

**CURRICULAR EXPERIENCES FOR A SUMMER
AVIATION EDUCATION WORKSHOP**

by

Walter Zaharevitz, Miami University, Oxford, Ohio, August 1959

Educators use a variety of methods to help keep their knowledge of new developments up to date. One important educational technique is the summer session or in-service workshop. An educational workshop is a method of organizing information and experience. It may include lectures, demonstrations, discussions, field trips and specialized projects such as orientation flights or flight instruction.

Aviation education workshops are generally conducted in one of two ways. During the summer months colleges and universities offer one week to eight week workshop sessions for teachers. These are usually for academic credit.

School systems -- sometimes in cooperation with a college or university -- offer in-service workshops. These are aviation learning experiences conducted during the regular school year. They may be held after school hours or during time set aside during the regular school day for selected teachers.

Many times Federal Aviation Agency personnel are called upon to serve on planning committees or as guest speakers for aviation education workshops.

In order to assist you in understanding the nature, scope, and content of aviation education workshops, this material -- which includes excerpts from a graduate thesis -- is made available to you.

Primarily you will find this information helpful in planning for your participation in an aviation education workshop or as background material for your use prior to working with aviation education workshop directors and staff members.

FEDERAL AVIATION AGENCY
Office of Public Affairs

ABSTRACT OF THE THESIS:

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The main purpose of the study was to develop suggested curricula experiences for a summer aviation education workshop. This included a consideration of the following problems; (1) For whom shall the workshop provide? (2) What are the workshop objectives? (3) What is an optimum length of time for an aviation education workshop? (4) What essential activities and experiences should be included? and (5) What desirable (but not essential) activities and experiences should be included? It also involved a clear-cut determination regarding the rightful place of aviation education in the curricula of our schools.

A review of previous research and related literature clearly indicated that aviation does have a proper place in our schools' curricula.

An open-form questionnaire survey of fifty-nine individuals (eleven by interview and forty-eight by mail) experienced in the conduct of aviation education workshops was made. Five aviation education specialists were selected to validate the data.

Data collected showed that the clientele should include all teachers, school administrators, laymen interested in aviation, and mature students preparing to become teachers. Seventeen objectives for a workshop were recommended; basically, fourteen of these objectives were those contained in the 1949 Report of the Aviation Education Committee, American Association of Colleges for Teacher Education. Although no one specific period of time was stated for all workshops, the general belief reported was that at least four or five weeks were necessary. Thirteen activities and experiences of varying degrees of importance were recommended as "essential;" of these, the following should be included in all workshops: (1) basic fundamentals of aviation and astronautics; (2) orientation flight; (3) field trips; and (4) curriculum planning or a written plan of action. Activities designated as "desirable but not essential" and additional comments were included to assist in the planning of an aviation education workshop.

CHAPTER I

INTRODUCTION

STATEMENT OF THE PROBLEM

The main purpose of this study was to develop suggested curricular experiences for a summer aviation education workshop. This involved the following problems;

1. For whom shall the workshop provide?
2. What are the workshop objectives?
3. What is an optimum length of time for an aviation education workshop?
4. What essential activities and experiences should be included?
5. What desirable (but not essential) activities and experiences should be included?

It also involved a clear-out determination regarding the rightful place of aviation education in the curricula of our schools.

SIGNIFICANCE OF THE PROBLEM

What man had dreamed about for centuries finally became reality when Orville Wright flew the first successful powered

airplane on December 17, 1903, at Kitty Hawk, North Carolina, As one glances at today's headlines dealing with man-made satellites, missiles, and moon bases, it seems difficult to believe that it all started with a flight of the unpretentious proportions of 120 feet for 12 seconds at 7 miles per hour. Yet, in the extremely short period of about fifty-six years -- an insignificant moment in time -- the airplane has revolutionized our way of life and has certainly changed the course of history of the entire world. Man-made satellites orbiting around the earth have become common. Discussions of space platforms and landings on the moon are taken for granted. Seven men are now undergoing training for selection as the nation's -- and possibly the world's -- first astronaut or space man. Present plans indicate that the attempt to send one of these men into orbit around the earth in a one-ton capsule, and return, will be made about two years from now -- in 1961. Within a very few years, we have been bombarded with more scientific phenomena than any people have been exposed to in history. We have undoubtedly made more technical progress in the past half century than all combined previous centuries. We have been deluged with electronics, supersonics, jet propulsion, fusion, rockets and satellites.

There can be no doubt that this swift pace of scientific achievement has tremendous implications for education. Indeed, many educators agree with Mehrens who said "...air and space flights, predominant as they are in their impacts upon modern

life, must be recognized as educationally significant"¹ and

Brown who stated:

Aviation -- its rapid growth and its impact on the lives of people everywhere -- is becoming increasingly one of the social and technological factors with which those responsible for schools must reckon.²

Brewer, Robinson, and Thomas were more emphatic:

Aviation is one of the realities of our times; it should play a proper role in the educational drama of our nation. It should find a place in the curricula of our schools, not only as a separate instructional area, but also as distinctive threads woven throughout the fabric of all instructional areas -- threads which catch interest, contribute color, and bring strength of design to a school's curricular pattern.³

LIMITATIONS OF THE STUDY

This study was concerned with formal, aviation education, credit-bearing courses conducted by colleges and universities during summer terms under the title of aviation education workshop (or some similar title such as Air Age Education Workshop or Air and Space Education Workshop). It was limited to

¹H. E. Mehrens. Education--Aviation--and the Space Age. Bolling Air Force Base, Washington, D. C.: Civil Air Patrol, 1959, p.4.

²Willis C. Brown. "Aviation Education for Modern Living," Aviation Education Series, U. S. Department of Health, Education, and Welfare, Office of Education, Washington 25, D. C., September 1955.

³A. C. Brewer, Georgia Robinson, and Ruth Thomas (eds.). Curriculum Guide for Aviation Education. Knoxville, Tennessee: Tennessee Aeronautics Commission, 1958, p. 8.

the consideration of those aviation education workshops which were of at least one-continuous-week's duration. Those of lesser duration were not included. It touched on but did not investigate the important areas of aviation education in-service training and regular term aviation education courses of instruction at teacher preparatory institutions.

The survey was limited to individuals who have had past experience (director or staff) with the actual conduct of aviation education workshops of at least a week's duration or aviation education specialists closely associated with the planning and conducting of such workshops.

An "Experience Survey" form and the interview technique were utilized to obtain the data for this study. Whenever it was possible, individuals were interviewed and the form was used as a guide for the interview; however, the majority of the contacts was made by mail. The weaknesses of a questionnaire study were understood; as expressed by Best:

The questionnaire is probably the most used and most abused of the data-gathering devices. ...It has been referred to as the lazy man's way of gaining information, although the careful preparation of a good questionnaire takes a great deal of time, ingenuity, and hard work. ...As a result of this sparse response, the data that are obtained are often of limited validity. The information in the unreturned questionnaires might have changed the results of the investigation materially...

Unless one is dealing with a group of respondents who have a genuine interest in the problem under investigation, who know the sender, or who have some common bond of loyalty to a sponsoring institution or

organization, the results are frequently disappointing, and provide a flimsy basis for generalization.

While the foregoing discussion may have seemed to discredit the questionnaire as a respectable research technique, the attempt has been to consider the abuse or misuse of the device. Actually, the questionnaire has unique advantages and, properly constructed and administered, it may serve as a most appropriate and useful data-gathering device in a particular research project.⁴

This study does not purport to indicate exactly how aviation education is to be integrated into the various subject areas (although two examples are shown) and taught as a separate subject. The actual implementation "depends upon the tactical situation" and is an area of activity which rightfully belongs to the administrator in charge of curriculum and the classroom teacher.

DEFINITIONS OF IMPORTANT TERMS USED

Aviation education. "Aviation education is that branch of general education concerned with communicating knowledge, skills, and attitudes about aviation and its impact upon society. It must be distinguished from that branch of special education known as aeronautical education which is concerned with training specialized aviation workers."⁵

Aviation education workshop. Formal, aviation education, credit-bearing instruction conducted for at least one-continuous-

⁴John W. Best. Research in Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959, pp. 143-144

⁵Mervin K. Strickler, Jr., "The Air Center as a Means of Implementing Aviation Education," unpublished Doctoral dissertation, Stanford University, Palo Alto, California, 1951, p. 162.

week's duration by colleges and universities under the title of aviation education workshop (or similar title such as Air Age Education Workshop or Air and Space Education Workshop).

Curricular experiences. All of the organized courses, activities, and experiences which students have under the direction of the educational institution, whether in the classroom or not.

Aviation education is to be integrated into the various subject areas (although two examples are shown) and taught as a separate subject. The actual implementation "depends upon the local situation" and is an area of activity which is highly responsive to the administrative changes of curriculum and the classroom teacher.

DEFINITIONS OF IMPORTANT TERMS USED

Aviation education. "Aviation education is that branch of general education concerned with communicating knowledge, skills, and attitudes about aviation and its impact upon society. It must be distinguished from that branch of special education known as noncurricular education which is concerned with training specialized aviation workers."

Aviation education workshop. General aviation education credit-bearing instruction conducted for at least one continuous

John W. West, Research in Aviation Education, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1956, pp. 143-144.
Harvey E. Kestelaker, Jr., "The Air Center as a Means of Implementing Aviation Education," unpublished doctoral dissertation, Stanford University, Palo Alto, California, 1951, p. 103.

