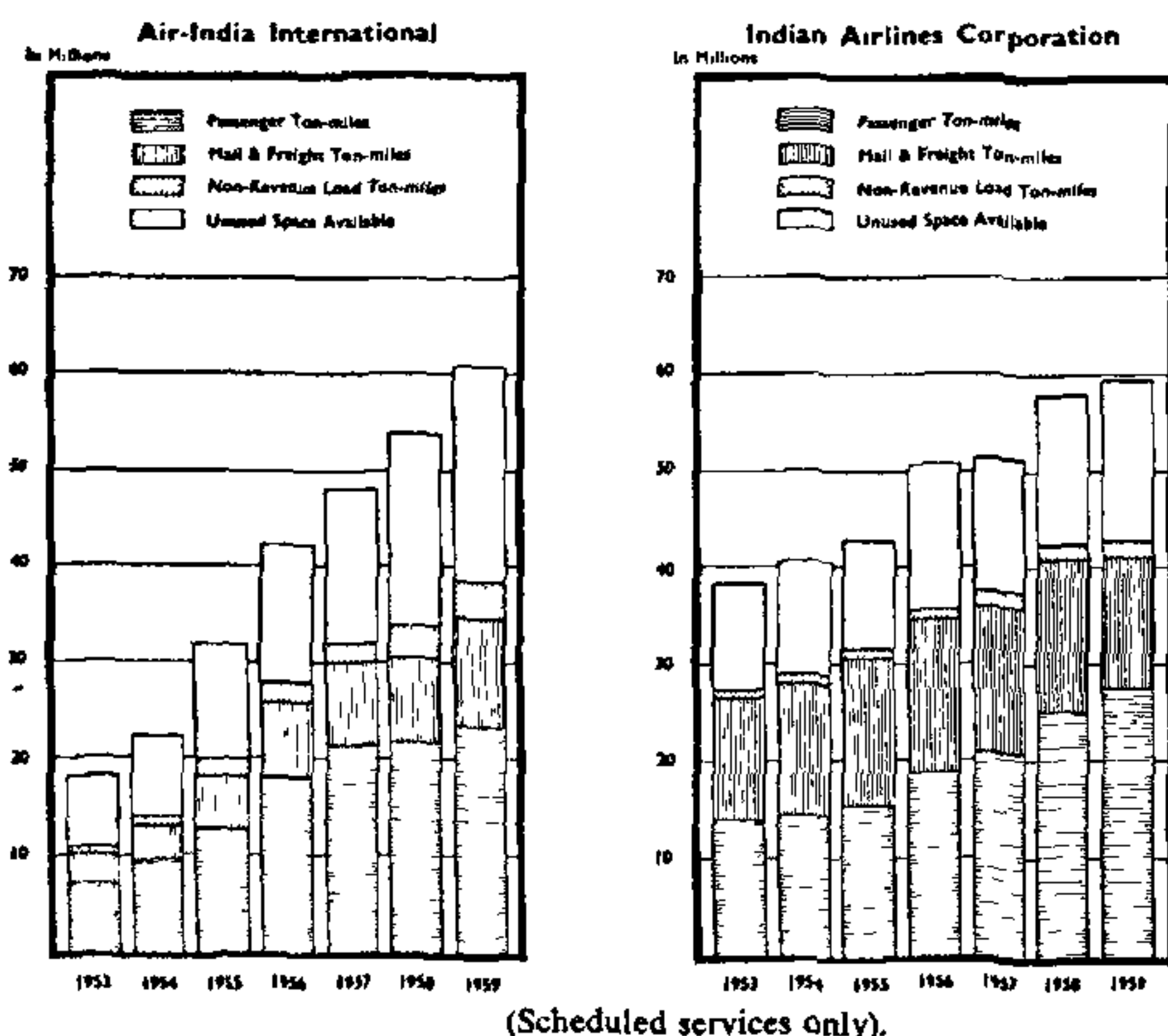


FIGURE 13. Volume and break-down of available ton-miles produced by Indian Air Transport: 1953-1959.

The main elements of the picture for 1959 may be summarised as follows:

Capital employed	:	Rs. 446 million (£33.45 m.)
Annual turnover approx.	:	Rs. 245 million (£18.37 m.)
Unduplicated route mileage	:	42.1 thousand
A.T.M. produced	:	121 million
Passenger-miles flown	:	583 million
Mail and Cargo ton-miles	:	25 million

Setting these figures in their international perspective, the available ton-miles produced by Indian air transport in 1959 represented roughly 22 per cent of British operations (B.E.A. plus B.O.A.C.), 30 per cent of French (Air France), 37 per cent of the Dutch (K.L.M.), 101 per cent of the Swiss (Swissair), and 150 per cent of the Japanese (J.A.L.). It may also be of interest to compare the rate of growth of Indian air transport with corresponding figures for the rest of the world. Fig. 15 attempts this comparison in graph form, first separately for domestic and external operations and then jointly for both. These graphs, based on ICAO, show that in regard to rate of growth India has up to now compared on an average favourably with the rest of the world.

Future Prospects

What of the future? India's international air transport operations are, as those of other countries, controlled largely by bi-lateral treaties. Their future growth, therefore, depends to a considerable extent on events and developments in the rest of the world as well as on India's ability and willingness to provide the resources and particularly the foreign exchange required for fleet expansion. The shortage of foreign exchange is today the most serious likely obstacle in the way of expansion. Fortunately, A.I.I. is an earner of foreign exchange at present to the tune of about £2.13 million (Rs. 28.40 million) per year. Assuming that the foreign exchange difficulty will be overcome, I see no reason why Air-India's future growth will not at least keep pace with that of the world industry as a whole. In fact, India may well exceed the average rate of growth of international air transport, for two reasons. First, having entered the field later than other countries, there is still considerable scope for enlarging Air-India's route system. The Pacific is an obvious possibility. Secondly, India has, under a series of five-year plans, embarked on a long-range programme of forced expansion of its economy as a result of which it may be expected that its trade and commerce with other countries will grow more rapidly than on the average elsewhere.

Furthermore, there is immense scope for the development of tourist traffic to India, which at present is limited to only about 100,000 visitors a year. Italy alone received 12 million foreign visitors in 1959. With increasing resources devoted to developing tourist traffic facilities in the country, a considerable expansion of air travel to and from India may be expected in the coming years.

