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AIR AGE EDUCATION

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MAGNITUDE OF THE PROBLEM

DURING the war and postwar years aviation education has been brought intermittently to the attention of the aviation public. Spokesmen of the organized aircraft industry with bursts of prophetic zeal have spoken of the need for the schools to make of America "an air-faring nation." The spokesmen of air transport have stressed the need for youth to understand the implications of "a shrinking world."

By news stories, pictures, magazine articles, and radio commentary, the public has learned of the efforts of fixed-base operators, airlines, the Air Forces, Naval Aviation, and aircraft factories to bring aviation to American youth and to the teachers who influence the thinking of youth by providing them with courtesy hops, guided tours of their facilities, and occasional speakers.

In the past two years, however, two developments have led many people in aviation to wonder whether aviation education has something that transcends the immediate interests of the schools and the abilities of the schools to solve. The first of these events was the *Report* of the Joint Congressional Aviation Policy Board,¹ in which aviation education was listed as one of the nine points that comprised the Board's concept of the national aviation policy. The other development was the Aviation Education Conference held in February, at Atlantic City, sponsored by the American Association of School Administrators, for which schoolmen made the almost unprecedented move of inviting representatives of the aircraft industry, labor, air transport, and civil government and military aviation to work out jointly the problem of aviation education. It is hoped that from this Conference will grow a permanent or semi-permanent organization to serve as a meeting ground for these several interests of aviation education.

The *Report* of the Joint Congressional Aviation Policy Board called for "an air-minded public and a reservoir of technically trained personnel." It touched on the importance of education's giving our future citizens intellectual preparation for the world as aeronautical science has modified it in order that our citizenry "may meet the

¹U.S. Congressional Aviation Policy Board. *A Report, National Aviation Policy*. Washington, U.S. Government Printing Office, March 1, 1948. p. 5 (80th Congress, 2nd Session, Senate, Report 949.)

responsibilities of world leadership." It stressed the need for trained teachers.²

The Aviation Education Conference of February, 1950, was sponsored by the American Association of School Administrators with the assistance of the Civil Aeronautics Administration's Aviation Education Division. It was a first step in establishing the basis for joint cooperative solution of such basic aviation education problems as materials of instruction and teacher training. It also may provide an opportunity for joint discussion of such questions as the nature of aviation education itself; the nature of aviation's social implications; and the nature of the aviation education interest of air transport, the aircraft industry, labor, personal flying, military aviation, as well as that of the elementary and occouratory schools. The meeting was somewhat unique in that it represented a national gathering of the branches of a great industry, on invitation of the schools, to discuss with the schools common problems involving broad areas of the curriculum. Occasionally schools and industry have met at industry's request; occasionally on invitation of the government or of a foundation; but seldom on invitation of the schools, and seldom has the scope of the discussion touched so many curriculum areas.

It is the purpose of this paper to discuss briefly the meanings that school people ascribe to the term aviation education; the nature and extent of the interests of air transport, aircraft industry, fixed-base operators, labor, and the schools in aviation education; the problems of aviation education needing solution; and the future for aviation education.

DEFINING AVIATION EDUCATION

The term aviation education has a variety of meanings for school people. To some it means the airplane model building occasionally found in the technical arts courses and hobby programs of the schools. During the war years and the immediate postwar years model building received considerable impetus from the model industries and the National Aeronautical Association. In recent years because of the untimely cessation of their promotional efforts, which were leading to the publishing of textbooks and manuals for the several grade levels, model building in the schools has not fulfilled its promise, and may have lost ground. The Russians seem to be giving some attention to model building in their youth programs. Perhaps, the model building program of the American schools might be furthered by such an organization as was envisaged at Atlantic City, representing the several aviation education interests.

To other school people aviation education implies the mechanics training courses of the aircraft mechanic and engine mechanic trades. During the war years these were frequently found in the public trade and industrial schools. Today mechanic training for aviation trades

² *Ibid.*, p. 33.

is found in not over fifty of the nation's trade or industrial schools; this phase of aviation education could be of considerable importance if military aviation leaders should decide that its reservoir of technically trained manpower needed to be replenished.

