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Promotion of Aeronautics by State Regulatory Bodies

Albert Langeluttig

Leo Freedman

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The promotion of adequate transportation facilities has always been a function of both federal and state governments in the United States. One of the powers granted to Congress was to establish post offices and post roads. Congress, the state legislatures, and the local governments, in the past have all contributed greatly to the development of inland waterways, railroads, and highways. The development of aircraft as a safe and useful means of transporting both persons and property has already called forth some assistance from the various governmental agencies. It is the purpose of this article to detail the nature of the state assistance and to indicate wherein the aid must be improved if society is to realize the highest use of this new and swift means of transportation.

Just as the merchant marine, the railroad and the automobile have become established only by the encouragement of government, so must aviation in part depend upon it and assert a claim upon its consideration. The use of the automobile was definitely limited until the period of hard surfaced roads began; so, also, will the airplane be of little value until an adequate system of airways and

*This is the second of a series of articles on the administrative control of aeronautics in the United States. The first article, written by Mr. Langeluttig, "Standards in Aviation Legislation," appeared in the January, 1933, issue of the JOURNAL OF AIR LAW. The writers desire to express their grateful appreciation for the invaluable assistance rendered by the various existing state commissions, particularly for the very complete responses given to the questionnaire sent out by the AIR LAW INSTITUTE in an effort to gather full information relative to current practices.

†Mr. Langeluttig is Lecturer on Administrative Law in Northwestern University School of Law, and Member of the Chicago Bar. Mr. Leo Freedman is a graduate of Northwestern University School of Law, who, during his third year of study, has been engaged in an individual study of the problems dealt with in this article, in conjunction with the AIR LAW INSTITUTE.

1. Art. 1, Sec. 8.
airports is provided. As private initiative failed to provide the automobile roads, so, also, will it be unable to provide the necessary airways and airports to serve the aviation industry.

As stated, the purpose of this article is to consider the aid given by state governments, but it will be necessary to first outline the activities of the federal department so that it will be clear what functions have been left to the individual states and in what ways they may be of help.

I. Federal Encouragement

(a) Mail Contracts:

In the establishment of post offices and post roads, the federal government has regularly used its postal funds as an encouragement to the merchant marine and railroads by profitable mail contracts. It has, likewise, in the interest of aviation, established a special air mail service and now offers to the various air carriers fairly lucrative transportation contracts. To date, this has probably been the most helpful means of encouraging the development of scheduled air transport and, just as the merchant marine is a feeder in time of war, so commercial flying may become a feeder for the needs of military aviation. The subject of encouragement through mail contracts is too technical and involved for more than passing mention in this article.

(b) Airways and Navigational Aids:

Mail contracts, however, do not exhaust federal aid necessary to a successful merchant marine, for lighthouses, harbors, and coast and geodetic surveys are essential. Similar aids must also be supplied for aviation. Airways, airports, emergency landing fields, weather reports, beacons, etc., must be provided. Accordingly, the federal government has assisted materially in the establishment of the great trunk airways and landing fields with their auxiliary navigational aids. This direct assistance has been furnished through the office of the Assistance Secretary of Commerce for Aeronautics.

The value of these aids to flying, and particularly night flying, can not be overestimated. As a pilot leaves an airport at night, his route is identified by flashes of light from federally constructed and maintained beacons located at ten to fifteen mile intervals. At the present time, there are some 1623 of these beacons throughout the United States.2 As the main beam of light revolves out of the

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2. C. M. Young, "The Federal Airways System," 22 Aero Dig. 20 (Mar. 1933): beacon lights are classified as: (1) airway beacons which may be
PROMOTION OF AERONAUTICS

To facilitate a night landing, beacons are provided at federal intermediate landing fields. These fields are usually located about thirty to fifty miles apart and each is outlined with boundary lights to facilitate a night landing. Obstructions are marked by red lights and the best line of approach is indicated by green lights. About 352 intermediate fields have already been provided.

More dramatic aid is given when the night is foggy and the beacon lights are not visible. To provide for such circumstances, radio facilities have been developed and are maintained to assist the pilot in keeping on his course. These radio range beacons are operated on 150 miles circuits and use is made of either visual or aural systems. The visual range beacon, by means of a vibrating reed located on the plane’s instrument board, establishes the true course without the necessity of any land mark identification by the pilot or navigator. The aural range beacon achieves the same result through the aid of sound. In the latter case, a radio wave is transmitted and, if the plane is flying along the airway, a long dash will predominate in the pilot’s earphones. The moment the plane drifts from the course, a characteristic sound will be heard indicating whether to turn right or left to regain the course. At regular intervals, the long dashes will be interrupted by radio signals which tell the station over which the plane is passing.8

In addition to beacons and radio aids, the pilot must have available all the latest data concerning weather conditions in the vicinity of his flight. This information, supplied by the Weather Bureau, is broadcast through the Aeronautics Branch Radio Communication Stations in the form of airway weather reports. These reports indicate the ceiling above the airport upon which a landing is intended, condition of the airport landing surfaces, conditions of visibility, velocity and direction of the wind at various altitudes, temperature, barometric reading, etc. The broadcasts are made hourly, and are arranged in groups of three along the same frequency—two from the terminals and one from some intermediate

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8 There are 106 Department of Commerce Radio communication and range stations, including 20 under construction; there are 85 intermediate airway radio stations (which may act as marker beacons on request), including 18 under construction and 20 stations operating as miniature type radio range beacons: Airway Bulletin No. 1, pp. 89-93 (Sept., 1932).
field. The last broadcast, from the intermediate field, occurs a few minutes before or after terminal broadcast so that if the pilot misses one he may still obtain the weather report from the next emission. This information is collected by teletypewriter stations along the airways and at points 200 miles to the right and left of the airways.\(^4\) In addition, the teletypewriter circuits have been developed to enable the transmission of weather maps.\(^5\)

The pilot may thus continue along his airway and receive guidance by a force that is released many miles from the plane itself. At various points the pilot may communicate with the airport manager if the plane is equipped with a two-way radio. Through the use of these radio range beacons and as a result of the research conducted by the Aeronautics Branch it is already possible to guide planes to a safe blind landing. This type of landing is necessary when a heavy fog envelops an airport. The federal department has realized the value of radio and has not awaited the inventive genius of others but has, itself, encouraged and discovered radio aids to facilitate aerial navigation.