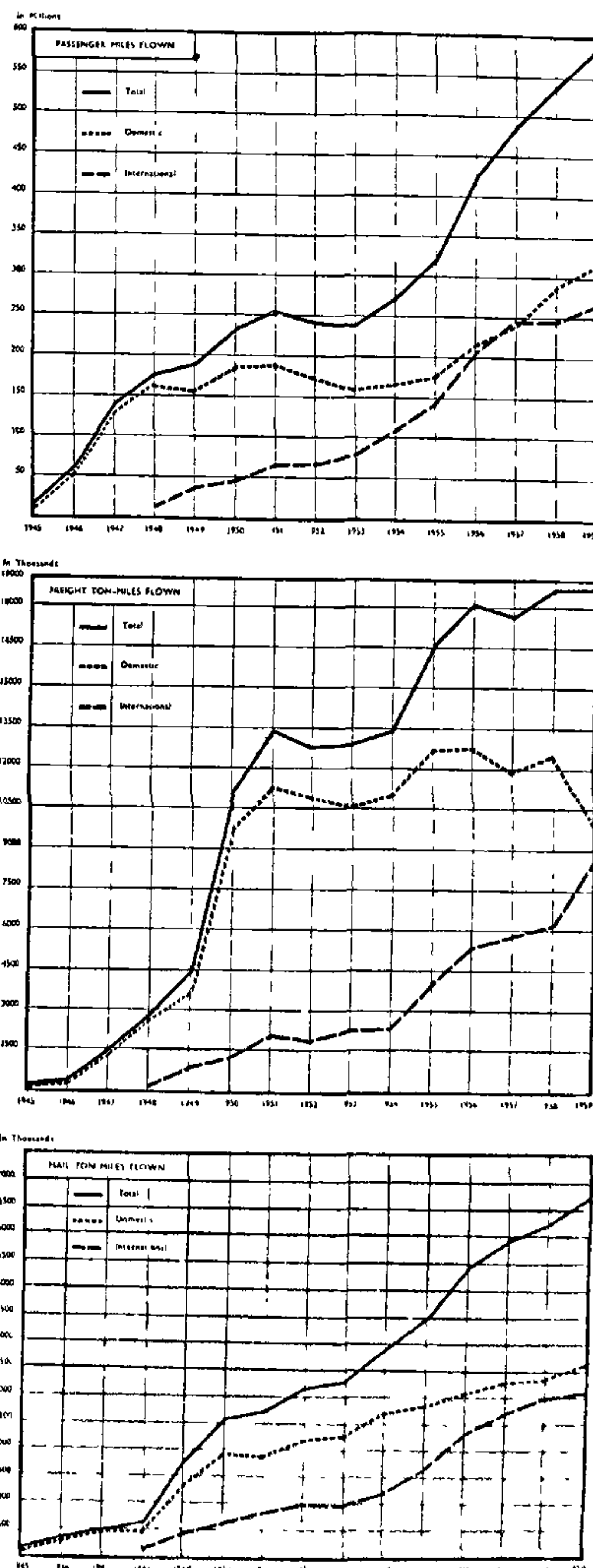
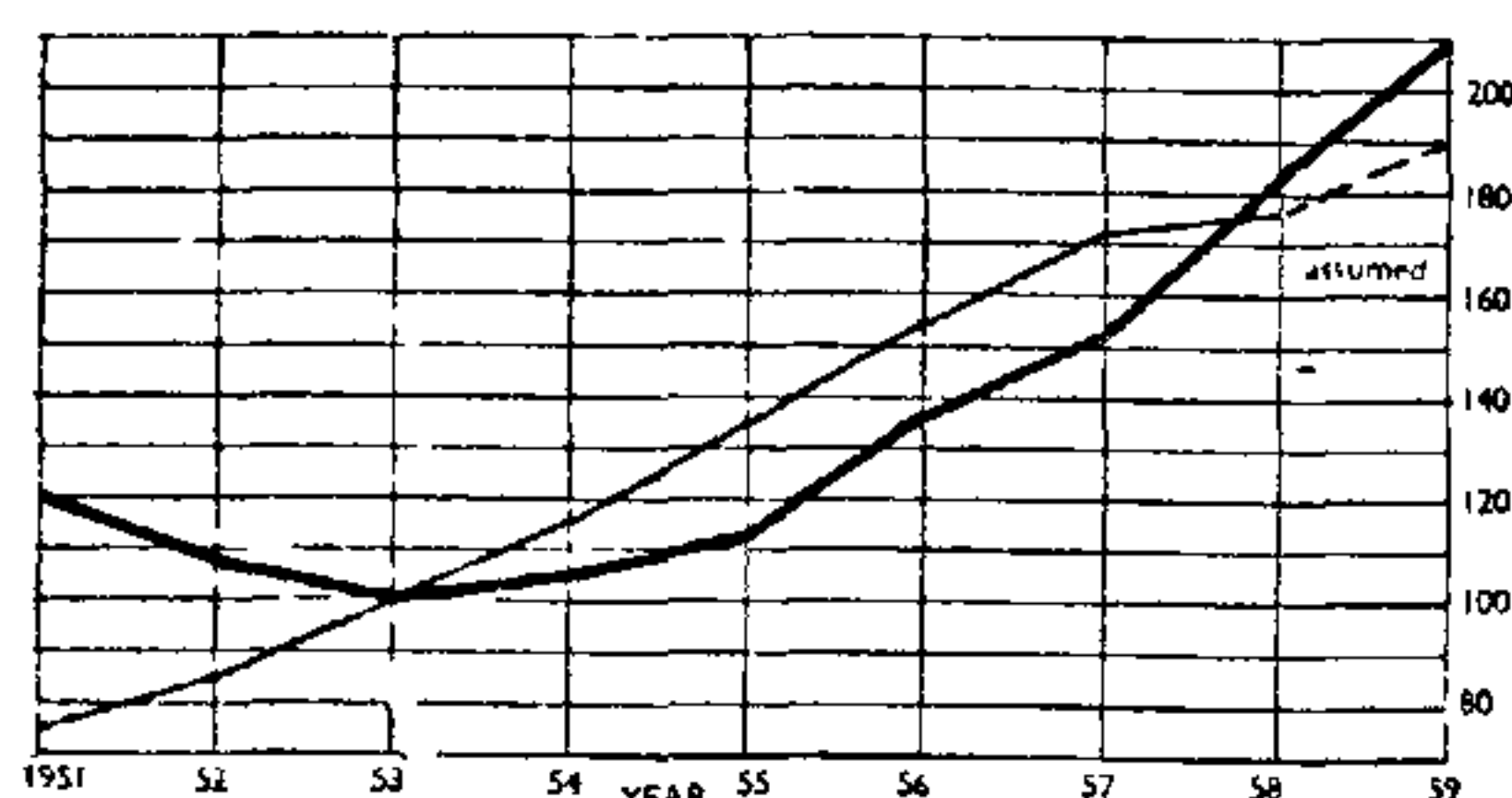
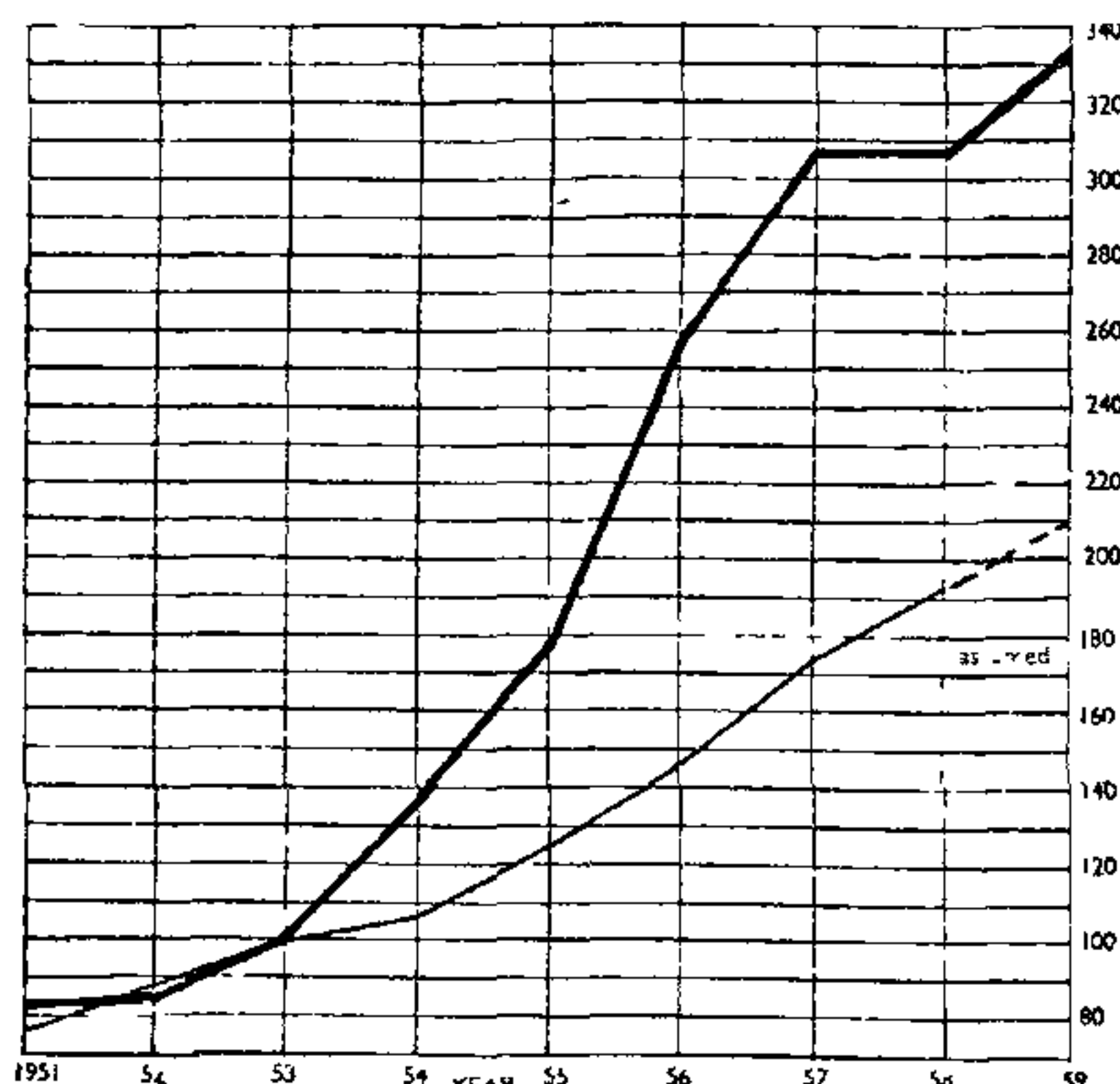