CHAPTER II

REVIEW OF PREVIOUS RESEARCH AND RELATED LITERATURE

PREVIOUS RESEARCH

A thorough search of the indexes of dissertations and research in aviation education was made in the Miami University library at Oxford, Ohio. Two doctoral dissertations and two master theses, related to this study, were located. They are reviewed in the following paragraphs.

In his study (1950) to determine the extent of offerings and activities in air age education in this nation, Pawelek gathered information by examining literature and using letters of inquiry.⁶ He defined air age education as suggested education for the world of today and tomorrow and used the term synonymously with aviation education. Some of his principal findings, which are related to this study, are:

1. Teacher training is a critical issue in this area.
2. It is difficult to find teachers with adequate backgrounds.
3. The majority of present teachers in pre-flight aeronautics have backgrounds in physics, science, and mathematics.

⁶Alan R. Pawelek, "Air-Age Education," unpublished Doctoral dissertation, University of Minnesota, Minneapolis, 1960.

4. Aviation has entered the school curriculum in two forms: in separate aeronautics courses and by the fusion of aviation content into existing courses.

5. Flight experience for both teachers and students is almost universally recommended.

6. A course in aviation, at least one year long, is desirable in the secondary schools.

7. Knowledges and understandings resulting from the study of aviation and its impact on the community are significant in the social studies.

8. Air-age education in the colleges and universities has not declined appreciably since the war and now courses are being added.

9. In 1945 about one-half of the six million pupils in the 28,000 American secondary schools had access to aviation education.⁷

In studying the air center as a means of implementing aviation education, Strickler established an operational definition of aviation education and showed the historical development of aviation education, as well as describing an air center.⁸ His definition of aviation education, which he arrived at after analyzing many statements and definitions of aviation education, aeronautical education, and air age education is:

Aviation education is that branch of general education concerned with communicating knowledge, skills, and attitudes about aviation and its impact upon society. It must be distinguished from that branch of special education known as aeronautical education which is concerned with training specialized aviation workers.

⁷Ibid., pp. 174-175.

⁸Strickler, op. cit.

Aviation education may be formal or informal, that is, it may be organized in school and college curriculums or it may be undertaken by agencies devoted to informal rather than to formal education -- agencies such as newspapers, magazines, the radio, television. One must therefore distinguish between formal aviation education and informal aviation education.⁹

He fully described the air center and furnished information relative to definition, types, services rendered, groups served, and establishment of an air center. Regarding the place of the air center in aviation education, Strickler said:

The air center in aviation education is primarily a tool. It is a means of furthering the educational use of aviation content in general aviation. Otherwise expressed, it facilitates the dissemination of appropriate knowledge in aviation education. The air center, in short, may be described as an educational instrument or facility.¹⁰

One of Strickler's principal conclusions was that "...the air center concept in aviation education is clearly important, and second, that because of the newness of existing centers, much must be done in the immediate future to develop its potentials.¹¹

Anderson surveyed (1954-1958) eight-four secondary schools which had aviation education courses in their curricula.¹² The schools were selected as representative of all areas of the United States. He sought "...to determine certain aspects

⁹Ibid., p. 162.

¹⁰Ibid., p. 80.

¹¹Ibid., p. 170.

¹²Kermit Anderson, "A Survey of Certain Aspects of Aviation Education in Selected Schools in the United States," unpublished Master's thesis, North Dakota Agricultural College, Fargo, July 1955.

of aviation education in secondary schools as to the historical background of the program, organization and administration, professional background and training of aviation education instructors, instructional material and project activities, finance, and promotional policies of aviation education."¹³

Of his findings the following have been selected as pertinent to this study:

1. Of the eight-four schools surveyed, thirty-seven, or 44 per cent, reported their programs were set up by the combined efforts of the aviation education instructor and Civil Air Patrol.
2. Seventy-six, or 90 per cent of the schools reported they offered aviation education as a regular class offering. The remaining schools offered the course as an extra-class activity.
3. Sixty-four, or 76 per cent, of the schools did not have a sum regularly allotted in the annual budget to meet the needs of the aviation education department.
4. Twenty-five, or 29 per cent, of the instructors stated that the United States Air Force had been the greatest influence in arousing their interest in aviation education.
5. Nineteen, or 23 per cent, of the instructors indicated they had completed college credit courses (excluding aviation education workshops) in aviation education.
6. Twenty-seven, or 32 per cent, of the instructors indicated that they had completed some credit-bearing aviation education workshops.
7. Twenty-four, or 29 per cent, of the instructors indicated they had attended non-credit workshops or conferences dealing with aviation education.
8. Sixty-six, or 62 per cent, indicated they were in need of more help in teaching aviation education. The types of help most needed were more group conferences and materials for study.

¹³Ibid., p. 4.

9. Twelve, or 14 per cent, indicated they had found aviation education workshops to be the most valuable experience. (It should be noted that this should undoubtedly refer to twelve of the twenty-seven (or 44 per cent) who had completed some credit-bearing aviation education workshops.)

10. The majority of instructors considered "General Education As Needed By Air-Wise Citizens of Today" as the most valuable objective of the program. They indicated that "Realization of the Present and Potential Value of the Air Age" was the second most valuable.

11. The instructors reported that the interest and support of students was much greater than that of the community.

12. School administrators provided more co-operation to the aviation education programs than did the other selected groups. Townspeople and Parent and Teacher Associations were considered the least co-operative.

13. Lack of trained staff was the greatest obstacle to the introduction of aviation education in the secondary schools. Objection by school administrators was considered the second highest obstacle. Lack of funds was considered the third highest obstacle.¹⁴

One of his recommendations, which is directly related to this study, was: "To help eliminate the obstacle of untrained staff, and to partially fulfill the needs as stated by the instructors, college courses in aviation education and in-service training, such as workshops and conferences, should be organized."¹⁵

Kipp sought (1958) to develop a college program to train airline and executive pilots.¹⁶ A questionnaire was developed and sent to forty-eight airline personnel directors (forty

¹⁴Ibid., pp. 128-139.

¹⁵Ibid., p. 143.

¹⁶John V. Kipp, "A College Program for Training Pilots With Special Reference to Miami University," unpublished Master's Thesis, Miami University, Oxford, Ohio, 1958.

replied) who, as judges, were to indicate the desirable educational qualifications of airline and executive pilots. Educational qualifications were divided into three categories: (1) general aviation (2) technical and other special courses important to aviation, and (3) special pilot training. Of the non-technical courses, "History of Aviation," with a rating of 156, was rated the highest; the second highest was English, with a rating of 148. The respondents favored the four-year college program. In five questionnaires, the college subject program was considered of equal importance to the flight training program. The following recommendations were made: (1) colleges establish a program for training pilots: (2) further studies be made of physical qualification, other desirable aptitudes, and personality traits; and (3) a study be made on the selection of candidates for pilot training.

RELATED LITERATURE

Educational Implications of Aviation. Pawelek indicated that in 1945 about one-half of the six million pupils in the 28,000 American secondary schools had access to aviation education.¹⁷ Mehrens reported that 100 school systems (87 local systems, 12 state systems, and Alaska) responded to an aviation

¹⁷Pawelek, op. cit., p. 174.

questionnaire in 1951.¹⁸ Although he mentioned that there was a great range of diversity in aviation education activity, he concluded that "in almost 50 per cent of the cases reported, little or no provision is being made for aviation education."¹⁹ He further states that "information from these school systems subsequently received and analyzed reveals that in many instances the 1953 aviation education situation has changed little from that of 1951."²⁰ Gill Robb Wilson painted a blacker picture in 1955:

Of seven million high school students now in classrooms in the United States, less than one-half of one per cent are exposed to accredited aviation subjects in any category -- scientific, vocational, cultural.²¹

One reason for this low availability of aviation education may be the prevalence of the following thought. In discussing the kinds of learning best undertaken by the high school, one educator recently said:

Whatever the educational demand of the moment-- driver education, elimination of juvenile delinquency, "air age" education, swimming and other sports, specific vocational skills-- the American public view the high school as not only capable of assuming successfully almost any conceivable task of education

¹⁸H. R. Mehrens (ed.). Aviation in School and Community. American Council on Education in cooperation with Civil Aeronautics Administration. Washington, D. C.: Judd & Detweiler, Inc., 1954, pp. 93-99.

¹⁹Ibid., p. 98.

²⁰Ibid., p. 99.

²¹Gill Robb Wilson, "Public School Education--The Bullseye." an editorial, Flying, vol. 57, October 1955, p. 8.

or training but also as the proper agency to undertake any such job that seems important to some group. No clear basis which the high school can use in selecting the tasks it should undertake is commonly recognized in America.

Discussions of this problem are frequently confused by arguments regarding the values of learning to drive safely, of wholesome recreation, of appreciating the contributions of aviation, of learning to swim and to participate in other sports, and of acquiring specific occupational skills. These are not the primary issues facing secondary education (and should be left to other agencies).²²

In order to gain a place in the curriculum, aviation, as any other subject, must stand on its educational merits. Such low acceptance of aviation education by our schools and such comments by educators raises an important question. Does aviation education have a proper place in the curricula of our schools? Unless this question is answered clearly and unequivocally in the affirmative, there would be no need to continue this study.