The foregoing statement represents a part of the development of aviation, through physical aids to navigation, accomplished by the federal department. Before an airway has been established, it is necessary to make a preliminary survey from the air to determine the natural aids and hazards. Then a ground survey is made to locate intermediate fields and beacon sites. Location costs, drainage and lighting facilities are all considered before the leases are finally negotiated.\(^6\) Extreme and novel difficulties have been surmounted by the Department and the 19,500 miles of lighted and equipped airways is a tribute to its valuable service.\(^7\) The organization of the Airways Division and the allotment of its duties is presented in Chart No. 1.

(c) **Educational Services:**

The establishment of interstate airways constitutes the present material facilities furnished by the federal government as part of

\(^4\) Relative to weather service, there are 260 stations reporting weather data hourly (connected by teletypewriter circuits), 310 weather bureau airway stations equipped with teletypewriter service, 68 weather bureau airport stations (located along federal airways), 14 airport stations making three-hour reports of conditions in their areas (transmitted over teletypewriter circuits and commercial telegraph wires), 71 stations with pilot balloon service (to determine direction and velocity of wind for aviation), 46 centers preparing three-hour summaries and maps, 1 upper air station in North Dakota.

\(^5\) There are at present 13,500 miles of teletypewriter service: Airway Bulletin No. 1, pp. 128-132 (Sept. 1932); C. M. Young, supra note 2.


\(^7\) 32 Aviation 87 (1933).
its program to encourage aeronautics. In addition, various sections are maintained to distribute the data obtained through its research to the industry and to the public. The promotional activities, the conduct of the research work, and the dissemination of information has been assigned to the Aeronautic Development Service. The organization of that department is also illustrated in Chart No. 1.

The Editorial Section publishes the Air Commerce Bulletin which is a valuable contribution to the history of aeronautics in the United States. Furthermore, surveys are constantly being made to facilitate the printing of accurate air maps and these are issued at present either as sectional or strip maps.

(d) Accident Reports:

The Air Commerce Act provides for the investigation and reporting of all accidents. This service is essential as a means of encouraging civil aviation. Uniform analysis is maintained in order to arrive at comparative figures that will permit intelligent analysis. It is hoped that these investigations will facilitate the drafting of regulations to assist in the prevention of a recurrence of such accidents. The Department does not attempt to place the blame in any accident but conducts the investigation solely for its possible preventive effects. The investigations are handled by an accident board composed of two or more competent pilots, an aeronautic engineer, a flight surgeon, a lawyer, and a statistician.

**Limitations Upon Federal Encouragement:**

The Air Commerce Act authorizes the Secretary of Commerce "to designate and establish civil airways, and . . . to establish, operate, and maintain along such airways all necessary navigation facilities, except airports." The first limitation pertains to the authority to establish civil airways which means, by definition, those routes "suitable for interstate or foreign air commerce." Whatever the reason for the limitation, it is clear that if intrastate air-

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<tr>
<th>Period</th>
<th>Miles Flown</th>
<th>No. of Accidents</th>
<th>Accident Per Miles</th>
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<tr>
<td>Jan.-June, 1928</td>
<td>4,484,612</td>
<td>35</td>
<td>1 — 125,132</td>
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<tr>
<td>July-Dec., 1928</td>
<td>6,188,938</td>
<td>61</td>
<td>1 — 121,350</td>
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<tr>
<td>July-Dec., 1931</td>
<td>27,196,062</td>
<td>66</td>
<td>1 — 418,386</td>
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<tr>
<td>Jan.-June, 1932</td>
<td>24,628,414</td>
<td>67</td>
<td>1 — 368,185</td>
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<tr>
<td>July-Dec., 1932</td>
<td>26,584,663</td>
<td>48</td>
<td>1 — 547,178</td>
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10. 44 Stat. L. 568, Sec. 5-b. Italics ours.
ways (a most important feature of private flying) are to be established, they must be provided by state or local government, or by private initiative.

The second limitation concerns airports. While the provision of airports is a necessary part of interstate air commerce development, it is apparent that federal encouragement is not to extend that far. The government does aid in the provision of the intermediate fields located along the main airways, for safety purposes. Regular commercial use of these fields is prohibited by the Act and this has called forth some criticism.

There are other limitations that are not statutory. Despite a far-reaching program of encouragement that has been planned, budgetary necessities have caused a serious curtailment in appropriation and there may not be sufficient funds even for adequate maintenance. This cut may also affect the Weather Bureau and leave a very important service to be maintained by the States, if it is to meet the needs of aviation.

II. TYPES AND METHODS OF STATE ENCOURAGEMENT.

(a) In General:

"Private or intrastate flying will appear as a major factor in social and business life when . . . and only when . . . the several states recognize their opportunities and responsibilities . . . ." The state must supplement both the federal and local activity in relation to the promotion of aeronautics.

The main constitutional objection standing in the way of the expenditure of state funds to promote a particular industry is that such moneys, collected as taxes, are being used for a private purpose. Most state constitutions expressly provide that appropriations should only be made for a public purpose. The contention that money as used is not for a public purpose has adequately been answered by precedent. The Report of the Standing Committee on Aeronautical Law of the American Bar Association, in commenting upon Section 2 of the proposed Uniform Aeronautics Code, states: "We conceive it to be within the power of the state government to foster an industry so promising of convenience and prosperity to its population, just as a state may encourage agri-

11. C. M. Young, supra note 2.
16. See, for example, Constitution of Illinois, Art. IV, Sec. 16.
culture, stock raising, egg production, game and fish propagation.”
To this may be added the state encouragement of the automobile
industry and of navigation by the establishment of harbor facilities.

The courts have generally upheld the public character of pro-
motional work of state commissions when that question was urged.
In *Brooks & Taylor v. Tripp*, it was held that an act to protect
and promote the shellfish industry was within the police power.
Similar results have been reached in the cases of *Westlake v. Anderson*, *Portland Fish Co. v. Benson*, and *State v. Robinson*.