FIGURE 14. Growth of Indian Air Transport 1945-1959.
(Scheduled Domestic and International Services).



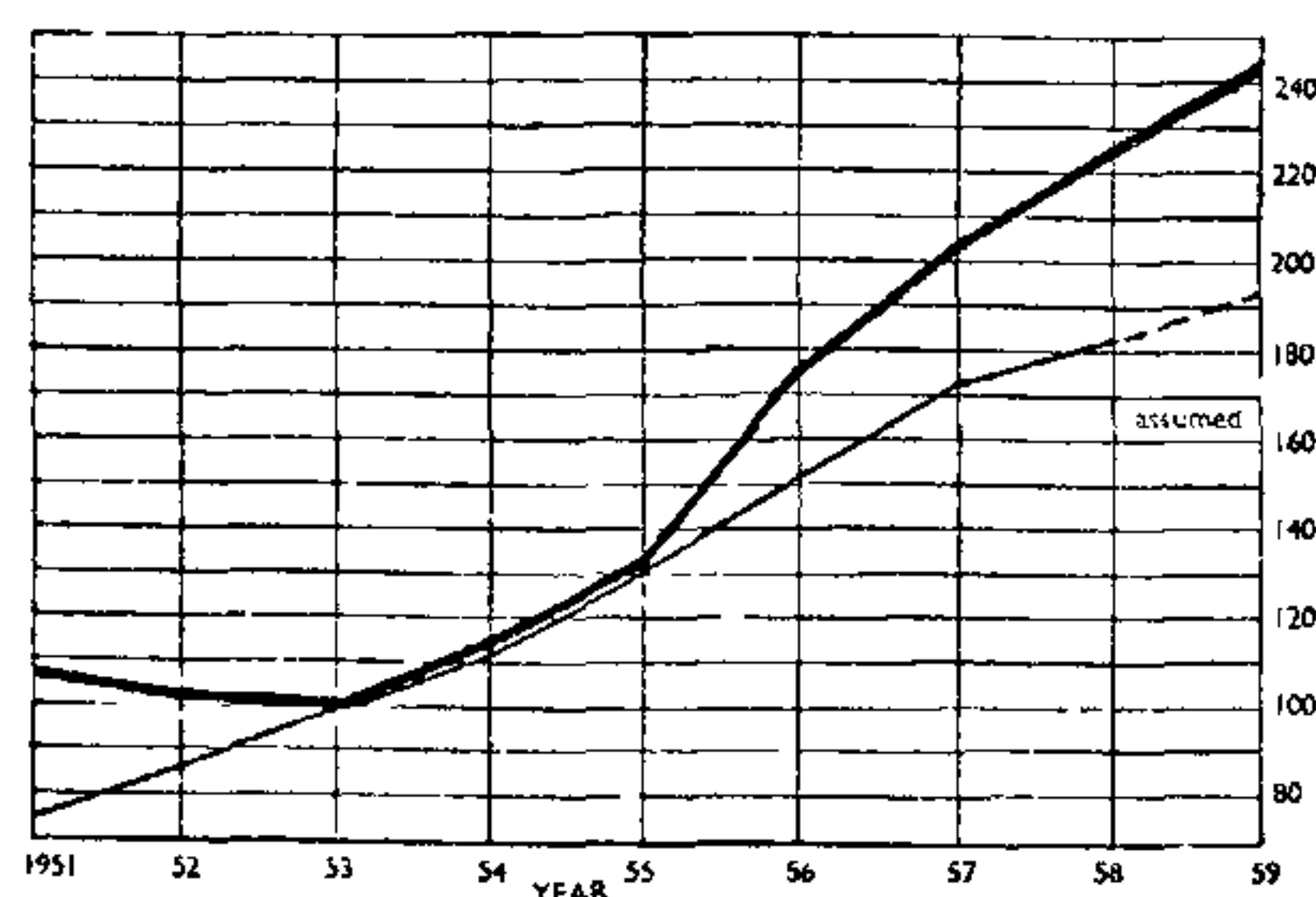
I.A.C.† and Predecessors versus World Domestic Airlines