Aviation education to many means a modified aviation ground school course given in the eleventh or twelfth grade of the high school. The high schools have called it "science of aeronautics," crediting it as an elective science. Some schools have added material on the social implications of aviation, and a few have provided a flight laboratory experience of three or four hours where the students have had an opportunity to see demonstrated the principles studied in class. In very few cases was pilot flight training offered. This course has been found in the schools since the late 1920's. During the war years it was found in an estimated 40%-50% of the nation's schools. In the post-war years, as schools discontinued wartime pre-induction courses, the science of aeronautics course was eliminated from many; today it is found in less than ten percent of the nation's secondary schools. It is interesting to note that it was only in America that a science of aeronautics course was added to the secondary curriculum as a war-preparation step. In Nazi Germany and in England the principles of aeronautics were included in the science and mathematics courses. In Russia today it appears that the science of aeronautics is taught in the physics and mathematics classes of the secondary school.

The concept of aviation education that has had greatest appeal in education is that aviation should be integrated into the curriculum at all grade levels and subject areas. The growing number of school officials and classroom teachers who are accepting the concept of integrating aviation into their programs are motivated by their appreciation of the importance of aviation's social implications and by their realization of the power of aviation's appeal in motivating pupils to master the three R's and the other subjects of the course of study.

This approach to aviation education through the standard curricular areas opens the way for aviation understandings reaching the minds of every student every year that he is in school. During the prewar years, a few teachers with a knowledge of aviation included aviation units, particularly in the elementary schools. However, in the last three years, this concept of fusing aviation into the curriculum has become better understood by school people, particularly through the missionary work of the aviation education services of the C.A.A., the airlines, and Link Aviation, and, recently, the U.S. Office of Education.

INTEREST OF INDUSTRY, STATE AND FEDERAL GOVERNMENTS

Allusion has been made to the interest and effort in aviation education of non-school groups such as air transport, aircraft industry, fixed-base operators, the Air Forces, Naval Aviation, the U.S. Office of Education, and the Civil Aeronautics Administration. Although the nature and extent of this interest is difficult to evaluate with any exact-

ness, there appears to be among all these groups general agreement on two points: first, that aviation education, if it brings to American youth an understanding of aviation's social implications, is an important element in the preparation of citizens for today's and tomorrow's world. Second, that aviation education, if it provides an insight for all of America's future citizens into the nature and problems of aviation, will break the charmed circle in which aviation people find themselves. Aviation education may be the means for aviation people to talk aviation to others than themselves. The possibilities of this process of developing an air-minded America can be glimpsed by considering just one of its many aspects: namely, the possibility of school and classroom libraries including aviation periodicals among their subscriptions in order to provide students with necessary information on current aviation developments for social studies, science, language arts, and mathematics classes.

Each of the non-school groups interested in aviation education has, of course, its own special interest. The airlines' special interest in aviation is the obvious one of developing more potential passengers. Of the airlines, United, Pan American, and TWA have had excellent aviation education services. Pan American's education school this spring however, began to reduce its activities. American had an excellent service, too, until their aviation education division was curtailed two years ago. Many of the airlines have been generous in providing courtesy hops and guided tours for teacher groups, and guided tours for pupils. The Air Transport Association of America does not have an aviation education program.

The airlines' aviation education sections, in addition to making available the usual time tables and travel brochures that school people request of airlines, have made real progress in helping teachers in matters of materials of instruction and method. They have also done much to relax the attitude of the schools toward aviation education, and to make them more receptive to bringing it to the classroom; this, in spite of an occasional eager-beaver in airline sales or public relations whose remarks raise the bugaboo of airlines' exploiting the schools. In recent years the airlines' educational services have had difficulty in justifying their existence to their parent airlines, as the tendency has been for airlines to justify promotional expenditure in terms of an immediate return in passenger miles flown.

The aircraft, engine, and accessory manufacturing industry has shown very little substantial interest in aviation education, although because of the billions of public money spent on aircraft manufacture it has perhaps more to gain from public understanding than have other segments of aviation. The only industry with an aviation education service is Link Aviation, Inc., which provides the schools with splendid instructional materials and first-rate consultant services. Elsewhere in the industry, the manufacturers have provided occasional speakers, guided tours, courtesy hops, and public relations brochures and pic-

tures. Very little material of specific use for the schools has been published by the industry. The Aircraft Industries Association has no aviation education program.