The promotion of aviation likewise serves a most essential pub-
lic purpose. In a letter to the county Boards of Supervisors, the
Michigan Department of Aeronautics writes:

“We feel that the increased use of the airplane should be encouraged
in the State of Michigan for two particular reasons. The first is our
manufacturing possibilities; just as our State now leads in the production
of motor cars and accessories, so will our state lead the world in the
production of airplanes, motors and accessories. The second reason for
encouraging the use of this fast transportation medium is for the purpose
of bringing tourists and sportsmen in greater number into our now out-
standing northern playgrounds. As new manufacturing industries locate
in our state and prosper, as our resort areas increase their business, as
more and more of northern tax delinquent lands are put to useful purposes
so will our state as a whole prosper.”

Michigan has thus expressed the advantage of aeronautic en-
couragement in that state with two specific and convincing reasons.
Chart No. 2 illustrates the states that have provided promotional
work.

(b) **Airports and Landing Fields:**

(1) **State Aid Through Construction and Maintenance**—
There are nineteen states which have a total of forty or more air-
ports or landing fields and ten states that have over fifty such
facilities. These figures include federal fields, military fields,
and the federal intermediate fields which are open to civil aircraft
only in time of emergency. Not more than nine states have more

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17. 125 N. C. 190, 47 S. E. 401 (1904).
18. 53 N. D. 326, 156 N. W. 925 (1916—the promotion of diversified
farming).
19. 56 Ore. 147, 108 Pac. 122 (1910—promotion of salmon industry).
20. 35 Neb. 401, 53 N. W. 213 (1892—promotion of agriculture through
Agriculture Society).
22. Arizona, California, Florida, Georgia, Idaho, Illinois, Indiana, Kansas,
Massachusetts, Michigan, Montana, New York, Ohio, Oklahoma, Oregon, Penn-
sylvania, Texas, Washington, and Wisconsin.
23. California, Florida, Illinois, Michigan, New York, Ohio, Oklahoma,
Pennsylvania, Texas, and Wisconsin.
## Chart No. 2

**STATUTORY AUTHORIZATION OF PROMOTIONAL FUNCTIONS OF STATE REGULATORY BODIES**

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<td>Bulletin of airports and airways</td>
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<td>Study aviation conditions for purpose of recommendation</td>
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1. Financial aid to municipal airports.  
2. Special enabling act.
than forty municipal and commercial airports, so it is quite obvious that there have not been adequate airport facilities provided to meet the present needs of aircraft operations. This definite lack of airport facilities in the hundreds of medium and small cities contributes materially to the decrease of private flying, despite a definite increase in commercial air travel—where the facilities have been provided. Even more serious, is the neglect of the many small airports that have already been constructed.

The problem of airport construction and maintenance—particularly the problem of securing the assistance of other agencies in the construction and maintenance—is becoming more distinctly a state problem. In the United States, there are not over thirty-five state owned airports. It has been held that the establishment of an airport by a municipality serves a public purpose and that it is therefore within the sphere of governmental aid. By a parity of reasoning, a state could—through its aeronautics commission or similar regulatory body—supervise and aid in the establishment of airports and landing fields.

The present economic stringency has hampered all promotional activity of this character—especially governmental activity. However, large sums are not required to provide the necessary facilities. The airlines are quite well provided with airport facilities along their routes, but what is seriously needed is more landing fields and airports at the smaller communities, both for reasons of safety in general flying and to serve as feeders to the main lines. One writer suggests the provision of landing fields (50 acre average) at an annual rental of from $2.50 to $3.00 an acre with an initial outlay of $500 to condition the field and $100 annually to maintain it. Another writer has estimated the cost of federal intermediate fields at $4.71 an acre for leasing a field (47 acre average) and about $5,000 to provide night lighting. The State of Michigan expended $30,000 on twenty-six fields and many of the fields in that state have been constructed with an initial cost of not more than $400. The New Jersey commission, in its annual report, makes the following statement:

25. B. D. de Weese, "Local Airport Problem," 21 Aero Dig. 41 (July 1932).
26. "Neglect of Small Airports" (editorial), 21 Aero Dig. 35 (July 1932).
27. 4 Air Commerce Bull. 399 (1932). State owned airports estimated at 19.
28. H. J. Freeman, "Establishment of Airports as a 'Public Purpose,'" 1 Air Law Rev. 139.
"One of the obstacles encountered in a field program is the impression that development of a community airport necessitates the outlay of large sums of money. As a matter of fact, development of a field adequate to serve the needs of a community for daylight operation can be very inexpensive. The boundary marking of a fairly level field of doubtful agricultural importance, placing of a cross in the center, removal of a few trees or bushes on the edges of the field, are all that are essential. For the expenditure of a hundred dollars almost any town can have an airport adequate to serve its needs for pleasure and for the carrying on of an occasional passenger service."81

There has been a variety of opinion as to what private or governmental agency should supply the necessary airport and landing field facilities. At present, there are (1) private and commercial airports and fields; (2) municipal airports; (3) a few state airports and fields, and (4) federal intermediate and auxiliary fields—which are not available to civil aircraft unless in time of emergency. Because of the failure of any one of these agencies to establish and maintain a sufficient number of ports and fields, various combinations of agencies have been advocated. Many have called for some form of federal aid. The proponents liken this assistance to the present federal policy of subsidizing state highway construction. In Florida, for instance, the Tampa Aero Club requested that part of a $3,250,000 road fund be used in the construction of emergency landing fields. The claim was that since the state appropriates $25,000 a year for fields, the federal government should provide a like amount. The same general idea has been expressed by others in close contact with aeronautical needs and conditions.82 Others have advocated some form of state cooperation or assistance. Thus, the Pennsylvania officials thought it prudent to have the state buy the land and have the municipalities or other governmental subdivisions manage the port.38 Such a plan has many good features. The community requirements are looked after by local officials while the state authorities can develop a general scheme for the location of airports and landing fields and may impose adequate regulations to insure the meeting of minimum standards. A variation of this financial program would be to have the local governmental body donate the land and allow the state regulatory body to construct and maintain the port or field. Such a method would permit the state commission to

initiate its policies directly. Essentially, a uniform organization of these facilities is necessary and whether this can be achieved better by regulations and supervision or by direct maintenance is a matter of conjecture at present.