INDIAN WORLD



A-I.I. versus World International Airlines

INDIAN WORLD



Total Indian versus Total World

INDIAN WORLD

Source: ICAO.

FIGURE 15. Growth of Indian Airlines compared with growth of World* Airlines: 1951-59.

(As measured by passenger miles flown)
1953 = 100*Excludes The U.S.S.R. and The People's Republic of China.
†Includes Services to Pakistan, Ceylon, Burma and Nepal.

In the case of domestic operations, the growth of traffic as represented by passenger-miles flown has risen annually at a rate five times as great as the national income of the country. If it continues to do so, and assuming that during the current decade the real national income of India grows at the rate of about 4 per cent—by no means an unrealistic figure—the demand for domestic air transport would grow on an average by about 20 per cent per year. Taking passenger-miles flown as an illustration, the figure of 329 million passenger-miles flown in 1959-60 might rise to nearly one thousand million by the middle sixties and to over two thousand million miles by 1970. Even if actuals do not reach these estimates, it can still be seen that with rising standards of living and an immense potential domestic market, with distances between major centres ideally suited to air travel and an enthusiastically air-minded population, future growth prospects are bright indeed.

For A-I.I., as for other international carriers, the supersonic age looms ahead. I am one of those who firmly believe that the prospect of crossing the Atlantic in one-and-a-half hours or of flying from England to Australia in half a day is so dazzling and would bring such immense benefits to mankind, that nothing should be done to discourage or deter such a phenomenal step forward. At the same time, it is fervently to be hoped that supersonic operations will not be forced upon the world of air transport for reasons of prestige or political rivalry between power blocks before all the technical and economic problems have been solved. Some of these are of such magnitude and complexity that I doubt that regular operations at sustained supersonic speeds will be possible until the end of the present decade. In any case, in my view, for whatever it is worth, supersonic aeroplanes can only supplement and never supersede subsonic aircraft. Because of the extreme altitudes at which they must operate, coupled with the limitations likely to be imposed by the noise and destructive impact on the ground of their own shock wave, supersonic aircraft will probably be usefully and economically employable only on long non-stop flights, mostly over water. People will presumably still want to travel over medium and short distances for which subsonic aircraft will continue to be required.

Furthermore, as in other forms of transport, the vast majority of travellers will want to travel as cheaply as possible rather than as fast as possible. The world's airlines have up to now attempted to combine in a single vehicle the largely incompatible requirements of luxury, speed and economy. The advent of the supersonic jets may well force the industry into a new pattern in which separate types of aircraft best suited to each type of operation will be used. Whatever the ultimate pattern, the sooner realistic thinking is done on the next step, particularly in the direction of satisfying the vast untapped demand for cheap air travel, the sooner will the air transport industry reach its full stature and fulfil its historic mission.

Conclusion

The twenty-eight year history of Indian air transport has been an eventful one. To one who, like myself, has taken some part in it since that first flight of a Puss Moth from Karachi to Bombay in 1932 until today, when India's Boeings or Viscounts speed night and day across the world's skies, it has brought both exhilaration and anguish. But all that is past. Like a young man who has renounced the habits and ways of his chequered youth, Indian air transport has now settled down to a mature and sensible existence. Sound progress and stability have replaced the romance of pioneering and the excitement of battle. That is as it should be, for air transport plays today, and will increasingly play in the future, a powerful and beneficial rôle in the developing economic life of India. Given the resources, it now has the vitality and the experience to give a good account of itself and in the process to render great services to the nation.

Acknowledgments

For the assistance or advice given me in the prepara-

tion of this paper, I should like to express my grateful thanks to Mr. M. Philip, Secretary, Ministry of Transport and Communications, Government of India, for kindly allowing me inspection of Government files; to Mr. K. M. Raha, Director-General of Civil Aviation, and Mr. B. S. Gidwani, Deputy Director, Information Directorate, Office of the D.G.C.A., for the immense trouble they kindly took in exploring archives and supplying valuable information, statistics and background material; to Sir Frederick Tymms, for much useful data and information based on intimate knowledge acquired as Director-General of Civil Aviation in India for sixteen years; to Miss Florence Barwood, Royal Aeronautical Society, for providing me with valuable sources of material; to Mr. J. S. Parakh, Financial Comptroller, Indian Airlines Corporation, for his informative notes, statistical material, and also for permitting me to reproduce a post-card carried on the World's First Air Mail.

I owe a special debt of gratitude to Dr. F. A. Mehta of the Department of Economics and Statistics, Tata Industries, and to Miss N. Deshpande, who assisted him, for the long hours of research, study and noting on which this lecture has been largely based.

APPENDIX I GROWTH OF DOMESTIC AIR TRANSPORT: 1932-1946 (SCHEDULED SERVICES)

	Unit	1932*	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Miles flown	('000s)	36	154	346	554	552	595	1,412	1,687	1,355	1,292	1,620	1,926	2,121	3,320	4,520
Passengers carried		1	155	757	553	349	1,238	2,104	3,518	3,646	3,747	4,659	7,574	13,433	24,090	105,251
Passenger miles	('000s)	0.7	53	243	210	120	311	970	1,329	1,749	2,438	3,394	5,140	9,346	16,716	61,066
Mail carried	(tons)	1.33	10.71	21.43	43.30	49.55	61.16	244.60	204.02	52.68	63.39	153.12	184.37	165.62	214.75	458.04
Freight carried	(tons)	0.02	0.45	9.82	3.12	0.45	1.99	18.09	40.62	12.95	16.52	72.77	287.05	519.64	380.36	588.39
Freight ton-miles	('000s)	n.a.	n.a.	2	1	0.4	1	8	16	9	12	86	225	362	253	390
A.T.M. produced	('000s)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	757	1,185	1,754	2,709	n.a.