Of the major industries of the nation, the aircraft industry has shown the least interest in an educational program. The Association of American Railroads, duPont, General Motors, Westinghouse, Coca Cola, Metropolitan Life Insurance, General Electric, and General Mills, to mention a few, have effective educational services, producing helpful materials of instruction for school use. It is interesting to note that whereas the industries mentioned above are in a sense petitioners for the schools' attention and asking the schools to assist them in the development of their several instructional programs, the situation is reversed in aviation. School people interested in aviation education not only are asking the aircraft industry to provide them with instructional materials, but are also inviting the industry and other aviation interests to assist in organizing a framework of industry-school cooperation, as attempted at the Atlantic City Aviation Education Conference last February.

Although the aircraft industry has shown little interest in aviation education, fixed-base operators and state aviation officials have sensed its value and made real contributions to its progress. In spite of limited resources, individual fixed-base operators have, nevertheless, spared no effort to make successful aviation education programs held at their establishments. Guided tours, courtesy hops, and speaking engagements, on the one hand, and enthusiastic local civic support and appreciation of the schools' efforts in aviation education, on the other, have helped the program. On the state level the state aviation officials have lent their prestige and financial support to the state departments of education in the publication of aviation education curriculum bulletins. On national level the National Association of State Aviation Officials has been among the most vigorous supporters of the C.A.A.'s Aviation Education Division.

The Air Force and Naval Aviation have both recognized aviation education's importance. The Air Force and its civilian patrol have cooperated with local schools' efforts to develop their own aviation education programs, frequently assisting the C.A.A. in its work with teacher groups. The Air Force has also attempted in the schools an aviation education program of its own through the Civil Air Patrol organization. Naval Aviation, on the other hand, recognizing the fundamental hesitancy of Americans to bring the military too close to their schools, has directed its entire energy into supporting the schools' programs and the efforts of agencies such as the C.A.A., promoting these programs.

Organized labor until recently has shown next to no interest in aviation education. At the recent Atlantic City Conference, the C.I.O., although invited, sent no representative. The A. F. of L., on the other hand, was well-represented. The Report of the Labor Section of this

Conference, one of the first statements of Labor's interest in aviation education, stressed Labor's concern for youth to understand the social implications of aviation. It also pointed out the danger of flooding the labor market should the government embark on an aviation mechanics training program in an effort to implement the recommendation of the Congressional Aviation Policy Board's Report calling for a reservoir of trained manpower.

On the national level of civil government, the Civil Aeronautics Administration, the U.S. Office of Education, and the U.S. Weather Bureau have shown some interest in aviation education.

The C.A.A.'s Aviation Education Division, organized in 1942, has a small Washington office and a representative in each region, and has been most active in the development of aviation education. Much of the progress of aviation education in teacher training institutions, in state and local curriculum programs, and in national education associations can be attributed to this division's missionary work. It operates under the section of the Civil Aeronautics Act of 1938, calling for the Civil Aeronautics Authority to foster and develop civil aviation.

Although given excellent cooperation by C.A.A.'s operating branches of Safety and Airways, and by some of the Regional Administrators, it has had a difficult time at the hands of other elements of the Administration in carrying out a realistic publications program and in operating with a qualified staff of adequate size.

During the war, the U.S. Office of Education made a distinct contribution with its promotion of trade training in aviation mechanic skills. Two years ago it created an office for a specialist in aviation education. At that time the Office of Education's interest was primarily in terms of aviation as a science. In recent months, however, it has noted school people's interest in aviation's implications for society and also aviation's possibilities for motivating pupils' school work.

The U.S. Weather Bureau has assisted in aviation education's efforts to give students an understanding of the science of weather. It has made generally available a kit of its publications, has opened its facilities for visits, and provided its personnel for lectures. It has no education service of its own.

TEACHERS ACCEPT AVIATION EDUCATION

Among school people the acceptance of aviation education has been considerably greater than among aviation people. School people who favor aviation education see its contribution in the light of social implications, modern teaching methods, and curriculum enrichment. This vision of aviation education's possibilities has taken hold to the extent that over thirty states have published curriculum bulletins in aviation education; and seventy or more teacher training institutions for the past three summers have offered aviation education courses for teachers. In the spring of 1949 the American Association of Colleges for Teacher Education appointed an Aviation Education Committee.

At the same time the American Association of School Administrators appointed an Aviation Education Committee, the report of which led to the Atlantic City Aviation Education Conference. This interest of school men in aviation education is most encouraging and much greater than was hoped for three or four years ago.