Much has been written over the past years stressing the importance of including aviation education in our curricula; however, doubt and inaction seems to be prevalent. Perhaps another viewpoint will be of assistance. Because of its close relationship to the need for this study, this point will be explored in detail.

Determinants of the Modern Curriculum. What criteria determine educational objectives and thus the composition of the modern curriculum? Three fundamental assumptions underlie

²²Ralph W. Tyler, "Emphasize Tasks Appropriate for the School," Phi Delta Kappan, vol. 40, November 1958, p. 72.

curriculum development: (1) the curriculum does not belong to the educators; (2) the curriculum exists to serve, not to be served; and (3) the curriculum should employ the best educational practice based on sound theory.²³ Three major positions have been taken regarding the nature and source of educational objectives: the society-centered, child-centered, and interactive positions.²⁴ Smith, Stanley, and Shores stated that "most educators, whatever their formal educational philosophy, have found some place for both the demands of adult society and the interests of children in their educational programs."²⁵

Probably the most well-known report dealing with the secondary school curriculum is that of the Commission on the Reorganization of Secondary Education, issued in 1918. It set forth several important principles and indicated that the curriculum of the secondary school should be determined by: (1) the needs of the society to be served; (2) the character of the individual to be educated; and (3) the knowledge of educational theory and practice available.²⁶ A similar suggestion was made by Inglis, also in 1918, in his listing of three fundamental aims for secondary education, as for all education, in America:

²³Stephen A. Romine. Building the High School Curriculum. New York; The Ronald Press Company, 1954, pp. 11-14.

²⁴B. Othanel Smith, William C. Stanley, and J. Harlan Shores. Fundamentals of Curriculum Development. Revised edition, New York: World Book Company, 1957, p. 548.

²⁵Ibid., p. 551.

²⁶U. S. Bureau of Education. Bulletin 1918, No. 38, p. 7.

1. The preparation of the individual as a prospective citizen and cooperating member of society--the Social-Civic Aim;

2. The preparation of the individual as a prospective worker and producer--the Economic-Vocational Aim; and

3. The preparation of the individual for those activities which, while primarily involving individual action, the utilization of leisure, and the development of personality, are of great importance to society--the Individualistic-Avocational Aim.

Widely understood and accepted by educational leaders in America was this announcement for education for life adjustment aimed at influencing the secondary school curriculum:

...that (education) which better equips all American youth to live democratically with satisfaction to themselves and profit to society as home members, workers, and citizens.²⁸

In discussing the criteria for selecting subject matter, Leonard declared that "subject matter is a function of the individual, of time, and of social customs."²⁹ Although they mentioned that some cautions should be observed, Smith, Stanley, and Shores said "...the school should provide those educational experiences that will, in any given case, best utilize the present drives and motivations of the learner in activities designed to direct

²⁷Alexander Inglis. Principles of Secondary Education. New York: Houghton Mifflin Company, 1918, p. 368.

²⁸U. S. Office of Education, Federal Security Agency, Life Adjustment Education for Every Youth, Bulletin 1951, No. 22, p. 4.

²⁹J. Paul Leonard. Developing the Secondary School Curriculum. Revised edition. New York: Rinehart & Company, Inc., 1953, p. 102.

his growth toward the ends desired by society."³⁰ Albery³¹ and Romine³² also have indicated that the basis for curriculum building is the interaction of the needs of the individual and of society. These philosophies amount to a restatement of Inglis' three fundamental aims: Social-Civic, Economic-Vocational, and Individualistic-Avocational.

³⁰Smith, Stanley, and Shores, op. cit., p. 556.

³¹Harold Albery. Reorganizing the High-School Curriculum. Revised edition. New York: The Macmillan Company, 1953, p. 45

³²Romine, op. cit., p. 108.

Definite Need for Aviation Education in the Curriculum.

The airplane has made its mark in both peace and war. The zooming growth and progress of aviation has had and is having a direct impact on all mankind. In addition to those areas commonly thought of as dealing with aviation, aviation has created new problems and new opportunities in fields such as law, metallurgy, chemistry, ceramics, air-conditioning, bioastronautics (aviation and space medicine), epidemiology, and diplomacy. It is a new tool for cartographers and geologists. Businesses rely on aviation for administration, supply, distribution, and markets. Its influence is felt on every individual as a consumer (directly and indirectly), as a worker, and as a social being. Look where you will, but you will not find a field untouched by aviation. The old slogan "the future belongs to those who prepare for it" is never more appropriate than now.

A review of material used in discussing the selected three determinants of the modern curriculum as applied to aviation education clearly indicates that aviation has powerful implications

⁷⁰"Civil Aviation Flights Reach New Peak," Planes, vol. 15, February 27, 1959, p. 8.

⁷¹Ibid.

in either the Social-Civic Aim or the Economic-Vocational Aim, and to a lesser degree, the Individualistic-Avocational Aim. Aviation's impact on either of the first two aims would absolutely warrant its inclusion in the modern curriculum. Taking the implications in concert, the need is so overwhelming that it just cannot and must not be ignored. (For additional thoughts relative to organized education and aviation, see APPENDIX I.)

Mehrens stated the case very concisely:

Aviation enters the picture not only because it can be translated into military power, and is thus a major factor in our national destiny and perhaps in the survival of Western civilization, but also because its impact upon all fields of peaceful pursuits make it as powerful as, if not more powerful than, that of any other contemporary social force.⁷²

Brewer, Robinson, and Thomas have clearly sounded the challenge:

There can be no question of the effects of aviation upon the realities of today's world. If education is to be conducted in terms of these realities, there can be no doubt concerning the urgent need for a modification of the curricular programs of most of the nation's school systems. If education is to meet the needs of an air age, the curriculum must change so that aviation's influence can be accommodated.⁷³

Whatever the curriculum organization--experience, core, broad fields, correlated, subject matter, or several fused areas--aviation does have a proper place in it! If the needs of the

⁷²Mehrens, op. cit., p. 100.

⁷³A. C. Brewer, Georgia Robinson, and Ruth Thomas (eds.), Curriculum Guide for Aviation Education. Knoxville, Tennessee: Tennessee Aeronautics Commission, 1958, p. 11.

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The airplane has made its mark in both peace and war. The zooming growth and progress of aviation has had and is having a direct impact on all mankind. In addition to those areas commonly thought of as dealing with aviation, aviation has created new problems and new opportunities in fields such as law, metallurgy, chemistry, ceramics, air-conditioning, bioastronautics (aviation and space medicine), epidemiology, and diplomacy. It is a new tool for cartographers and geologists. Businesses rely on aviation for administration, supply, distribution, and markets. Its influence is felt on every individual as a consumer (directly and indirectly), as a worker, and as a social being. Look where you will, but you will not find a field untouched by aviation. The old slogan "the future belongs to those who prepare for it" is never more appropriate than now.

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⁷⁰"Civil Aviation Flights Reach New Peak," Planes, vol. 15, February 27, 1959, p. 8.

⁷¹Ibid.

individual and society are to be met, organized education must overcome the traditional "education-lag" and provide aviation education for all youth.

Chief Areas of Educational Activities Needed to Accomplish Aviation Education. Aviation appeals to the imagination of all humans and can be used as a strong motivating force in all levels of teaching. The following examples deal with a ninth-grade class and a first-grade class. Oliver reported an aviation education project (ninth-grade, Concord, New Hampshire, high school) which provided motivation for the study of general mathematics and which carried through the year under its own momentum because it was within the interests and experiences of the students.⁷⁴

Pupil interest in aviation was aroused in a first-grade class in Ohio when two of the pupils brought to school small planes that had been made at home.⁷⁵ Besides singing about planes, the pupils have read about them and have drawn pictures of them. Their big project was making a plane large enough so that they could take turns sitting in it and pretending to take trips to Washington, D. C., California, Africa, and other places they could talk about. The teacher reported that many of the activities of the room have centered around the plane. An

⁷⁴Muriel N. Oliver, "Aviation in General Mathematics," The Bulletin, National Association of Secondary-School Principals, vol. 34, January 1950, pp. 108-109

⁷⁵"Stewart School First Graders Study Flying, Build Airplane," The Oxford Press, Oxford, Ohio, May 7, 1959, Section One, p. 4, col. 2.

additional project that the pupils have undertaken is writing and illustrating airplane books of their own to take home to their parents. As a result of their interest a class visit was made to the local airport where they observed the hangar, sat in an airplane and handled the controls, learned about flying and the windsock, and watched an airplane land.

The attention and interest of school administrators are important factors in incorporating aviation education in the curricula of our schools. In 1955, Gill Robb Wilson singled out the State Superintendents of Education as the key men of public education and said:

If, unindoctrinated in the vast implications of aviation, they view "aviation education" with a jaundiced eye, who is to blame them? How are they to know that we are not just another pressure group?⁷⁶

He suggested that these key men be taken on a tour of the nation's air endeavors--military, industry, great airports, aircraft carriers, research laboratories, air bases, proving grounds, cockpits, and "Wherever else there is evidence of what modern youth needs by way of education to make him at home in the air age"--under the leadership of the U. S. Department of Education.⁷⁷ In addition to this indoctrination he proposed:

...enough funds (for educators) to finance such research projects as might help him to the decision of when, where and how he could adjust school curricula to best serve American youth in the air age.