* 15th October 1932 to 31st December 1932. n.a. Not available.

APPENDIX II GROWTH OF DOMESTIC AIR TRANSPORT: 1947-1952 (SCHEDULED SERVICES)

	Unit	1947	1948	1949	1950	1951	1952
Hours flown	('000s)	59.3	77.2	88.6	109.0	107.6	108.5
Miles flown	('000s)	9,362	12,238	13,822	16,858	16,757	16,622
Passengers carried	('000s)	255	339	349	441	429	413
Passenger miles	('000s)	138,827	164,141	155,766	184,929	190,717	174,607
Mail carried	(tons)	627	671	2,147	3,590	3,020	3,525
Freight carried	(tons)	2,521	5,308	9,855	35,410	38,186	37,888
Freight ton-miles	('000s)	1,506	2,652	4,017	9,853	11,412	11,060
Unduplicated route mileage*	('000s)	11.8	13.5	14.0	15.9	18.6	17.5
A.T.M. produced	('000s)	18,597	24,390	29,870	41,348	43,300	42,176

* End of year.

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APPENDIX III
PROGRESS OF INDIAN AIRLINES CORPORATION: 1953/54 - 1959/60
 (SCHEDULED AND NON-SCHEDULED SERVICES)

JANUARY 1961

	Unit	1953-54*	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Revenue hours flown		113,914	114,808	121,839	124,152	116,545	119,280	116,975
Revenue miles flown	(Mn.)	17,994	17,953	18,986	19,202	18,319	19,535	19,402
A.T.M. produced	(Mn.)	45,840	46,443	51,582	55,111	55,988	64,075	67,870
R.T.M. performed	(Mn.)	31,221	32,390	36,397	37,921	39,993	45,263	47,998
Available seat miles†	(Mn.)	n.a.	n.a.	n.a.	364	391	477	506
Unduplicated route mileage‡		n.a.	n.a.	14,600	14,212	14,209	14,881	15,261
Revenue passengers carried		430,683	477,583	500,363	571,106	599,573	653,494	703,013
Revenue passenger miles	(Mn.)	n.a.	189	210	240	270	310	329
Revenue passenger ton-miles	(Mn.)	n.a.	16,368	18,316	20,787	23,439	26,992	29,823
Revenue mail carried	(Tons)	3,843	4,659	4,997	5,221	5,166	5,465	5,856
Revenue mail ton-miles	(Mn.)	n.a.	2,772	2,994	3,196	3,274	3,470	3,680
Revenue freight carried	(Tons)	52,833	50,256	53,856	50,194	44,208	49,977	46,041
Revenue freight ton-miles	(Mn.)	n.a.	13,250	15,087	13,938	13,280	14,801	14,495
Operating revenue	(Mn. Rs.)	65,147	69,247	80,860	86,135	92,607	108,249	119,498
Operating expenses	(Mn. Rs.)	77,069	78,262	92,800	97,014	102,914	117,367	118,717
Operating profits	(Mn. Rs.)	-11,922	-9,015	-11,940	-10,879	-10,307	-9,118	+0,781
Operating revenue per A.T.M.	(Rs.)	1.42	1.49	1.57	1.56	1.63	1.69	1.76
Operating costs per A.T.M.	(Rs.)	1.69	1.69	1.80	1.76	1.81	1.83	1.75
Number of employees‡		n.a.	n.a.	9,324	9,254	9,448	9,463	9,553
A.T.M. per employee		n.a.	n.a.	5,532	6,022	6,094	6,771	7,105
Break-even load factor	(%)	85.0	82.0	83.7	80.7	81.0	78.3	70.7
Overall load factor	(%)	68.1	69.7	70.6	68.8	70.2	70.6	72.1
Total capital employed‡	(Mn. Rs.)	48.5	65.8	104.6	136.3	186.3	192.9	172.8

NOTE: Years ended March. * Eight months figures converted to 12 months. † Scheduled services. ‡ End of year. n.a. Not available

APPENDIX IV
PROGRESS OF AIR-INDIA INTERNATIONAL: 1948 - 1959/60
 (SCHEDULED AND NON-SCHEDULED SERVICES)

	Unit	1948*	1949	1950	1951	1952	1953-54†	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Revenue hours flown		1,773	5,422	8,060	10,352	10,520	15,249	14,413	19,696	23,808	26,306	27,924	28,842
Revenue miles flown	(Mn.)	0.411	1.263	1.979	2.595	2.697	3.731	3.573	4.909	5.973	6.719	7.110	7.435
A.T.M. produced	(Mn.)	1,930	6,668	10,903	14,103	14,358	20,670	23,684	35,242	43,567	50,657	56,010	59,518
R.T.M. performed	(Mn.)	1,332	4,625	6,508	9,148	9,094	12,682	13,950	19,635	27,927	29,988	31,782	34,618
Available seat miles	(Mn.)	16,136	47,377	64,569	101,529	104,167	166,978	186,922	275,910	328,379	394,629	434,831	452,117
Unduplicated route mileage‡		5,158	5,158	9,613	9,633	10,328	10,364	14,991	17,845	21,252	21,617	24,710	24,671
Revenue passengers carried	(No.)	2,690	7,980	12,267	19,756	21,499	34,148	40,287	56,445	79,825	88,312	83,868	89,385
Revenue passenger miles	(Mn.)	11.9	34.9	48.5	66.5	67.5	83.9	115.7	158.1	224.5	247.2	252.8	258.6
Revenue passenger ton-miles**	(Mn.)	1.146	3.224	4.244	5.846	5.859	8.629	9.973	13.927	19.491	21.247	22.169	22.660
Revenue freight carried	(Tons)	38.4	189.7	300.9	549.6	521.9	978.1	878.1	1021.4	1453.6	1474.1	1854.0	2757.1
Revenue freight ton-miles**	(Mn.)	0.175	0.861	1.272	1.996	1.723	2.782	2.503	3.841	5.584	5.644	6.547	8.716
Revenue mail carried	(Tons)	36.2	98.7	139.7	185.7	215.2	268.7	297.8	435.3	604.5	658.5	801.3	862.1
Revenue mail ton-miles**	(Mn.)	0.173	0.449	0.628	0.871	1.010	1.228	1.316	1.777	2.520	2.690	2.930	2.952
Operating revenues	(Mn. Rs.)	5.2	14.7	20.8	27.9	28.8	41.4	48.4	67.7	96.5	108.3	115.6	125.8
Operating expenses	(Mn. Rs.)	5.6	14.7	20.0	25.8	29.2	40.6	46.0	66.6	87.1	100.5	113.9	124.0
Operating profits	(Mn. Rs.)	-0.4	—	+0.8	+2.1	-0.4	+0.8	+2.4	+1.1	+9.4	+7.8	+1.7	+1.8
Operating revenue per A.T.M.	(Rs.)	2.69	2.20	1.91	1.98	2.01	2.00	2.04	1.92	2.21	2.14	2.06	2.11
Operating cost per A.T.M.	(Rs.)	2.90	2.20	1.83	1.83	2.03	1.96	1.94	1.89	2.00	1.98	2.03	2.08
Average number of employees		164	496	‡‡	‡‡	‡‡	‡‡	2,102	3,121	3,661	4,070	4,442	4,596
A.T.M. per employee		11,768	13,444	‡‡	‡‡	‡‡	‡‡	11,266	11,292	11,900	12,446	12,609	12,950
Break-even load factor	(%)	83.8	68.5	56.1	58.5	61.7	60.3	56.1	53.3	59.1	55.7	56.0	57.3
Overall load factor	(%)	77.4	68.5	58.4	63.3	60.9	61.1	59.0	55.8	64.3	59.1	56.8	58.2
Total capital employed	(Mn. Rs.)	20.0	28.0	27.2	28.8	31.3	53.9	102.4	109.5	147.4	167.2	181.9	272.8