With the state regulatory body supervising these construction projects, the country would be assured of fields which would be equitably placed and which would be of uniform design. There is also the probability that the commission, as one member of the state's society of administrative boards, would be able to coordinate the machinery of many state departments and thereby realize some economies. For example, the County Road Commission of Michigan has agreed to do work in the construction of an airport without an equipment rental charge. Other departments in that state, such as the Department of Public Works, State Highway Department, and Conservation Department, can and do cooperate with the Aeronautics Board. A movement that is now being stimulated by the Michigan Board of Aeronautics is the use of unemployed welfare labor through cooperation with the State Welfare Department, to engage in the actual development of new fields and to improve the condition of the fields which have already been established.

Comparatively few states have actually established or now maintain airports or landing fields. In some instances, state legislatures by special act have appropriated money for a state airport. Connecticut and Rhode Island\textsuperscript{34} have splendid state airports and Louisiana is now developing the Shushan Airport.\textsuperscript{35} Other states have carried on a more constant program in the establishment of these airports. Tennessee has twelve airports classified as "Municipal" with state aid.\textsuperscript{36} Florida has made an appropriation of $20,000 for ten fields and contemplates a state sponsored airport at West Palm Beach. Virginia has made an appropriation of $25,000 for airports.\textsuperscript{37} In the State of Idaho, the Aeronautics Division of the Department of Public Works has established five state auxiliary fields.\textsuperscript{38} Michigan has shown the most progress so far as the establishment of state fields is concerned. At present, in that state, there are seventeen completed landing fields, four are now under construction, and five fields will soon be started.\textsuperscript{39}

\textsuperscript{34.} "Rhode Island State Airport," 19 Aero Dig. 41 (Nov., 1931).
\textsuperscript{35.} 20 Aero Dig. 44 (Jan., 1932).
\textsuperscript{36.} Bulletin, Department of Highways and Public Works, Division of Aeronautics, Tennessee, 1932.
\textsuperscript{37.} Definite data concerning the activities of the last two states has not been received.
\textsuperscript{38.} Letter from Mr. A. C. Blomgren.
\textsuperscript{39.} Monthly Bulletin, issued by State Board of Aeronautics, No. 18, Feb., 1932.
To date, the cost of these fields has been approximately $30,000; the statute expressly limits the amount of money that can be spent in any one county to $15,000.40

Michigan seems to be the only state which assists private airports, and then only to the extent of marking them. In case of municipal and county airports, the Michigan Board of Aeronautics has contributed $60 per month to each port to help carry the burden of the lighting costs, and have also assisted in the marking of the ports. The cost to the Board of airport lighting for the past year was $5,760 and $1,200 for airport marking. This assistance has been rendered despite serious statutory limitation for, according to the act which created the gas tax and so furnished the revenue, money collected is to be spent only upon landing fields and airports completely controlled by the state.41

In Idaho, the state has aided thirteen airports and landing fields. This includes the grading and surfacing of a municipal airport (Burley), the sand-surfacing of runways (Boise), winter maintenance, like the rolling of snow—in cooperation with the Highway Department (McCall, Cascade, Warren, DuBois and Idaho Falls), the lighting of a port (Nampa), construction of an administration building (Pocatello), and participation in the erection of hangars. The total cost of this work was $14,500.42 In Virginia, financial assistance has been given to municipal airports through the Highway Department.

(2) Cooperation of State Commissions by Encouragement of Airport Establishment—The development of an airport involves many technical, as well as practical, problems. These include the selection of a proper site relative to accessibility and area, weather information, scientific grading and drainage, preparation of runways, landscaping, illuminating for night flying, radio installation, and the construction of buildings.43 The information concerning

40. Michigan, Public Acts 1931, No. 160, approved May 27, 1931, Sec. 4: "Upon recommendation of the Michigan Board of Aeronautics or the Department of Public Safety, the State Administrative Board is hereby authorized to acquire, own, control, lease, equip, improve, operate and regulate landing fields for the use of aircraft as may be deemed necessary and advisable for use by the Department of Public Safety, the Department of Conservation, the Michigan Board of Aeronautics and the several police officers of this State. Said board is hereby authorized to establish landing fields for aircraft for such purposes upon any land owned or leased by the State of Michigan: Provided, however, That there shall not be expended to exceed $15,000 in any one county for such purposes and no money shall be expended except such as may be in the aeronautics fund hereby created. Such expenditures shall be authorized by the State Administrative Board upon plans and specifications approved by the Michigan Board of Aeronautics." See 1931 U. S. Av. R. 381.

41. Ibid.

42. Report of the Department of Public Works, Aeronautics Division (1932).

these factors can best be obtained from some central, well-qualified source.

The state regulatory body should conduct studies to determine at what points landing fields could be located most advantageously. This would include a consideration of available local commerce, the development of a system of intrastate airways, the proper spacing between fields to avoid unnecessary duplication, the avoidance of dangerous local air traffic conditions, and the ultimate establishment of a system of emergency landing fields throughout the state. Connecticut, Idaho, Illinois, Michigan, New Jersey and Ohio have already made such studies and are in position to advise as to desirable sites. In Massachusetts, the Highway Department aids in the airport surveys. The supplying of expert information relative to the proper maintenance of an airport has also been part of the commission’s program in both Connecticut and Idaho.44

The state body should also stress local cooperation as the ultimate solution of aeronautical advancement, and in furtherance of that purpose could supply information to communities so as to feature the advantages of landing fields. The Illinois Aeronautics Commission has illustrated what can be done, in this connection, despite a limited budget. The commission first conducted a survey of the state for state-owned land or fair grounds which might be available for airport purposes. The next step was to interest the county commissioners and municipalities in the possibilities of aviation’s development and services. Nine new projects were given state assistance by means of addresses and articles to arouse enthusiasm and assist in the money raising campaigns. The commission also conducted an aerial survey of the entire state in order to suggest possible sites and has, on occasion, made detailed ground surveys for communities which were about to establish an airport.