⁷⁶Gill Robb Wilson, "Public School Education--The Bullseye," an editorial, Flying, vol. 57, October 1955, p. 8.

⁷⁷Ibid.

With these two basic steps taken, I would then lean on the professional educators for results. If he does not provide the means to a greater national air consciousness--then God help the country!⁷⁸

The school administrators are important but in the final analysis any successful program of aviation education rests with the individual teacher. It is disconcerting to hear and read statements, concerning the teaching profession, such as:

Sometimes it is in spite of and not because of a school's program that youth become conversant with the changing world. Fortunately informal education continues in the market place, on the street and on the playground. Quite often this circumstance results in students knowing more about life's realities, including developments in aircraft and the uses of these, than do their teachers.⁷⁹

And this one by Geuting:

It is certainly a fact that relatively few of the tens of thousands of persons who make-up the educational profession have any formal knowledge of air age education. This simply means that the youth of our land, whose lives will be more greatly affected by the air age than ours, are being taught by an earthbound generation of teachers.⁸⁰

Any realistic goal for the accomplishment of aviation education must include teachers and school administrators. There are four chief areas of educational activity which require immediate and continuing attention:

1. Inclusion of aviation education in all teacher preparatory programs at teacher training institutions. The nature and extent of the progress to be made in aviation education will ultimately depend upon pre-service training. A committee

⁷⁸Ibid.

⁷⁹Brewer, Robinson, and Thomas (eds.), op. cit.

⁸⁰Joseph T. Geuting, Jr., "General Aviation in Business, Industry and Agriculture," lecture delivered before the Ninth Air Transportation Institute of American University, Washington, D. C., October 31, 1955.

of the American Association of Colleges for Teacher Education made this strong recommendation: "...we recommend that aviation education be a part of every teacher's preparation."⁸¹

2. Until all teachers have a background in aviation education, it will be necessary to conduct accredited, aviation education workshops at colleges and universities. The following recommendations were included in a 1949 report made by a committee of the American Association of School Administrators:

That in order to make aviation education an integral part of the total school program in America, curriculum workshops and courses of instruction be established at both state and local levels.

That recognition be given those teachers who are equipped to incorporate aviation education in their regular program, and that attendance of supervisory personnel at orientation conferences be encouraged.⁸²

Activity in this area has been steady through the past few years with workshops being conducted in all parts of the country. In 1955, thirty-one were held; in 1958, thirty-seven were conducted (APPENDIX II); and thirty-five are scheduled to be held in 1959 (APPENDIX III). The Civil Air Patrol has been extremely active in this area, sponsoring a national aviation education workshop for the past several years, assisting with the planning of many regional and local efforts, and obtaining

⁸¹American Association of Colleges for Teacher Education. Report of Aviation Education Committee. Washington, D. C.: U. S. Government Printing Office, August 1949, p. 108.

⁸²American Association of School Administrators. Aviation Education. Washington, D. C.: American Council on Education, in cooperation with Civil Aeronautics Administration, September 1949, p. 10.

scholarships for teachers to attend. In addition to providing information concerning content and methodology, these workshops also serve to provide the leadership and resource personnel necessary for the conduct of other workshops and of the third required activity--in-service training.

3. School systems and/or individual schools should include aviation education in their in-service training program. Dade County, Florida and the Minneapolis Public Schools have expended considerable efforts in this area. For example, the Minneapolis Public Schools initiated an in-service aviation education program on open circuit television. Eleven 30-minute aviation education programs were telecasted in 1958 as part of their "As Teachers Teach" series, a regular weekly in-service program. (Eight of these programs were kinescoped and are available on loan through the Civil Air Patrol.) Regarding in-service education and the curriculum, Romine commented that "this approach to the improvement of teachers has not been fully exploited, in fact, many schools have done relatively little with it."⁸³ An in-service aviation education program is a challenging area of endeavor and much more must be done.

4. Because of the pressure of time and events, some teachers and school administrators may find that they must resort to independent, individual study.

⁸³Stephen A. Romine. Building the High School Curriculum. New York: The Ronald Press Company, 1954, p. 34.

CHAPTER IV

DATA

Response to the Questionnaire. Eleven individuals were interviewed. Forty-eight questionnaires were mailed and four were returned as "unable to locate." Eleven persons of the forty-four did not reply: thirty-three (or 75 per cent) replies were received. Of the thirty-three replies, six individuals indicated limited or no experience resulting in twenty-seven usable mail replies. These twenty-seven coupled with the eleven interviews totaled thirty-eight usable replies.

TABLE VI (page 58) records the respondents' interest in receiving a copy of the results of the survey. Thirty-seven of and thirty-eight respondents with usable replies (or 97 per cent) provided an affirmative answer: one individual left this portion of the questionnaire blank.

Aviation Education Workshop Experience of Respondents and Institutions and States Represented. The thirty-eight respondents indicated that throughout the years that they had had first-hand experience with a combined total of 237 aviation education workshops. This is an average of six workshops per individual.

These individuals held positions as: Professors, Associate, or Assistant Professors of Education, Industrial Arts Education, or Transportation and Public Utilities; Aviation Education Specialists;

TABLE VI
RESPONDENTS' INTEREST IN RECEIVING A
COPY OF THE RESULTS OF THE SURVEY

Respondents	Yes	No	Blank	Total	Per Cent Yes
The six who indicated limited or no previous experience	2	1	3	6	33
The twenty-seven usable mail replies	26	0	1	27	96
The eleven interviewed	11	0	0	11	100
Total	39	1	4	44	89

Chairman, Division of Science; Head of Department of Geography; Dean of Instruction; High School Principal; High School Dean; Coordinator of Workshops; Director of Institute of Tropical Meteorology; Instructor; Director of Aviation; Superintendent of City Schools; Elementary Instruction and Supervision Director of a Public School System; State Consultant in Secondary Education; State Aeronautics Commission Administrators; Airline Director of School and College Service; and an Air Force Reserve Center Commander.

Individuals who had conducted aviation education workshops for twenty-four institutions of higher learning plus aviation education specialists from Washington, D. C. and ten states answered the questionnaire (APPENDIX V.) In all, twenty-three states, Washington, D. C., and Puerto Rico were represented.

For Whom Shall the Workshop Provide? The respondents (thirty-eight usable questionnaires) indicated that a workshop should provide for the following (number of respondents indicated in parentheses):

1. All elementary teachers. (30)
2. All secondary teachers. (37, plus one respondent who indicated secondary science and mathematics teachers)
3. All college teachers. (11, plus one respondent who specified college teachers in education)
4. All students preparing to be teachers. (9)
5. School administrators. (16)
6. School supervisors. (9)
7. Laymen interested in aviation. (14)

Various opinions were reported concerning the clientele for aviation education workshops; representative comments were:

1. Teachers with at least one year of experience.
2. All teachers, all grades, all subjects.
3. Elementary school teachers or advanced work for secondary science and mathematics teachers, but not together.
4. Students with at least junior classification who plan to teach.
5. Participants should be as homogeneous in background and preparation as possible. A pre-test or information inventory at the opening of the workshop was suggested to determine this.

Aviation Education Workshop Objectives. The respondents made recommendations for aviation education workshop objectives which varied from very broad objectives to very specific objectives. One respondent furnished a list of seventy-one objectives (see APPENDIX VI). Twenty-four (or 63 per cent) of the usable questionnaires specifically mentioned the fourteen recommendations contained in the 1949 Report Of the Aviation Education Committee, American Association of Colleges for Teacher Education. In the following tabulation these fourteen objectives are listed and an interpretation of the objectives listed by the respondents was made to determine if the working of the fourteen AACTE objectives fairly reflected their statements. Where such was not the case, additional objectives (to the fourteen) were added; there were three additions made. Numbers in parentheses following the objective indicate the number of respondents who indicated such an objective.

1. An adequate reading and speaking vocabulary of aviation. (37)
2. (Knowledge of) The importance of weather and climate to successful aviation. (38)
3. A general knowledge and understanding of air-plane structure. (38)
4. A general knowledge and understanding of the simple scientific principles of flight (38)
5. An understanding of the places of aviation in peace and war. (37)
6. An understanding of the effects of air transportation on various levels of international relationships. (37)
7. An introduction to the social, economic and political implications of current and future aviation development. (38)
8. An appreciation of the services rendered by airports and their associated personnel. (37)
9. Familiarity with existing and needed basic governmental services, regulations and relationships in aviation. (37)
10. A knowledge of available aviation education resources in materials, personnel, (organizations) and equipment for instructional purposes. (37)
11. The know-how for organizing units of aviation education (for actual use in their own teaching, curricular, or administrative problems) and providing resulting learning experience for children through student or directed teaching. (37)
12. A realization of the growing interdependence of people through aviation. (37)
13. An understanding of problems--political, economic, international and social--that aviation has created and the institutions society has established to solve these problems. (37)
14. A realization of how the airplane has changed geographic relationships--particularly in terms of mankind's concepts of time, place and distance and mankind's attitudes toward waterways, land masses and land and water barriers.⁸⁴ (37)

⁸⁴American Association of Colleges for Teacher Education. Report of Aviation Education Committee. Washington, D. C.: U. S. Government Printing Office, August 1949, p. 108.