NOTE: Calendar years up to 1952; thereafter years ended March. * June to December only. † January 1953 to March 1954. ‡ End of year. ‡‡ Separate figures for these years are not available, as A.-I.I. during this period utilised some staff in common with Air India Ltd. ** Scheduled services.

APPENDIX V
PROGRESS OF INDIAN AIR TRANSPORT
DOMESTIC AND INTERNATIONAL: 1948-1959
(SCHEDULED SERVICES)*

	Unit	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Revenue hours flown		78,961	93,944	117,422	118,684	119,490	114,796	117,402	125,655	136,813	134,453	135,046	131,397
Revenue miles flown	(Mn.)	12 649	15 098	18 896	19 498	19 562	19 202	19 798	21 267	23 483	23 496	24 578	24 742
A T M produced	(Mn.)	26 320	36 538	53 252	57 403	56 734	56 551	62 644	74 869	92 805	99 901	111 888	120 936
R T M performed	(Mn.)	19 296	23 249	34 414	39 015	37 457	37 240	41 183	49 204	60 595	66 039	71 924	76 613
Unduplicated route mileage†	('000s)	18 7	19 2	25 5	28 2	27 8	27 0	29 3	31 8	37 1	33 8	41 7	42 1
Revenue passengers carried	('000s)	341	357	453	449	434	404	432	469	559	615	696	736
Revenue passenger-miles	(Mn.)	176 366	190 619	233 426	257 243	242 056	239 760	273 660	320 020	422 009	485 662	537 061	583 316
Revenue passenger ton-miles	(Mn.)	15 812	16 986	20 706	22 841	21 459	21 076	23 884	28 076	37 001	42 373	46 959	51 127
Revenue freight carried	(Tons)	5,346	10,045	35,717	39,136	38,410	37,866	38,578	43,839	42,960	38,255	41,804	32,981
Revenue freight ton-miles flown	(Mn.)	2 827	4 466	11 105	13 408	12 789	12 886	13 392	16 630	18 154	17 701	18 693	18 728
Revenue mail carried	(Tons)	707	2,246	3,730	3,206	3,740	3,949	4,765	5,124	5,663	5,840	6,075	6,712
Revenue mail ton-miles	('000s)	0 657	1 797	2 603	2 766	3 209	3 279	3 906	4 497	5 440	5 964	6 272	6 758
Operating revenue‡	(Mn. Rs.)	51 8	63 2	81 7	91 5	87 6	n.a.	117 6	148 5	182 6	200 6	223 8	245 3
Operating expenses‡	(Mn. Rs.)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	124 3	159 4	184 1	203 3	231 3	242 7
Operating profits‡	(Mn. Rs.)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-6 7	-10 9	-1 5	-2 7	-7 5	-2 6
Operating revenue per A.T.M.‡	(Rs.)	1 97	1 73	1 58	1 59	1 54	n.a.	1 68	1 71	1 85	1 86	1 86	1 93
Operating cost per A.T.M.‡	(Rs.)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 77	1 84	1 87	1 89	1 93	1 91
Number of employees		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12,445	12,915	13,518	13,905	14,149
A.T.M. per employee		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6,016	7,186	7,390	8,047	8,547
Overall load factor	(%)	73 3	63 6	65 8	68 0	66 0	65 9	68 6	65 7	65 3	66 1	64 3	63 3
Total capital employed‡	(Mn. Rs.)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	168 2	214 1	283 7	353 5	374 8	445 6

* As shown in Appendix VI, the role of non-scheduled operations is considerable, but their data are too incomplete for purposes of incorporation in this Appendix.
† End of year. ‡ Figures from 1954 onwards are for fiscal years ending March. 1954 read as 1954-55 etc. n.a. = Not available

APPENDIX VI
GROWTH OF NON-SCHEDULED OPERATIONS: 1948-1959*

Year	Miles flown '000s	Hours flown No.	Number of passengers No.	Freight carried Mn. lb.	A.T.M. produced '000s	Revenue earned Mn. Rs.
1948	4,484 (35 5)	30,749 (38 9)	—	—	—	16 5 (32 0)
1949	4,101	21,126	12 490**	4 8**	—	10 9
1950	6 837	44,566	66,000	108 1	—	20 8
1951	6 008 (40 8)	41,815 (35 2)	65,885 (14 7)	131 6 (150 1)	—	20 0 (22 1)
1952	5 819	36,203	88 829	126 5	—	16 9
1953	5 223	31,855	94 976	88 8	14 279	13 5
1954	5 351 (27 0)	32,155 (27 4)	137,537 (31 8)	97 8 (111 3)	15 935 (25 5)	16 1 (15 9)
1955	5,132	30,945	108,445	84 2	17,069	18 7
1956	5,732 (24 4)	34 005 (24 9)	114,380 (20 5)	97 1 (100 8)	17 271 (18 6)	20 4 (12 7)
1957	5 458	32,832	126,459	88 7	16 714	20 8
1958	4 986 (20 3)	30 457 (22 6)	99 549 (14 3)	84 4 (90 1)	14 946 (13 4)	18 0 (9 0)
1959	5,577	33,931	88,840	81 1	16,391	21 4

* Figures within brackets represent the percentage of total non-scheduled to total scheduled operations.