The Michigan Board of Aeronautics has repeatedly shown originality and thoroughness in its airport program and has recently inaugurated a plan of bringing pressure to bear upon county organizations to set up a county aviation commission or to delegate to some existing county organization the responsibility for aeronautical progress in that community. At present, thirty-two of these county aviation committees have been appointed.45

(3) The Idaho and Michigan Procedure in Regard to Airport Development—Idaho and Michigan are the only states where aero-

44. P. Becker, “Connecticut—An Aviation Leader,” 18 Aero Dig. 46 (June, 1932).
45. Monthly Bulletin, supra Note 39, p. 3.
nautical authorities have undertaken anything approaching a complete program of promotion. As an indication of methods which may be emulated and improved upon when other commissions are adequately empowered and financed, the activities of these states are here described.

In Idaho, the aeronautic interests of the state are cared for by the Aeronautics Division of the Department of Public Works. To the Airways Engineer of the Department is delegated the duty and responsibility of establishing the landing fields. Three methods of promotion have been adopted by the Division, as follows: (1) the state itself has established a number of fields; (2) the state body has cooperated with counties, cities or towns in their construction programs, and (3) the Engineer has inspected proposed sites, for private operators, and has recommended possible sites, condition of the fields before any improvements have been made and estimated costs of necessary improvements. According to the Idaho law, no airport or landing field may be used until the proper state officer has issued a permit or license therefor. Hence, when an airport or landing field is contemplated, a letter is sent by the individual or group interested to the state officer who makes a careful investigation and report.

In the selection of a site, a preliminary ground survey is always made—including a layout plan showing the location of all obstructions, runways and hangars. When it becomes necessary to make an engineering survey (when the land selected requires elaborate grading and development work), the highway engineers are asked to assist. Such a survey consists of a topographical map together with any other data required for a comprehensive report and cost estimate. The state plane is used occasionally to demonstrate the safety of the site and the absence of dangerous air currents. Aerial pictures may be taken when several sites are being considered. In any case, the choice of locations is influenced primarily by the traffic needs and weather conditions. The first state constructed field was developed to provide a landing field on the federal airway and yet out of the fog belt which occasionally enveloped the Boise airport, the customary terminal.

The state airways are laid out along the best topograph areas available. Their establishment was the result of a very careful air survey, supplemented by photographs, weather reports, notes on air conditions, and a thorough ground survey. When a community desires to avail itself of the benefits of air transportation and

46. Idaho L. 1929, Ch. 137, Sec. 2(h). See 1929 U. S. Av. R. 493.
wishes to establish an airport or landing field, the first question is concerned with the need for such a facility. If not needed, the project is officially discouraged. If needed, the second question concerns the willingness on the part of the community to finance the port. A satisfactory disposition of these two questions leads to the active assistance of the state body. The equipment and personnel of the highway forces is drawn upon for maintenance purposes. For fields owned and maintained by the state, the annual cost of maintenance has averaged about $100. The state does not provide for any personnel in the form of a manager or supervisor at any landing field or airport.

In Michigan, the promotion of aeronautics is carried on by the State Board of Aeronautics which consists of the Highway Commissioners, the Commissioner of Public Safety and five members appointed by the Governor to serve without pay. An "aeronautic fund" is maintained by the State Administrative Board, which fund includes all income from aviation. When the Board contemplates an improvement, it recommends to the Administrative Board that funds be released for a specific purpose. The manner of utilizing the money is within the sole discretion of the Board of Aeronautics.

The Director is made responsible for the establishment of landing fields. Once more, the desirability of landing facilities is ascertained by aerial surveys conducted by the state plane. To date, aerial photographs of existing and proposed airports have cost the state $2,100. The establishment of fields has been undertaken (1) to meet definite traffic needs; (2) to take advantage of community cooperation with finances; (3) to reduce navigational hazards, and (4) to increase the use of private planes by providing landing facilities in the hunting and resort area. Of the fields now completely constructed, the land for six was purchased, five were leased, and six were located on state, county or city land. The costs range from $100 to $2,500. These fields are maintained with the cooperation of the State and County Highway Departments and the Conservation Department. Annual maintenance for a typical field has been estimated at $25. The Director or an Inspector regularly inspects the fields in the interest of safety.

The Board has furnished aid to privately or municipally owned airports by means of addresses, selection of sites, and expert advice as to construction and finance. As previously indicated, this assistance has also included the marking and lighting of these airports. The lighting equipment has been leased and the marking is
recommended, then materials are purchased by the Board and welfare labor is secured at the airport proprietor's expense. In any case, the marking is done under the general supervision of the Board. One of the reasons justifying this action is that of a furtherance of the public safety.

(c) Airways:

Airways are as necessary for flying as highways are for motoring. The most desirable airways should be equipped with beacons for night flying, with radio aids and an adequate weather service. The federal government, as indicated, has done much for the interstate trunk airways but appropriation cuts have necessitated a premature cessation or curtailment of its valuable activities. The states must continue the growth that has been so carefully started. Intrastate airways remain exclusively a problem for the states to handle.47

The laying out and maintenance of airways is solely a governmental function. Precedent for such activity may readily be found in the construction of highways. In former times, it was the custom of each village to develop and maintain the public roads by means of labor supplied by the villagers. It was even considered a criminal offense to fail to work on the public roads.48 As the use of the roads increased, complicated machinery became necessary and expert surveys were needed to insure a wise expenditure of money and to prevent unnecessary duplication of facilities. The federal government, under the Federal Highway Act, has given much aid to the building of state highways and this aid has induced the states to enter into gigantic construction programs.49 As airway planning and development is perhaps an even more technical matter, it is quite necessary that the promotional program be conducted by state governmental experts.

Few states, however, have given much assistance to the provision of air navigation facilities. In Idaho, the selection of logical flying routes across the state and their development has been a major activity of the Aeronautics Division of the Department of Public Works. Flying conditions, existing or projected ground facilities, terrain traversed and probable traffic requirements are all considered. At present, there are twelve designated airways in Idaho comprising a total of 2,228 miles—1,793 miles of which

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47. G. K. Berry, "Subsidizing the Short Feeder Line," 31 Aviation 253 (1932).
are state airways. These airways are classified as follows: (a) federal airways (lighted)—435 miles; (b) interstate connections—542 miles; (c) state airways connecting federal airways—1,011 miles, and (d) state airways feeding federal airways—240 miles. Lack of funds has prevented the placement of lighting facilities along these airways.