15. To provide educators with information related to space science that is not readily available in published form and to develop an understanding of how concepts too recent for general inclusion in text books may be treated at successive grade levels. (2)

16. An understanding of the problems involved in operating an aviation education workshop.(9)

17. First-hand experience with flight. (2)

Optimum Length of Time for an Aviation Education Workshop.

The respondents made recommendations concerning the length of the workshop as follows:

1 to 6 weeks	(1)
2 weeks	(1)
2 to 3 weeks	(1)
2 to 4 weeks	(1)
2 to 6 weeks	(3)
3 weeks	(7)
4 weeks	(7)
4 to 5 weeks	(4)
4 to 6 weeks	(2)
4 to 8 and 10 weeks	(1)
5 weeks	(4)
5 to 6 weeks	(1)
6 weeks	(3)
8 weeks	(1)
No indication	(1)

TABLE VII records the recommended length of a workshop and includes the multiple answers of the respondents.

TABLE VII

RECOMMENDED LENGTH OF WORKSHOP
(INCLUDING MULTIPLE ANSWERS)

Duration In Weeks	Number of Respondents	Per Cent of Total Multiple Answers
1	1	1
2	7	10
3	13	18
4	19	27
5	16	22
6	11	16
7	1	1
8	2	2
9	1	1
10	1	1
Total	72	100

Essential Activities and Experiences to be Included in a Workshop. The following activities and experiences were indicated as "essential" by the respondents (they are not listed in any order of importance):

1. Pre-test or information inventory.
2. Basic fundamentals of aviation and astronautics (aerospace developments). Basic content in one or more (depending upon available time) of the fourteen objectives listed in the 1949 Report of the American Association of Colleges for Teacher Education; includes such subjects as: aircraft, rockets, missiles and satellites, flight, propulsion, weather, navigation, airports, airways and traffic control, communications and electronics, and air power.
3. History of aviation.
4. The use, effects, and problems of aviation (social, economic, and political aspects of aviation).
5. Collecting and evaluating aviation source material (and getting acquainted with aviation organizations for knowledge of available resource people as well as materials).
6. Information on how to integrate or fuse aviation material into all subject areas at all school levels and how to present aviation as a separate elective course.
7. Curriculum planning which includes information on questions that children are most likely to ask about aviation. Individual preparation of aviation curriculum materials (course or teacher outlines or resource units) for personal use. A written plan of action for subsequent use by the teacher in his own teaching situation (special interest projects).

8. How to assume aviation education leadership in the schools and community.

9. Use of outstanding resource people for the latest factual information and contact with leaders of aviation organizations for inspiration and motivation.

10. Model aircraft building (construction and use of aviation teaching aids).

11. Orientation (or experience) flights.

12. Flight instruction (pilot training).

13. Inspection field trips (tours) to airports, military aviation installations, aviation industries, and demonstrations such as Civil Air Patrol's search and rescue (SARCAP).

14. Detailed evaluation of the workshop by the participants.

Assigning an arbitrary value of 5 points for an indication of a first order of importance by the respondents, 4 points for second order of importance, 3 points for third order, 2 points for fourth order, and 1 point for fifth order, the following is the order of importance of the reported "essential" activities and experiences as determined by the total points (TABLE VIII):

1. Basic fundamentals of aviation and astronautics.	139 points
2. Curriculum planning.	86 points
3. Orientation flights.	81 points
4. Field trips (tours).	76 points
5. Use of outstanding resource people.	49 points
6. The use, effects, and problems of aviation.	44 points
7. Information on how to integrate or fuse aviation material into all subject areas at all school levels and how to present aviation as a separate course.	40 points

- | | |
|---|-----------|
| 8. Collecting and evaluating aviation source material. | 27 points |
| 9. Model aircraft building (construction and use of teaching aids). | 13 points |
| 10. How to assume aviation education leadership in the schools and community. | 9 points |
| 11. History of aviation. | 3 points |
| 12. Pre-test or information inventory. | 3 points |
| 13. Flight instruction (pilot training). | 2 points |
| 14. Detailed evaluation of the workshop by the participants. | 2 points |

Desirable (but Not Essential) Activities and Experiences to be Included in a Workshop. The following activities and experience (and comments) were reported as being desirable, but not essential, by the respondents: they are not listed in any order of importance (where no mention is made of the number of respondents, the comment was made by only one):

1. Eight respondents mentioned model aircraft building and flying.
2. Seven respondents indicated planned social activities.
3. Five mentioned the need for expansion of the activities indicated as "essential"; the feeling being that the workshop should concentrate on doing a good job with the "essentials" and that the "non-essentials" would take care of themselves.
4. Four would devote any "extra time" available for additional time for research in special topics and individual problems.
5. Three stated that the use of more aviation films would be desirable.

TABLE VIII

INDICATED ORDER OF IMPORTANCE OF REPORTED
"ESSENTIAL" ACTIVITIES AND EXPERIENCE

Activities and Experiences Indicated As "Essential" By Respondents	Number Reporting Order of Importance As:					Total Points
	1	2	3	4	5	
1. Pre-test or information inventory	0	0	0	0	5	3
2. Basic fundamentals of aviation and astronautics.	24	1	4	1	1	139
3. History of aviation.	0	1	0	0	1	5
4. The use, effects, and problems of aviation.	2	3	4	3	4	44
5. Collecting and evaluating aviation source material.	0	1	2	6	5	27
6. Information on how to integrate and how to present aviation as a separate elective course.	1	2	6	2	5	40
7. Curriculum planning. Individual preparation of a written plan of action.	1	11	9	4	2	86
8. How to assume aviation education leadership in the schools and community.	0	1	0	1	3	9
9. Use of outstanding resource people.	1	4	6	3	4	49
10. Model aircraft building (construc- tion & use of teaching aids).	0	0	1	3	4	13
11. Orientation flights.	9	5	3	1	5	81
12. Flight instruction (pilot tng.).	0	0	0	0	2	2
13. Field trips (tours).	2	7	5	11	3	70
14. Detailed evaluation of the work- shop by the participants.	0	0	0	0	2	2

"First order of importance given a value of 5; second order 4; third order 3; fourth order 2; and fifth order 1.

6. Three mentioned the collection of aviation source material.
7. Three respondents thought that discussions by teachers with similar teaching situations would be beneficial in order to share experiences and to see what others are doing.
8. Two felt that the use of nationally-known speakers of the many groups interested in aviation would add prestige to the workshop.
9. Two placed "field trips" in this category.
10. Two listed opportunity for flight instruction (pilot training.)
11. Two felt that when facilities were available, flight could be made to points of aviation interest by individuals and that those making the flights would report to the rest of the workshop on the activity they observed. A note of caution was mentioned that these cross-country air tours should be carefully planned as tours with little or no purpose are likely to lose their value after a brief period in the air.
12. Schedule an "Open House" to provide an opportunity for the workshop to contribute to the general education of the entire college.
13. Use of a demonstration aviation class, as in a laboratory school, to show observers practical things that may be done with children.
14. Providing central housing and cafeteria facilities to provide opportunities to build associations that can be drawn upon at later dates for advice and assistance in resolving teaching problems.
15. A flight in a commercial or military airplane.
16. Provide opportunities for combining the aviation workshop with other campus activities such as conservation and geology classes.

17. Wherever and whenever possible, the Civil Air Patrol should be "dealt into the game" by including time and facilities for conducting a CAP staff school in connection with the workshop. By so doing a larger area of resource men, facilities, and materials will be open to all workshop participants.

18. If anything is desirable, it is essential. Nothing that is desirable should be left out.

19. Included in this category are all those non-essential things that could be justified which develop and keep at a high level the morale of the workshop participants while they are engaged in the activities mentioned as "essential." ("The days that make us happy, make us wise.") In some of the workshops this aspect has been overdone to a degree which obscured some of the more essential and basic activities. It is difficult to be specific here because the morale requirements vary with different groups and, from time to time, within the same group. What would be justified on one occasion might not be on another.

Additional Suggestions and Remarks by the Respondents. Twenty-two (or 58 per cent) of the thirty-eight respondents with usable questionnaires made additional comments. Suggestions (not necessarily in agreement with one another) made to assist in the development of better aviation education workshops are as follows:

1. Suggest that in light of recent developments, that concepts concerning space travel and interstellar navigation be included.
2. Enlist the cooperation of the United States Air Force's Air Training Command and Air Force ROTC; also the Air Transport Association of America and Civil Air Patrol.
3. Use well-qualified instructors.

4. Several respondents indicated the need of getting the subject matter well organized and coordinated for the groups involved. Don't be too technical; start as elementary as necessary for the group.

5. Scholarship support should be obtained and made available to those needing support as it tends to involve business, industry, boards of aeronautics, etc. in a more personal relationship with the recipient.

6. Sixty-three per cent of those who made additional comments (14 respondents) cautioned planners of workshops to be realistic about their objectives and not to schedule too much for the time allotted. In general, their recommendation was to develop objectives according to the time available, and if time is not available to include all of the aspects of aviation, then do a good job with a chosen few.

7. Start full scale publicity one year in advance of the workshop -- get articles in journals serving teachers in the area under consideration.