** Figures for October to December 1949 only.

APPENDIX VII
PROVISION AND EXPENDITURE UNDER FIVE-YEAR PLANS
ON GROUND ORGANISATION AND FACILITIES FOR AIR TRANSPORT IN INDIA

	Expenditure during the First Plan		Expenditure during the Second Plan		Provision for the Third Plan	
	'000s	Mn. Rs.	'000s	Mn. Rs.	'000s	Mn. Rs.
1. Works at Aerodromes	4,591	61 213	10 019	133 587	13 500	180 0
2. Telecommunication Equipment	912	6 829	1,944	25 918	3,750	50 0
3. Air Routes & Aerodrome Equipment	214	2 872	479	6 39	750	10 0
Total	5 717	70 914	12,442	165 895	18,000	240 0

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28. INDIA, GOVERNMENT OF. (1926). *Agreement made with Imperial Airways Ltd., for the establishment of a Civil Air Transport Service between Egypt and India*.
29. INDIA, GOVERNMENT OF. (1932). *Agreement with Messrs. Tata Sons Limited for the operation of an Air Mail Service between Karachi and Madras via Bombay*.
30. INDIA, GOVERNMENT OF. (1924). *Annual Report on the Progress of Civil Aviation in India for the year ended 31st December 1923*.
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32. INDIA, GOVERNMENT OF, DEPARTMENT OF CIVIL AVIATION & COMMUNICATIONS. *The Organization of the Government of India—Paper prepared by the Indian Institute of Public Administration, pp. 167 to 181*.
33. INDIA, GOVERNMENT OF. (1926). *Development of Civil Aviation in India*.
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35. INDIA, GOVERNMENT OF. *Minutes of the Meeting of the Air Board held in January 1924, June 1925 and April 1926*.
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Dr. Moul: Mr. Tata had given a very complete picture of the development of civil air transport in India. Despite the early political difficulties which had punctuated its existence through years, it was plain for all to see that firm foundations were laid and from this beginning steady progress had been made. Not only had India made progress but its rate of progress relatively had more than equalled the average for the rest of the world and that was a great achievement. He would like to say that Mr. Tata and his colleagues had brought this about by their persistence and their vision and it had been a great privilege to hear from him an authentic story. It would be a record for all time of what, collectively, had been a splendid piece of work.

They were most grateful to Mr. Tata for this lecture and for the personal charm and the humour with which it had been delivered.

He would now ask Professor Baxter to propose a formal vote of thanks.

Professor A. D. Baxter: When the President made his introductory remarks he was reminded of the Council's

desire to emphasise the importance that they attached to this Commonwealth Lecture. Undoubtedly the present lecturer had maintained its prestige and he felt that an additional vote of thanks to the Lectures Committee for their persistence in assuring that Mr. Tata gave it would not be out of place.

He thought the Commonwealth Lecture was instituted by the Society to enable them to learn something of and to keep in touch with the aeronautical achievements and activities which had been, and still were being, pioneered outside their own shores but within the confines of those nations who were partners in the Commonwealth. This was a very happy idea and as a result they had had some very attractive lectures and had learned something about aviation in Africa, in Australia, New Zealand and in Canada, but he thought this was the first time that they had had a lecture entirely devoted to aviation in India.

It had been a story of air transport, a story well told, but it had been more than a story, it had been history; probably the Society's Historical Group, so recently inaugurated, would not be long before it wanted to claim

this lecture as, should he say, an eastern gem, in the collection it was making.

They were all interested not only in the history of aviation but in the men who had been making that history, and as the President had said, they had in Mr. Tata one who must be regarded as a founder of Indian aviation. He had been extremely modest about his own part in it but nothing illustrated it better than his brief reference in the written lecture to his two flights, one to this country in 1930 which took eight days and five hours to complete and the other exactly thirty years later when he flew back to India in one of his Corporation's aircraft in precisely eight hours and five minutes. Both were great milestones in the progress of Indian aviation.

He thought also that Mr. Tata showed great restraint in his mentions of the trials and tribulations consequent on Government decisions or indecisions and he could assure him that such difficulties were not unknown in this country; in fact, there might well be some in the audience who could appreciate from their own experience the same sort of problems and frustrations, although he doubted whether they would all have the same restraint that Mr. Tata had exercised. He could only hope that those over here with the same problems would eventually be as successful in achieving their objectives as Mr. Tata seemed to have been. The success had been only partly revealed by the lecturer that night and the paper itself should be studied carefully; it was full of facts which helped to indicate something of the extensive progress in India.

He had been interested in Mr. Tata's views of the future. It was encouraging to hear him say that there was such scope in India for the extension of air traffic and he wondered if that implied that there was also scope for the civil aircraft industry? Possibly they in this country might be able to assist and participate at some time. It was interesting, too, to hear Mr. Tata's remarks on the supersonic transport, and that he thought the time would come when they would travel across the Atlantic in an hour and a half. This was not the time to discuss whether it should be an hour and a half or three hours but it was encouraging to find that an operator did believe in supersonic transport.

Mr. Tata had in his lecture given generous acknowledgment of British aid in the pioneering days of India's aviation and now they ought equally to give acknowledgment of the valuable return that he had given by his lecture. It had been carefully prepared and delivered in a humorous and interesting style; it was packed full of useful data and it had been a very great Commonwealth story.

On behalf of all his fellow members of the Royal Aeronautical Society, he proposed a vote of thanks to Mr. Tata for delivering this Sixteenth British Commonwealth Lecture.

Following the Lecture a Dinner was held at 4 Hamilton Place, London, W.1, at which the following were present:—

Captain L. R. Ambrose, Regional Director, U.K. and Europe, Qantas Empire Airways.

Dr. A. M. Ballantyne, T.D., B.Sc., Ph.D., F.R.Ae.S., Hon.F.C.A.I., F.I.A.S., Secretary, Royal Aeronautical Society; Air Commodore F. R. Banks, C.B., O.B.E., F.R.Ae.S., M.I.Mech.E., Hon.F.I.A.S., Managing Director, Blackburn Engines, Vice-President Royal Aeronautical Society; A. Barracough, Barrister-at-Law, Air Transport Course Lecturer; A. D. Baxter, M.E., F.R.Ae.S., M.I.Mech.E., Director, de Havilland

Engine Co. Ltd. (Rockets & Nuclear Power), Member of Council, Royal Aeronautical Society; Professor J. A. J. Bennett, D.Sc., Ph.D., F.R.Ae.S., Head of the Department of Aerodynamics, College of Aeronautics, Cranfield, Member of Council, Royal Aeronautical Society; E. C. Bowyer, C.B.E., Honorary Companion, Director & Chief Executive, Society of British Aircraft Constructors; Major G. P. Bulman, C.B.E., F.R.Ae.S., Honorary Treasurer of the Royal Aeronautical Society.