Michigan has likewise engaged in the development of a system of state airways. In 1932, the State Board of Aeronautics was operating eleven beacons at an expense of $2,600. Part have been discontinued, and now only six remain. Connecticut operates a single beacon at the state airport with an annual operating expense of $1,500.

(d) Air Maps:

One of the most useful aids which may be furnished by the state regulatory and promotional bodies is the preparation and distribution of accurate state air maps. These maps would show, in addition to the usual data, the federal and state airways, all airports, landing fields and emergency fields, beacons, etc. Several of the states have already undertaken this task and the maps which have been provided are most useful. In this regard, the efforts of Florida, Idaho, Michigan and Tennessee must be mentioned.

(e) Weather Service:

There is a very definite need for a state weather service to supplement the federal service, but only two states have as yet established such services. They are New York and Michigan. In 1930, New York had 23 stations which were serving the whole state in conjunction with the federal service. Observations were made at 8:00 A.M. and 12:00 noon and the data sent to the central office at Albany and there charted and distributed quickly by means of radio and telegraph.

Michigan has six weather observation stations which, in 1932, cost the state $2,400. This service is carried on as in New York, in cooperation with the U. S. Weather Bureau. The service rendered consists solely of the making of observations. Forecasting, by reason of the specialized knowledge required, is left solely to the federal meteorological experts. The information collected is disseminated by relaying it to the federal radio station at Jackson. The Michigan Board of Aeronautics is attempting to facilitate the dissemination of weather information by getting the cooperation
of the State Police Department and the use of its radio. It will then be able to forward information to persons who intend to fly over a certain route about thirty minutes prior to departure. The Board has, in addition, established two stations which conduct experiments for accurate "ceiling" observations.

In Illinois, local operators were offered assistance in obtaining weather information when the commission established a communication system for its dissemination. Four stations were authorized to supply weather information by means of "collect" phone calls. The service to date has involved an expenditure of only $103. The commission has also attempted to make use of the police teletypewriter system which consists of fourteen stations throughout the state. The aim is to have the state highway police report local weather conditions—visibility, etc. These reports would then be transmitted to the fourteen stations and so be available to persons starting a flight from almost any part of the state. The major obstacle to such a scheme is a legal one, since the police teletypewriter apparatus may, by statute, be used only for police work. A bill has been introduced, in 1933, to empower the highway police to cooperate in this manner.51

A state weather observation and reporting system would serve the following purposes: (1) information would be disseminated along intrastate airways (the federal bureau only covers interstate airways); (2) an analysis of local conditions and the marking of "bad spots" would be facilitated; (3) with an intensive reporting system, transport planes and others could be routed so as to avoid bad weather; (4) upper air experiments could be made with the aid of the state plane (kites and captive balloons which are now used are expensive and not very efficient, since they can only reach a limited height and can be used only during fair weather), (5) the data collected would aid scientific research and make possible more accurate future forecasts, and (6) teletypewriter circuits could be installed to increase the speed in distribution of weather information and so make it more valuable.

(f) Air Marking:

(1) Directional and Locational Air Markings—This type of marker has been provided or promoted by many of the state bodies. A frequent type of directional marker is to be found along the highways of the state, and another usual form is the municipality marker. There is a general tendency toward uniformity in fol-

lowing the federal air marking guide set forth in Aeronautics Bulletin No. 4. The state commissions in Connecticut, Idaho, Michigan, Ohio, Oregon and Vermont have directly shouldered part of the cost of this marking.

In Michigan, a very extensive propaganda is being engineered to have every town properly air-marked. The Board furnishes the paint provided that the local community will supply the labor. The Board also makes the preliminary aerial survey to determine the most useful location and then approves the marker after it has been completed. This service has cost approximately $1,150 to date. The labor is usually supplied by the local American Legion Post, a welfare department, or by one of the service clubs of the community. Over forty cities or towns have thus far been so marked and it is estimated that about 200 towns will be marked by the end of the present summer. During the past year, the Board repainted six highway markers, originally established by the service clubs, at an expense of $100.

In Idaho, the air marking program has required $500. The state body has encouraged the establishment of the markings and has rendered financial aid when necessary. The cost of the markers has been borne by the municipality, some civic organization, or by the state. At present, thirty-five out of one hundred fifty towns of over 500 population have been air marked. The Idaho department has also established two directional markers on the highway as an experiment to determine the cost of construction and maintenance and the value to pilots. It was found that the highway marking cost about $45 per marker and that it required painting about twice a year—making a yearly maintenance cost of $70. The State of Connecticut has expended $1,239 on the construction of air markings.

Several commissions have been able to obtain results by cooperation with other departments, and this should be an essential feature of every aviation commission's work. In New Jersey, the Highway Department installs highway marking for the commission

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62. The federal government, while not establishing such airmarkings except in conjunction with intermediate landing fields, has done a lot to encourage uniformity of airmarking. A special research study was made to determine the most advantageous types and sizes of markings and to determine what colors of paints would fulfill at least minimum requirements of aerial navigation. States have accepted this federal guidance, even as they have always looked to the Aeronautical Branch for the formation of essential policies. The Department has included in its publications descriptions of types of airmarkings, generally found in use, as follows: (1) roof markings, (2) airport markings, (3) intermediate field markings and auxiliary field markings, (4) highway markings, and (5) markings for those airports which require an enclosure of the field to the right instead of the left before landing. The ordinary airmarking should include the name of the city or town, the meridian marker, and an airport pointer and the mileage thereof, with the type of landing facility.
and requires only the minimum reimbursements. Massachusetts has had fifteen state hospitals marked by the Department of Mental Diseases. In California, air marking is handled by the local Chamber of Commerce. In Illinois, the state Chamber of Commerce, through its Aviation Committee, has been conducting a thorough campaign for air marking. The chairman of that committee is a member of the Illinois Aeronautics Commission so there is complete cooperation between the state body and the Chamber of Commerce. The state chamber again carries out its program through the efforts of the local chambers. In Michigan, the garages of the State Highway Department and all county garages have been air marked.