Although there has been substantial progress in the schools' acceptance of aviation education, there is still considerable resistance on the part of some, and considerable caution on the part of the majority. There are those who speak of the "hot air age." There are others in considerable numbers who wonder how aviation education's proponents propose to handle the problems of teacher training and instruction materials, even though the method and curriculum problems may have been solved.

THE TEXTBOOK AND INSTRUCTIONAL MATERIAL PROBLEM

Perhaps, the crucial point in the schools' development of aviation education is that of materials of instruction; that is, textbooks, reference books, pamphlets, brochures, pictures, films, and filmstrips. Surprising as it may seem to the layman, the standard textbook treatment of aviation is simply not adequate. The textbook publication lag is such that it has not and may never catch up to the fast-moving tempo of aviation's development, particularly on the social implications side.

Another factor that hampers the textbook's publication of adequate aviation information is the inability of the author who writes a standard text in such fields as social studies, reading, science, and mathematics to keep up with contemporary developments in every area of his field; one of these special areas is, of course, aviation. It may not be too difficult for the writer of a science text to follow the progress in aeronautical science; this has been well handled by the press. However, for the author of a social studies text, even for one who has better than a layman's grasp of the social, political, economic, and international aspects of aviation, his task of adequately treating aviation's problems and institutions is almost insurmountable. An indication of its nature can be seen when one asks how frequently he has seen the U.S. airpower discussions of the past two years treated by the aviation press in terms of the principles enunciated in the President's and Joint Congressional Air Policy Reports. One has read plenty about the air power controversy between the Air Forces and the Navy, about the merits of the B-36 and the big carrier, about the generals vs. the admirals — all good human interest stuff — but very little about the fundamental issues of air policy.

One can further ask himself how frequently and how fundamentally has the aviation press discussed the ICAO, the Air Coordinating Committee, the aviation issues in the development of a national transportation policy, the evolving philosophy of state-federal relations in aviation. These are significant institutions and areas of development in aviation, but few in America know of them.

Of course aviation is finding its way into the school texts. History books have pictures of B17's, prewar DC3's, a sentence or two on the Wright brothers, and a few sentences on Pearl Harbor and the bombing of Japan and Germany. Geographies picture the azimuthal equidistant projection and carry two or three pages explaining "air-age map projections" and great circle routes. Graded classroom readers range from Billie and Johnnie going to an airport, to accounts of aircraft uses in South America, to the poetry of aviation, usually including Tennyson's "Locksley Hall" with its "argosies of magic sails" and its "nations' airy navies grappling in the central blue," and Magee's "High Flight." The postwar geometry book have begun to include dead reckoning, and the postwar texts in science are introducing principles of aerodynamics and meteorology. But this is not what the teacher wants if he is to make aviation the center of pupil interest and build around aviation several weeks of activity, or if he is to use the pupils' natural interest in aviation to enliven the teaching of other material and concepts.

What the teachers who wish to give aviation a central place in their program need is colorful, up-to-date pictures, booklets, and explanatory brochures suitable for the several grade levels; the latest official reports of government committees and agencies; and the testimony before Congressional committees and Congressional Committee reports. With history in the making in contemporary aviation, even the dullest of pupils and the most difficult to interest in the classroom catch the spark and take fire when aviation is introduced.

The problem, however, is that the up-to-the-minute materials produced during World War II and the early postwar years by governmental agencies and aviation's non-school interests have gone out of print and are becoming dated. The industrial and commercial sources that produced them have either discontinued publishing school materials or curtailed this activity, and the governmental sources are not publishing the quantity of items they previously printed and had available for distribution.

The layman who looks back over twenty-five or thirty-five years to his school experience has difficulty visualizing the place of aviation education in the curriculum and the need for supplementary instructional materials beyond the basic texts. Except for the few specific mechanic training courses and science of aeronautics courses of the secondary schools, aviation education cannot be compared to the traditional subjects of the curriculum, such as reading, spelling, arithmetic, history, mathematics, or science. Aviation education's position is more nearly comparable to that of such areas as health, safety, atomic-energy education, and United Nations education. In the case of these, the effort is made by their proponents both in and out of the school to integrate pertinent materials at every possible point in the twelve grades. The supplementary texts, visual aids bulletin, and other teaching materials are provided in abundance. Their producers include

insurance companies, automobile manufacturers, foundations, associations, and government agencies.