Dr. W. Cawood, C.B., O.B.E., M.Sc., Ph.D., F.R.Ae.S., Chief Scientist, War Office, Member of Council, Royal Aeronautical Society; Professor A. R. Collar, M.A., D.Sc., F.R.Ae.S., F.I.A.S., Department of Aeronautical Engineering, Bristol University, Vice-President, Royal Aeronautical Society; Sir George Cribb, K.B.E., C.M.G., 1950 British Commonwealth Lecturer.

M. A. S. Dalal, Regional Manager, Air-India International.

Sir George Edwards, C.B.E., B.Sc., Hon.F.R.Ae.S., Managing Director, British Aircraft Corporation, Past President, Royal Aeronautical Society.

Air Chief Marshal Sir Francis Fogarty, G.B.E., K.C.B., D.F.C., A.F.C., Chairman of the Air League of the British Empire; L. G. Frise, B.Sc., F.R.Ae.S., A.F.I.A.S., Director Special Projects, Blackburn Aircraft, Member of Council, Royal Aeronautical Society.

Sir George Gardner, K.B.E., C.B., F.R.Ae.S., Controller of Aircraft, Ministry of Aviation, Member of Council, Royal Aeronautical Society; H. H. Gardner, B.Sc., F.R.Ae.S., Technical Director, Vickers-Armstrongs (Aircraft) Ltd., Member of Council, Royal Aeronautical Society; Captain K. R. Gazder, Divisional Operations Manager (Western Division), Air-India International Corporation.

Sir Arnold Hall, M.A., F.R.S., F.R.Ae.S., Managing Director, Bristol Siddeley Engines Ltd., Director, Hawker Siddeley Group, Past President, Royal Aeronautical Society; Sir Frederick Handley Page, C.B.E., Hon.F.R.Ae.S., President of the Society 1945-1947; R. E. Hardingham, C.M.G., O.B.E., F.R.Ae.S., 1952 British Commonwealth Lecturer; Dr. G. S. Hislop, B.Sc., Ph.D., F.R.Ae.S., A.R.C.S.T., Special Director & Chief Engineer, Fairey Division of Westland Ltd., Member of Council, Royal Aeronautical Society.

Sir Frederick James, O.B.E., Managing Director, Tata Ltd., London; Air Marshal Sir Owen Jones, K.B.E., C.B., A.F.C., B.A., D.I.C., F.R.Ae.S., R.A.F. Retired, Consultant to the Air Ministry, President-Elect of the Royal Aeronautical Society.

Shaharyar M. Khan, Third Secretary to the High Commissioner for Pakistan.

Sir Hamish D. Maclaren, K.B.E., C.B., D.F.C., President of the Institution of Electrical Engineers; H. Marking, M.C., M.Inst.T., Secretary, British European Airways; P. G. Masfield, F.R.Ae.S., M.Inst.T., Hon.F.I.A.S., Immediate Past President of the Royal Aeronautical Society, Managing Director, British Executive & General Aviation Ltd.; M. B. Morgan, C.B., M.A., F.R.Ae.S., Deputy Controller of Aircraft Research & Development, Ministry of Aviation, Member of Council, Royal Aeronautical Society; Dr. E. S. Moutt, C.B.E., B.Sc., F.R.Ae.S., M.I.Mech.E., Technical Director, de Havilland Engine Co. Ltd., President of the Royal Aeronautical Society.

J. R. D. Tata, British Commonwealth Lecturer, 1960; W. Tye, O.B.E., B.Sc., F.R.Ae.S., Chief Technical Officer, Air Registration Board, Member of Council, Royal Aeronautical Society; Sir Frederick Tymms, K.C.I.E., M.C., F.R.Ae.S., Immediate Past Master of the Guild of Air Pilots and Air Navigators.

S. Wheatcroft, Economic Adviser to British European Airways, Air Transport Course Lecturer; K. G. Wilkinson, Manager, Fleet Planning Branch, British European Airways, Air Transport Course Lecturer; P. A. Wills, C.B.E., A.F.R.Ae.S., Chairman, British Gliding Association; L. A. Wingfield, M.C., D.F.C., A.R.Ae.S., Solicitor to the Royal Aeronautical Society.

INFORMATION FOR CONTRIBUTORS

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All manuscripts should be addressed to the Editor, *Current Science*, P. B No 8001, C. V. Raman Avenue, Bangalore 560 080. *Submission of an article will be held to imply that it has not been previously published and is not under consideration for publication elsewhere, and further, that if accepted, it will not be published elsewhere. Three copies of contributions of all categories are required, with a letter of transmittal giving (i) names and complete addresses of the authors and (ii) title of the contribution and the category in which it is submitted (see below).*

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Review articles (not exceeding 5000 words) are expected to survey and discuss recent developments in a field. They should be well focused and organized, and avoid a general, 'textbook' style.

Research articles (not exceeding 4000 words) should report research results of fairly major significance. They should include an abstract not exceeding 100 words, introductory paragraph(s), and brief subheads.

Research communications (not exceeding 2000 words) should contain important findings that are novel and of fairly broad interest. They should include a brief abstract and an introductory paragraph. Text should not be broken up under subheads.

Correspondence includes letters, not exceeding 500 words, that are of general interest to scientists. All letters cannot be published. **Scientific correspondence** contains technical comments, including those on articles or communications published in *Current Science* within the previous six months. Letters may be reviewed and edited.

Research news articles are intended to inform nonspecialists about recently published advances or important findings discussed at a meeting. Authors should also send a copy of the paper(s) on which the article is based. Meeting reports should avoid merely listing brief accounts of topics discussed, and must convey to readers the significance of an important advance.

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Opinion articles present views on issues related to science and scientific activity. **Commentary** articles should contain expository notes on issues related to science and scientific activity.

Historical notes inform readers about interesting aspects of personalities or institutions of science or about watershed events in the history/development of science; most are expected to relate to India. *Illustrations are welcome. Brief items will also be considered.*

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References should be numbered in the order in which they appear, first through the text and then through table and figure legends. The following are examples of ways of writing references:

1. Mukundan, T. and Kishore, K., *Curr Sci.*, 1991, **60**, 355–362.
2. Constantine, G., in *Biology of Bats* (ed. Wimsatt, W. A.), Academic Press, New York, 1970, vol. 1, pp. 319–322.

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