8. Evaluate the material distributed to class numbers.

9. It is best to schedule the orientation flights before the end of the first week of the workshop.

10. It is most important that ALL phases of aviation and space flight be offered even though complete coverage is not made for each one. Most teachers have found the workshop to be both interesting and valuable when this is adhered to.

11. An aerospace education course is better than a workshop in most cases.

12. Make certain to involve the student in the activities.

13. Avoid too many speakers; select each with an eye to his ability to awaken interest.

14. Eliminate full scholarships -- give assistance only where and when needed. This will help to eliminate those "coming just for the ride."

15. Make the workshop interesting by keeping it moving and proceeding in logical steps. Don't bog down on technical details. Teachers are interested in basic principles and with things they can use.

16. The workshop is an established part of our teacher -- education system. It serves as a "refresher" for the seasoned veteran. It was first developed so that the teacher could learn through "work" (self-teaching). This is an important concept which must never be lost sight of.

17. Make a follow-up of all participants.

18. No workshop should be planned without blue-printing a task to be accomplished in addition to the basic objectives. This task could be in the nature of aviation materials, study guides, etc.

19. All teachers need to be identified with their aerospace age environment so that they may better assume their role as citizen and teacher. Aviation education programs in the past have been concerned largely with the concept of "spread" without giving sufficient attention to the concept of "depth".

20. Experience has shown it is good to use a pre-test or information inventory at the opening of the workshop to help plan additional curricula experiences.

21. The carry-over into the classroom is greater with a workshop experience than with in-service training programs.

22. Many aviation education workshops are hampered by:

- a. Too many speakers representing too many interests.
- b. A lack of definite coordination between various phases of the workshop.
- c. Lack of academic acceptance on the part of the college faculty.
- d. Inexperience and lack of information on the part of instructors.
- e. Inability on the part of instructors to coordinate this activity with the regular accepted curriculum.
- f. Lack of mental activities and study on the part of the students enrolled in the course. In many instances the "workshop" and "easy credit" are synonymous terms.

As a result of the increased emphasis on space activities, there seems to be a definite trend toward changing the name of the aviation education workshop to include the work "space" or "astronautics." The Oregon State System of Higher Education, for instance, already uses "Air and Space Education Workshop" as the title of their workshop. Various combinations of aviation and astronautics have been noticed; the more common ones are: Aero-Space (or Aerospace) Education, Air Space Education, Aviation and Astronautic Education, and Air and Astronautical Education.

EVALUATION BY THE AVIATION EDUCATION SPECIALISTS

Five aviation education specialists were selected to evaluate the data collected. Each of these five specialists has had considerable experience with aviation education and with aviation education workshops; for example, one of them has been engaged in aeronautical education at one of our universities since 1924, and another is one of the few--if not the only--individuals in the world with a doctorate degree in aviation education. All five specialists replied.

Specialists' Suggestions Regarding the Clientele for Aviation Education Workshops. The specialists agreed that any teacher, supervisor, administrator, or interested layman can be included in a workshop; however, two opposing views were mentioned:

1. Where the workshop is made up of both elementary and secondary school teachers, separate sessions for these groups should be scheduled in addition to general sessions. This would apply also to any other groups. If the workshop is one for beginners, the time devoted to general sessions could be more than half. For groups who have attended one or more aviation education workshops, the special sessions should merit the most time.

2. Homogeneous grouping by any criterion is neither possible from an administrative point of view nor desirable from the viewpoint of the general educational objectives of a workshop

Specialists' Suggestions for Aviation Education Workshop Objectives. The respondents' objectives were reported to be entirely adequate. Two of the specialists felt that it was of great importance

to add "and value" to the objective listed as number seven. As amended, this objective would then read: "An introduction to the social, economic, political, and value implications of current and future aviation development."

Specialists' Suggestion Relative to the Length of a Workshop.

There was unanimous agreement that there could be no one period of time for an aviation education workshop. One specialist mentioned that the best workshops with which he had been associated, were four to six weeks in length. He further stated that from a practical point of view, effective use can be made of any period of time--if the program is planned properly. The general feeling was that the length of the workshop must be based on a consideration of the time which the participants have in which to engage in it and the time--credit policy of the institution.

Specialists' Suggestions Concerning "Essential" Activities and Experiences. The specialists agreed in general with the reported "essential" activities and experiences, but not in the respondents' order of importance. Two of the specialists thought that it would not be possible to attain the reported objectives without accomplishing the listed fourteen activities and experiences. Three of the five, however, felt that flight instruction (pilot training) should not be an "essential" activity. They were unanimous in placing basic fundamentals of aviation and astronautics on top of the list. The specialists' order of importance of the reported "essential" activities and experiences and a comparison of their ratings with the respondents' ratings is recorded in TABLE IX, Utilizing the

assignment of an arbitrary point value, the following specialists' order of importance was determined by the total points (TABLE IX):

1. Basic fundamentals of aviation and astronautics.	70 Points
2. Orientation flights	59 Points
3. Field trips (tours).	59 Points
4. The use, effects, and problems of aviation.	53 Points
5. Curriculum planning (individual prepar- ation of aviation curriculum materials; a written plan of action.	51 Points
6. Use of outstanding resource people.	42 Points
7. Collecting and evaluating aviation source material.	36 Points
8. Model aircraft building (construction and use of teaching aids.)	36 Points
9. Information on how to integrate or fuse aviation material into all subject areas at all school levels and how to present aviation as a separate course.	32 Points
10. How to assume aviation education leader- ship in the schools and community.	28 Points
11. History of aviation.	27 Points
12. Pre-test or information inventory.	12 Points
13. Detailed evaluation of the workshop by the participants.	10 Points
14. Flight instruction (pilot training).	5 Points

TABLE IX

AVIATION EDUCATION SPECIALISTS' ORDER OF IMPORTANCE OF
REPORTED "ESSENTIAL" ACTIVITIES AND EXPERIENCES AND
COMPARISON OF RATINGS WITH RESPONDENTS' RATINGS

"Essential" Activities and Experiences in Respondents' Order of Importance	Number of Specialists Reporting Order of Importance As:														Total* Points
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1. Basic fundamentals	5														70
2. Curriculum planning		7			1	1			1						51
3. Orientation flights		1	2	2											59
4. Field trips		1	2	2											59
5. Resource people					3			1		1					42
6. Use, effects, and problems of aviation		1	1	1		1	1								53
7. Integrate aviation and separate course						2	1			1	1				32
8. Source material						2	1	1		1					38
9. Model building (teaching aid construction)					1		1	1	1	1					36
10. How to assume aviation leadership								1	2	2	1				28
11. History of aviation						1			1		3				27
12. Pre-test or Informa- tion inventory												2	3		12
13. Flight instruction**												1	1		5
14. Detailed evaluation												2	1	2	10

*First order of importance given a value of 14; second order, 13, third order, 12; fourth order, 11; fifth order, 10; sixth order, 9; seventh order, 8; eighth order, 7; ninth order, 6; tenth order, 5; eleventh order, 4; twelfth order, 3; thirteenth order, 2; and fourteenth order, 1. (H=5)

**

Three specialists recommended deletion.

Line of exact agreement between specialists and respondents. A tabulation to the left of this line indicates that the specialists placed a greater degree of importance to that item than the respondents did; right of the line, a lesser degree of importance.

Combining the points determined by the respondents' order of importance with the points determined by the specialists' order of importance resulted in the following combined order of importance (combined points listed after the item):

1. Basic fundamentals of aviation and astronautics. 209 Points
2. Orientation flights. 140 Points
3. Field trips (tours) 137 Points
4. Curriculum planning (individual preparation of aviation curriculum materials; a written plan of action. 137 Points
5. The use, effects, and problems of aviation. 97 Points
6. Use of outstanding resource people. 91 Points
7. Information on how to integrate or fuse aviation material into all subject areas at all school levels and how to present aviation as a separate course. 72 Points
8. Collecting and evaluating aviation source material. 65 Points
9. Model aircraft building (construction and use of teaching aids). 49 Points
10. How to assume aviation education leadership in the schools and community. 37 Points
11. History of aviation. 30 Points
12. Pre-test or information inventory. 15 Points
13. Detailed evaluation of the workshop by the participants. 12 Points
14. Flight instruction (pilot training) 7 Points

A comparison of the orders of importance of the reported "essential" activities and experiences is recorded in TABLE X.

TABLE X

COMPARISON OF THE ORDERS OF IMPORTANCE OF REPORTED
"ESSENTIAL" ACTIVITIES AND EXPERIENCES

Reported "Essential" Activities and Experiences	Order of Importance		
	Respondents (N=38)	Specialists (N=5)	Combined (N=43)
1. Basic fundamentals	1	1	1
2. Curriculum planning	2	5	3½
3. Orientation flights	3	2½	2
4. Field trips	4	2½	3½
5. Resource people	5	6	6
6. Use, effects, and problems of aviation	6	4	5
7. Integrate aviation and separate course	7	9	7
8. Source material	8	7	8
9. Model building (teaching aids construction)	9	8	9
10. How to assume aviation leadership	10	10	10
11. History of aviation	11½	11	11
12. Pre-test or information inventory	11½	12	12
13. Flight instruction	13½	14	14
14. Detailed evaluation	13½	13	13

Specialists' Suggestions Regarding Desirable (but Not Essential) Activities and Experiences. There was little comment on this category. The tenor of the replies was that any activity will reflect the individuality of the director and that most persons can think of one or more desirable activity which they would like to see included in any program with which they are associated. A word of caution to remember the goals was expressed. Do not attempt to jam more into the program than can reasonably be accomplished in the allotted time and do not schedule "desirable" activities at the expense of "essential" ones.