The other problem facing the schools, that of teacher training, is dependent to a considerable extent on the availability of materials of instruction. The C.A.A.'s summer workshop programs of the past three or four years showed that the mechanics of the job of bringing aviation education to America's teachers can be handled. For two or three summers the C.A.A. succeeded in organizing 70 or more aviation education courses in the nation's teacher training institutions, including 3,000 to 5,000 teachers each year. This is a significant beginning, but the main task lies ahead; there are hundreds of thousands of teachers, many of whom want to know something about aviation.

The related areas of curriculum and method, fortunately, in themselves present no difficulties, if the problems of instructional materials and teacher training can be met. Thanks to the work of the C.A.A. and the basic studies it has published, plus the contributions of United Air Lines, Pan American World Airways, Trans World Airlines, and Link Aviation, the methods for integrating aviation into the school programs have been and are being worked out

FUTURE OF AVIATION EDUCATION

The future of aviation education from the point of view of its acceptance in the schools of the nation depends on the availability of instructional materials. The organized profession, both on the local and state school levels and on the national organization level has shown surprising hospitality to the idea: it has been and still is working out problems of teacher training, methodology, and curriculum. When it saw it could not handle the materials of instruction problem alone, it called on the non-school interests thought to be concerned with aviation education as evidenced by the Atlantic City Conference, for a cooperative effort at its solution.

On the other hand, the non-school groups that have demonstrated or might be expected to demonstrate an interest in aviation education have tended to hold back. The airlines are curtailing their publishing and consulting services in aviation education; the aircraft industries continue to watch the program without participating. The civil government agencies with the above-noted exceptions are indifferent to the aviation education idea. The military services, however, seem to be giving more attention to aviation education. The fixed-base operators and State aviation officials seem to be sold on the importance of aviation education. Unfortunately, of the above groups that are in the position to contribute most to the aviation education idea, particularly through providing the needed support and materials of instruction, there is the least interest.

As has been pointed out above, instructional materials are the *sine qua non* of an educational program. If they are not forthcoming,

there can be no expanding future to aviation education and the recent ground gained in the schools will be lost. School people who take an interest in aviation education will be disappointed as they see distinct educational and social values in the program.

If aviation's non-school interests really do sense a value for aviation in the schools' efforts to make air-minded future generations of America's citizens, then it behooves the public relations staffs of aircraft manufacturing and air transport to take a leaf out of the book of other industries and produce instructional materials for schools. For the governmental agencies it means publishing aviation documents in sufficient quantity to be available to the schools of the nation, and it has been observed that these agencies do give serious thought in matters of publication volume and distribution to the values of the more vocal and more powerful of the non-governmental groups.

Aviation education, like aviation, is here to stay. Whether it produces "an air-faring nation" and a generation of youth capable of understanding the implications of "a shrinking world" depends upon the support it receives from aircraft industry and air transport.

DECLARATION OF POLICY AND RESOLUTIONS ADOPTED BY THE NATIONAL AVIATION EDUCATION CONFERENCE AT ATLANTIC CITY IN FEBRUARY, 1950

POLICY

1. The broad concept of education includes teaching for democratic living under the conditions and circumstances of the times.
2. The impact of aviation upon living compels its recognition as an important factor in the social, political and economic conditions and circumstances of our time—and in our National Security.
3. Organized education should include aviation and its implications as a part of—and an aid to—its regular processes of instruction.
4. Industry, Labor, Government, and Organized Education should cooperate, through a National Aviation Education Council, in the development and guidance of a comprehensive program of Aviation Education.

RESOLUTIONS

1. That there be established a National Aviation Education Council.
2. That the NAEC shall be an advisory body whose membership shall be widely representative of Education, Labor, Industry, Government, and other national organizations interested in aviation education.
3. That an Organizing Committee be selected by this Conference, including three representatives each of Industry, Labor, Government, and other national organizations interested in aviation education, and nine representatives of educational associations for the purpose of determining the number and method of selecting members of NAEC and of defining its functions.
4. That the NAEC Organizing Committee shall meet as promptly as possible, and that it report to the next meeting of the National Aviation Education Council.
5. That the Aviation Education Division of the Civil Aeronautics Administration act as the Secretariat of the Organizing Committee and of the NAEC until deemed expedient to make other arrangements.