Ohio, at present, is the most completely air marked state in the country and has 75% of its municipalities marked. The Ohio laws require that every incorporated city or town in the state shall be air marked. This program has been furthered by the Director of Aeronautics who has obtained the full cooperation of the various state departments and public institutions. The Highway Department constructed one hundred forty markers on the highways. The State Department of Education, Department of Public Works, Department of Public Welfare, and State Adjutant General's Department have all supported air marking by the installation of markers on the roofs of their buildings. The state has also had the assistance of large commercial firms and local civic organizations.

Every state body should attempt to arouse local interest in proper air marking, and this can be achieved as a result of personal letters, articles appearing in newspapers, addresses, and interviews—as has been done in Connecticut, Illinois, Virginia, Kentucky, and New Jersey.

(2) Marking or Removal of Hazards—The elimination of hazards to aviation, either by proper markers or by the removal of the obstacles is in furtherance of safety. An ideal program would result in the removal of all hazards. The state has been permitted to destroy property when it has been found to be a public nuisance. The obstacles to be found near airports and along the airways are of numerous types. Many are in the form of water towers, chimneys, tall trees, radio towers, high tension

54. 26 Aviation 1445.
lines, etc. These can hardly be classes as nuisances. If the ob-

stacles are to be removed, the procedure of eminent domain must

be resorted to and reasonable compensation must be made. But,

many times, all that is required is an interview with the owner of

the property in question. The success of such an approach de-

pends in large part upon the nature of the obstacle and its cost.

As yet, no state body has conducted a definite program look-

ing toward the removal of hazards. Idaho, Michigan and Vermont

representatives have made friendly appeals to the owners, in the

interests of the safety of aviation.

If the hazards cannot be removed, they should at least be

adequately marked. The state commission should either compel

the marking, or should do the marking itself. In Illinois, an ex-

periment was conducted as to the possible use of neon markers

placed on high tension lines, and it was found that the markers

can be installed and maintained at a very low cost.

(g) Educational Program:

A progressive educational program does not require extensive

financial support and yet upon its success rests the ultimate use of

all the aviation services. Whatever will increase the use of those

services is of benefit to the growth of the industry. In State ex

rel. Hall County Farm Bureau et al. v. Miller et al., the expendi-

ture of public funds for research as to the scientific methods of

farming and the dissemination of results was held to be for a

public purpose. A like result was reached in Owen et al. v. Main

et al. when the court was confronted with the expenditure of

public funds upon improvements in aid of educational work.

Some of the added functions of a state aviation commission

have been summarized by the New Jersey State Department of

Aviation, in speaking of their own program, as follows:

"Progress has been made in bringing the story of aviation before the

date Department has given innumerable lectures and lantern
talks to high schools and civic bodies. Many aviation 'projects' undertaken
by schools have been furnished data, photographs and organization assist-

55. Such is the case in Michigan. Pub. Acts 1931, No. 89, Sec. 1, 2. The
Board of Aeronautics may mark all obstructions within a reasonable distance
of an airport, landing field or seaplane harbor. The owners of such obstruc-
tions shall allow the Board to mark them, and the cost to be assessed upon
the owners or operator of the airport. The Act also makes unlawful any
further erection of "telephone, telegraph or transmission lines, wires, cables,
poles or towers, within a distance of 1,000 feet of any licensed airport . . . will be hazardous." See 1931 U. S. Av. R. 383.


57. 92 Neb. 245, 138 N. W. 154 (1912).
PROMOTION OF AERONAUTICS

ance. Numerous clubs are thriving on model building, meteorology and kindred subjects. The State Museum organized an exhibit early in the year which was viewed by thousands. Probably the finest local exhibit ever presented by a civic museum was that displayed at the Newark Museum, established with the assistance of Commissioner Aldworth, where the history of aviation is portrayed. This exhibit was visited by over 60,000 persons during a period of three months.

"So numerous have been inquiries as to aeronautics education that Rutgers University developed and established in September, 1932, a course of primary studies on the subject. The course has proven very popular and naturally the assistance of the State Department of Aviation has been given."58

The Michigan Board has made a concentrated effort to familiarize the youth of that state with the mechanics of aviation. This has been in part achieved by inserting a chapter concerned with the basic aviation subjects into the standard physics book. Model plane building has been encouraged by sponsoring contests. In Ohio, the Director has stimulated interest in aviation by aiding in the formation of clubs and associations. In addition, he has sought to educate the other state departments as to the desirability of using aircraft in the performance of their tasks. For example, aerial photographs were made for the Highway Department and traffic bureau. All the property of the State Division of Conservation was photographed to enable it to keep a complete record of the state properties. On another occasion, the state plane was utilized to transport the Adjutant General to widely separated points in the state during mine strikes and two thousand photographs of the disturbances were taken at the time.

III. FINANCING THE STATE PROMOTIONAL PROGRAM.

State commissions have three possible sources of revenue from which promotional work could be financed. In the first place, financial support may be secured by means of legislative appropriation from the general funds of the state. These appropriations may be made directly to an existing aeronautical commission, or to the state department which has been invested with the control and encouragement of aviation. In the latter instance, aeronautics only realizes an appropriation in so far as the department budgets

money for that purpose. Direct appropriations for aeronautics have been made in nineteen states.69

A second source of revenue accrues in the form of license fees. Many and varied fees are now being imposed.60 Their main object is to assure the safety and airworthiness of aircraft, the competency of airmen, and so forth, and to cover the administrative expenses involved, rather than to afford a large source of income for encouragement activities.61 In Idaho, for the period from April, 1929, to December, 1930, the revenue realized through license fees has been $1,628.11 from aircraft licenses, and $79.00 from airmen's licenses. During January, 1931, and to December, 1932, the commissioner collected $1,769.86 in aircraft license fees and $71.00 from airmen.62 It is to be noted that the federal government has in no way taxed airmen, aircraft owners or airport

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<td>Illinois</td>
<td>26,000</td>
<td>1931</td>
<td>From fees</td>
</tr>
<tr>
<td>Kentucky</td>
<td>5,000</td>
<td>1931</td>
<td></td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2,000</td>
<td>1932</td>
<td></td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2,000</td>
<td>1932</td>
<td></td>
</tr>
<tr>
<td>New Jersey</td>
<td>8,000</td>
<td>1931</td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>40,000</td>
<td>1930</td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>7,213</td>
<td>1932</td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>6,000</td>
<td>1932</td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>70,000</td>
<td>1929</td>
<td>Revenue from gas tax</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>55,000</td>
<td>1929</td>
<td>Airport improvement</td>
</tr>
<tr>
<td>Tennessee</td>
<td>50,000</td>
<td>1929</td>
<td></td>
</tr>
<tr>
<td>Virginia</td>
<td>3,000</td>
<td>1929</td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>3,000</td>
<td>1929</td>
<td></td>
</tr>
</tbody>
</table>