Specialists' Comments Concerning the Additional Suggestions and Remarks Made by the Respondents. The specialists thought that most of the remarks by the respondents were well taken and that they should be of considerable value to persons planning a workshop. Two of them took exception to the comment by one respondent that an aerospace education course is better than a workshop in most cases. They felt that this was an assumption which could not be conceded because the objectives of any course are necessarily different than the objectives of a workshop. One specialist offered an additional comment. He suggested that about fifty per cent of the time should be devoted to basic content material and that the rest of the time should be used for the other objectives.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary. The main purpose of this study was to develop suggested curricular experiences for a summer aviation education workshop.

A review of previous research and related literature indicated that there is a definite need for aviation education in our schools and that aviation does have a proper place in our schools' curricula.

An open-form questionnaire survey of fifty-nine individuals (eleven by interview and forty-eight by mail) experienced in the conduct of aviation education workshops was made. Four of the mailed questionnaires were returned as "unable to locate," eleven persons did not reply, and six individuals indicated limited or no experience. The twenty-seven usable mail replies plus the eleven interviews resulted in a total of thirty-eight usable replies. Five aviation education specialists were selected to validate the data.

Data collected showed that the clientele should include all elementary (38 responses) and all secondary (37 responses) school teachers, school administrators (16), and laymen interested in aviation (14). Inclusion of all college teachers ranked next with 11 responses. All students preparing to be teachers and school

supervisors each had 9 responses. The aviation education specialists agreed that any teacher, supervisor, administrator, or interested layman can be included in a workshop.

A majority of the respondents (63 per cent) specifically mentioned the fourteen recommendations contained in the 1949 Report of the Aviation Education Committee, American Association of Colleges for Teacher Education, as the objectives for an aviation education workshop. These fourteen objectives were included in all, except one, of the thirty-eight recommendations made; the respondents who did not mention the report, used their own words to express the same thought. In addition to the fourteen objectives proposed by the American Association of Colleges for Teacher Education, the objective of "an understanding of the problems involved in operating an aviation education workshop" was frequently mentioned. The specialists indicated that the fourteen plus three additional objectives reported by the respondents were entirely adequate. Two specialists felt it important to add "and value" to the objective listed as number seven. As amended, this objective would then read: "An introduction to the social, economic, political, and value implications of current and future aviation development."

Although the respondents made recommendations for the optimum length of a workshop which ranged from one to eight weeks, the greatest percentage (27 per cent) of the answers were for four weeks' duration. A duration of five weeks ranked second with 22 per cent of the answers, and three weeks ranked third with 18 per cent. The

specialists felt that there could be no one period of time for an aviation education workshop and that this was a determination which can only be made by individual directors and institutional administrators.

The most important "essential" activity or experience reported was that of basic fundamentals of aviation and astronautics; in the respondents' listing, this received 139 points out of a possible 185 maximum points. The item ranking second in this category, with 86 points, was curriculum planning or individual preparation of aviation curriculum materials (or a plan of action) for personal use. Orientation flight (81 points) was third and field trips or tours (78 points) was fourth. Use of outstanding resource people ranked fifth with 49 points. The specialists agreed in general with the reported "essential" activities and experiences but not in the respondents' order of importance. Three of the five specialists felt that flight instruction (pilot training) should not be an "essential" activity. They were unanimous in placing basic fundamentals of aviation and astronautics on top of the list. The first five items in the specialists' order of importance were: (1) basic fundamentals of aviation and astronautics (with 70 points out of a possible 70 maximum points); (2) orientation flights (59 points); (3) field trips (59 points); and (4) the use, effects, and problems of aviation (53 points); and (5) curriculum planning or individual preparation of aviation curriculum materials; a written plan of action for personal use (51 points).

Many different items were mentioned as desirable (but not essential) activities and experiences. Those mentioned most by the respondents were: model aircraft building and flying (by eight

respondents); and expansion of the activities indicated as "essential" (by five respondents). There was little comment by the specialists on this category. A word of caution to remember the goals was expressed. Do not attempt to jam more into the program than can reasonable be accomplished in the allotted time and do not schedule "desirable" activities at the expense of "essential" ones.

Twenty-two (or 58 per cent) of the thirty-eight respondents with usable questionnaires made additional comments. These suggestions (not necessarily in agreement with one another) were made to assist in the development of better aviation education workshops. The specialists thought that most of the remarks were well taken and that they should be of considerable value to persons planning a workshop.

Conclusions. Although it is evident that each aviation education workshop will vary somewhat, several conclusions common to all workshops can be made.

Clientele. The clientelle of an aviation education workshop should be all teachers, school administrators, and laymen interested in aviation; mature students preparing to become teachers may also be included. Because the workshop has general educational objectives, this lessens any problem of group homogeneity; however, careful planning is necessary to assure that the workshop objectives are met for each group of participants.

Objectives. With slight modifications, the fourteen objectives contained in the 1949 Report of the Aviation Education Committee, American Association of Colleges for Teacher Education,

plus the addition of three more objectives, can adequately serve as the objectives of any aviation education workshop. These seventeen modified objectives are listed on pages 86 to 88.

Length of Time. Although no one specific period of time can be stated for all workshops, the general belief is that at least four or five weeks are necessary. Directors of workshops of a lesser period of time should carefully review the objectives and eliminate those that are considered to be of lesser importance. This action should be taken in order to do a satisfactory job with fewer objectives in the time available rather than attempting to "touch" all objectives without adequately covering any.

Activities and Experiences. Each workshop should include the following "essential" activities and experiences: (1) basic fundamentals of aviation and astronautics; (2) orientation flight; (3) field trips; and (4) curriculum planning or a written plan of action. Because of the low mention by the respondents and the fact that three of the five aviation education specialists took issue with this item, flight instruction (pilot training) should be deleted from the "essential" category and included as a "desirable" activity. The workshop planner must consider the background and previous aviation experience of the expected participants as he programs the workshop activities.

The data gathered in this area lend themselves to organization into the categories of: content, methods or means of accomplishing the content, and workshop evaluation. "Essential" activities and experiences which are in the "content" category and those which are methods of accomplishing such content are:

1. Basic fundamentals of aviation and astronautics; the use, effects, and problems of aviation and astronautics; and history of aviation are one of three groups of content. Among the methods of accomplishing this portion of the workshop content are: orientation flights, field trips (tours), use of outstanding resource people, model aircraft building and flying, and a pre-test or information inventory.

2. Curriculum planning (individual preparation of aviation curriculum materials or a written plan of action) is another content group. Among the methods are: use of outstanding resource people, collecting and evaluating aviation source material, model aircraft building (construction and use of teaching aids), information on how to integrate or fuse aviation material into all subject areas at all school levels and how to present aviation as a separate course, and pre-test or information inventory.

3. How to assume aviation education leadership in the schools and community is the final content group.

The final category of "essential" experiences is a detailed evaluation of the workshop by the participants.

It is important to note that any of these "essential" activities and experiences are valid only as they relate to the accomplishment of the workshop objectives. They are means to an end -- and not the end itself.

The possibilities regarding desirable (but not essential) activities and experiences are limitless. The chief conclusion in this area is that the schedule must be planned with activities which

are realistically possible of attainment in the time allotted.

The primary consideration must be given to the objectives of the workshop.

A majority of the respondents felt the need to make additional suggestions and remarks. Perusal and study of these individual thoughts will benefit anyone planning to conduct an aviation education workshop.

Recommendations. The workshop shall serve all teachers, school administrators, laymen interested in aviation, and mature students preparing to become teachers.

Workshop Objectives. The aviation education workshop shall provide each participant with:

1. An adequate reading and speaking vocabulary of aviation (and astronautics).
2. (Knowledge of) The importance of weather and climate to successful aviation.
3. A general knowledge and understanding of airplane (and space vehicle) structure.
4. A general knowledge and understanding of the simple scientific principles of flight.
5. An understanding of the place of aviation (and astronautics) in peace and war.
6. An understanding of the effects of air transportation on various levels of international relationships.
7. An introduction to the social, economic and political (and value) implications of current and future aviation (and astronautical) development.

8. An appreciation of the services rendered by airports and their associated personnel.

9. Familiarity with existing and needed basis governmental services, regulations and relationships in aviation (and astronautics).

10. A knowledge of available aviation education resources in materials, personnel (organizations) and equipment for instructional purposes.

11. The know-how for organizing units of aviation education (for actual use in their own teaching, curricular, or administrative problems) and providing resulting learning experience for children through student or directed teaching.

12. A realization of the growing interdependence of people through aviation.

13. An understanding of problems -- political, economic, international and social -- that aviation (and astronautics) has created and the institutions society has established to solve these problems.

14. A realization of how the airplane has changed geographic relationships -- particularly in terms of mankind's concepts of time, place and distance and mankind's attitudes toward waterways, land masses and land and water barriers.⁸⁵

15. Information related to space science that is not readily available in published form and to develop an understanding of how aviation and space concepts too recent for general inclusion in text books may be treated at successive grade levels.