60. Connecticut has evolved a very complete list of fees in their recent Laws of 1933, Ch. 134: (a) Registration of each aircraft, 2½c per lb. gross load, minimum $1.00, maximum $50.; (b) Transfer fee, $1.; (c) Manufacturer's fee, $50.; (d) Other experimental aircraft, $2.; (e) License for aircraft, $5.; (f) Physical examination, initial examination $10., annual examination $10., semi-annual $5.; (g) Physical examination of parachute jumpers or glider pilots $3. (except soaring glider pilots or commercial glider pilots); (h) Additional copies of certificate of registration or license, 50c; (i) Copy of reports, 50c per page; (j) Certification of any record, 50c; (k) Glider registration, $2.; (l) Primary glider pilot's license, 50c; (m) Secondary glider pilot's license, 50c; (n) Soaring glider pilot's license, $1.; (o) Commercial glider pilot's license, $5.; (p) Temporary aircraft registration, $2.; (q) Parachute rigger's license, $2.; (r) Parachute Jumper's license, $5. It must be remembered that Connecticut conducts its own license examinations since state licenses are required.

61. In several states, for example in Illinois, the money realized from license fees has gone into the general funds of the state. Aeronautical interests realize a benefit from such assessments only in so far as general appropriations are made, and, in Illinois, there was appropriated the sum of $40,000 for the biennium ending June 30, 1932.

62. Figures secured in response to questionnaire.
PROMOTION OF AERONAUTICS

operators for the licenses and ratings issued through the Aeronautics Branch of the Department of Commerce.

The third source of income is from a gasoline tax on aircraft motor fuel. At present, only in Idaho and Michigan is there established a special "aeronautics fund" from aircraft gasoline tax revenue. Although every other state has imposed a gasoline tax on motor vehicle fuel which tax is likewise applicable to aircraft fuel, in most states the income thus accruing is devoted to highway purposes. Many legislative bodies have realized the obvious inequity of such a tax, and have provided for a refund to aircraft owners. Application must then be made sometimes within 60 or 90 days in order to recover what has been paid in the form of taxes. This is an awkward procedure which may result in unnecessary hardship and expense.

More serious, however, is the fact that there are sixteen state statutes which fail to provide for any refund. Money thus collected is misappropriated. One writer in the field, in an editorial written in 1929, criticizes this incongruous use of revenue from the gasoline tax for highways. It is pointed out that this condition has resulted from the failure to amend laws that did not anticipate extensive flying activities or realize the commercial utilization of airplanes. Any fuel tax that is collected should be directed toward development of aeronautics.

IV. RECOMMENDATIONS AND CONCLUSIONS.

1. Legislation should be enacted to permit and require state promotional activity. The fact that private enterprises cannot adequately supply aids to navigation is clear.

63. The amounts realized from the gasoline tax have been:

- Idaho: $12,508.51 during period from April, 1929, to December, 1930
- Idaho: 19,534.73 during period from January, 1931, to December, 1930
- Michigan: 41,078.00 during period from 1929 to 1930
- Michigan: 34,636.00 during period from 1930 to 1931
- Michigan: 34,071.00 during period from 1931 to 1932

64. In a few state aircraft gasoline has been expressly exempted. Cf. Conn. Ch. 297, P. A. 1929.

65. Cf. Indiana, Ch. 182, A. of 73 Reg. Sess. (90 days), as amended March 7, 1929: Colorado, L. 1929, Ch. 139 (60 days).

66. The states imposing gasoline tax are as follows:

- Alabama ........... 4c
- Delaware ........... 3c
- Florida ............. 6c
- Georgia ............. 6c
- Kentucky ............ 5c
- Louisiana .......... 4c
- Maine ber. 1930 ....... 4c (refund interstate carriers)
- Mississippi ......... 5c
- Nebraska ............ 4c
- New Mexico .......... 5c
- Oklahoma .......... 4c
- Pennsylvania ...... 3c
- South Carolina .... 5c
- Tennessee .......... 5c
- Vermont ............ 4c
- Wyoming ........... 4c


2. The federal government has felt the budgetary pruning knife and is unable to enlarge its promotional program; besides legislation has definitely narrowed the functions of the Aeronautics Branch. The states should continue to aid in the advance of aviation.

3. Every state, to aid aviation, should:
   (a) Establish, or aid in the establishment of, airports, assist in their proper maintenance, and encourage private and municipal activity;
   (b) Develop an adequate system of lighted intrastate airways to connect with federal interstate airways;
   (c) Remove or mark all hazards to aviation;
   (d) Provide for adequate directional and locational markers;
   (e) Study local weather conditions and make the information promptly available to aviators through all existing agencies (e.g. police teletypewriter systems);
   (f) Establish an intensive educational program.

With few exceptions, the state governments have been woefully backward in their support of these necessary features for aviation.

4. A state commission should be the ultimate residuum of power in this promotional program for:
   (a) The personnel of the commission is quite generally made up of experts;
   (b) They are in constant contact with the needs of the industry;
   (c) It provides for a body directly responsible for a successful program;
   (d) There is thus made possible uniformity of construction throughout the state, and by reason of exchange of information with other official bodies, national uniformity will be promoted;
   (e) The commission is able to cooperate with other state bodies in the interest of economy;
   (f) The commission can best gain needed reforms in legislation;
(g) The commission can best remove dangerous hazards to navigation by a concentrated effort;
(h) Such a centralized body can more effectively issue propaganda to arouse interest in local projects and public interest in aviation.

5. Revenue received from aeronautical activity, in the form of a gasoline tax or license fees, should be allocated to a separate aeronautics fund. This fund should be made available to state commissions for promotional work. If aviation is to bear its burden of taxation, such revenue should be used for its protection and promotion.