⁸⁵Ibid.

16. An understanding of the problems involved in operating an aviation education workshop and knowledge of how to assume aviation education leadership in the schools and community.

17. First-hand experience with flight.

The length of an aviation education workshop should be at least four or five weeks. There should be a reduction in the number of workshop objectives for any period of time less than this.

Each workshop should include the following "essential" activities and experiences; (1) basic fundamentals of aviation and astronautics; (2) orientation flights; (3) field trips; and (4) curriculum planning or a written plan of action. There are three chief areas of workshop content:

1. One of these groups is basic fundamentals of aviation and astronautics; the use, effects, and problems of aviation and astronautics; and history of aviation. Among the methods of accomplishing this portion of the workshop content are: orientation flights, field trips (tours), use of outstanding resource people, model aircraft building and flying, and a pre-test or information inventory.

2. Curriculum planning (individual preparation of aviation curriculum materials or a written plan of action) is another content grouping. Among the methods are: use of outstanding resource people, collecting and evaluating aviation source material, model aircraft building (construction and use of teaching aids), information on how to integrate or fuse material into all subject areas at all school levels and how to present aviation as a separate course, and pre-test or information inventory.

3. How to assume aviation education leadership in the school and community is the final content group. This includes material and practical experience concerning the operation of aviation education workshops. This experience is best presented as an "advanced" workshop or seminar running concurrently with the "regular" workshop.

Any formal educational experience involves evaluation. The culminating activity of every workshop should be a detailed evaluation of the workshop by the participants.

Desirable (but not essential) activities should be approached with caution. The objectives of the workshop must receive primary consideration at all times.

Additional Research. There is need for more research into the many ways in which local and state school systems and teacher education institutions are approaching the problems of aviation education. An appraisal of the plans and methods that offer greatest promise is needed in the following areas;

1. The integration of aviation with the present curricula -- how aviation materials are fused into all subject areas at all school levels.
2. Elective aviation courses (special and general).
3. Teacher education -- both pre-service and in-service aviation education preparation.

Some organization should undertake the task of recording data concerning the many aviation education workshops held each year. This same organization (perhaps the National Aviation Education

Council) could also act as a central agency for receiving various papers prepared by students at aviation education workshops and publishing selected ones in order to make the fruits of workshops available to others.

APPENDIX VI

AVIATION EDUCATION OBJECTIVES

SOURCE: Harold C. Hand. When Classroom Teachers Learn to Fly. Urbana, Illinois: University of Illinois Institute of Aviation, Aeronautics Bulletin Number 20, February 1958, pp. 24-28.

OBJECTIVE: PUPILS SHOULD BE HELPED TO --

1. Acquire an elementary knowledge of the military uses of aviation both for offense and defense, and thus see why air power is extremely necessary for national security.
2. Understand the potential benefits of aviation in disaster control associated with the bombing of American cities.
3. Appreciate the relationship between the air power of a nation and its possession of or ready access to strategically located air bases; understand in general where over the earth's surface these strategic locations are situated.
4. Appreciate the causal relationship between the air power of a nation and the literacy of its population; understand why only a highly literate people can produce, maintain, and operate modern military airplanes; recognize what this implies for their own education.
5. Appreciate the causal relationship between the air power of a nation and the knowledge of tools, mechanical processes, and the nature of materials possessed by its population; understand why only a people highly informed and well skilled in this regard can produce, maintain, and operate today's military airplanes; recognize what this implies for their own education.
6. Appreciate the causal relationship between the air power of a nation and the work habits of its population; understand why only a people with good work habits can in the minimum time produce the military planes that their country needs; recognize what this implies for their own education.
7. Appreciate the causal relationship between air power of a nation and the physical strength and vigor of its population; understand why it takes a people with high vitality and no absenteeism due to preventable sickness or accidents to produce in time the military planes that are needed by their country; recognize what this implies for their own education.

8. Appreciate the causal relationship between scientific theory and the air power of the nation; understand why competitive advantage in this regard will always rest with the country that best trains and utilizes its brains; recognize what is here implied for their own education.

9. Explore the requirements and offerings of the air branch of the military establishment as a basis for planning their preparation for later service.

10. Secure an elementary knowledge of the fortunes of the aviation industry; and understand what it is probably necessary to do, and why, to maintain this industry in the state of good health which the well-being of the nation requires.

11. Acquaint themselves with the services and facilities which the airports in their community afford; and understand how these benefit the people of the area.

12. Understand how and to what extent air transportation is employed, and how it benefits agriculture, business, industry, and government.

13. Understand how air transportation is bringing about changes in the techniques of agriculture, business, industry, and government, and how this is beneficial to the community.

14. Understand how and to what extent air transportation is employed in carrying the mail, and how this benefits the nation.

15. Understand the uses of aviation in law enforcement.

16. Understand the uses of aviation in the conservation of soil, timber, and wildlife resources.

17. Understand the uses of aviation for the relief of distress in remote, isolated, or devastated areas.

18. Understand the recreational uses of aviation.

19. Appreciate how handsomely our universal American "automotive know-how" paid off in both world wars; and understand how necessary to national security it now is for "aviation know-how" to be widely distributed in the population.

20. Understand what ground facilities -- airports and their facilities, air strips, radio ranges, beacons, instrument landing systems, etc. -- must further be provided, and why, to insure safe and efficient air transportation.

21. Acquire a sufficient elementary knowledge of meteorology to understand what must further be done by way of weather observation, forecasting, and reporting to facilitate the development of aviation.

22. Understand how and why the further development of radar, of radio communication, and of other electronic devices is requisite to the strengthening of both civilian and military aviation and hence to the well-being and security of the nation.

23. Understand what regulations governing the movement of aircraft, their inspection, maintenance, and certification, and the training, examination, and certification of pilots and mechanics, etc., are essential for safe and efficient air transportation and why.

24. Acquire a sufficient elementary knowledge of how aircraft are manufactured to understand what principally is involved when, as at present, a vast expansion of the aviation industry is called for.

25. Understand how and why the development of the railroad benefited the American people, and how and why the improvement of highways and the use of the automobile further added to strength of the nation.

26. Note how heavily the federal government subsidized the development of the railroad through land grants, and how abundantly it paid the people for it to do so.

27. Note how the utilization of the automobile and the development of the automobile industry waited upon, and was made possible, by the federal subsidization of highway construction, and how handsomely this benefited the people.

28. Note how heavily the federal government is currently subsidizing the automobile industry through the financing of highways, and how this benefits everybody.

29. Understand how and why, like the railroad and the automobile industry, the aviation industry requires federal subsidization, and how the doing of this by the government further promises to benefit the nation.

30. Acquire a sufficiently good command of the vocabulary commonly utilized in newspaper, radio, and other discussions of airplanes, aviation, and related matters to understand what is being said.

31. Acquaint themselves, by first-hand experience whenever possible, with the procedure one follows in planning and taking a trip in a commercial airliner.

32. Acquaint themselves, by direct experience if possible, with the travel accommodations afforded by commercial airlines.

33. Familiarize themselves with the etiquette ordinarily encountered in a commercial airliner.

34. Learn how to buy aviation services and products wisely.

35. Secure an elementary knowledge of how airplane traffic is controlled in the vicinity of and on a modern municipal air terminal and on the airways.

36. Secure at least an elementary grasp of the implications of air traffic and airport zoning on property uses, property values, and community planning.

37. Acquire a sufficient elementary knowledge of the simple scientific principles of flight to enable them to be modestly literate in this regard.

38. Secure a sufficient elementary knowledge of airplane structure to be reasonably informed in this respect.

39. Acquire an elementary general knowledge of turbo-jet propulsion which is so rapidly becoming a part of our everyday lives.

40. Acquaint themselves with present achievements and probable future developments in supersonic flight, and sense the likely consequences in civil and military aviation.

41. Experience flight, the basic reality of the air age.

42. Debunk the superman misconception of the physical, mental, and age requirements for personal flying (private pilot).

43. Acquaint themselves with the benefits of private flying in reference to farm and business profits, effective utilization of time and manpower, resources for disaster control, and recreation.

44. Acquire an elementary knowledge of the character of the principal requirements for safety in aircraft operation.

45. Understand the good and bad effects of aviation on the preservation and enjoyment of fishing, hunting and camping areas, and appreciate the need for effective regulation and control.

46. Acquaint themselves with the comparative safety statistics of rail, automotive, and air transportation; and note how closely comparable are the rail and commercial air statistics.

47. Understand the principal causes of aviation accidents, and appreciate the need for effective precautionary regulations and controls.

48. Understand and appreciate the personal safety and safety-to-others purposes of aviation regulations.

49. Become sufficiently well acquainted with the principal responsibilities of the Civil Aeronautics Board, the Civil Aeronautics Administration, /now the Federal Aviation Agency/ and the Civil Aeronautics Agency of his own state to understand why the work of these agencies is necessary for the development of safe and efficient air transportation.

50. Understand how and why weather is the principal uncontrollable deterrent to flight; know what is being done to reduce or eliminate this impediment; understand how this benefits the American people.

51. Acquire the ability to read and understand prognostic weather maps.

52. Become sufficiently acquainted with the elementary principles and basic requirements of aerial navigation to understand how the factors thus involved influence the development of aviation.

53. Acquaint themselves with the nature of the various occupations in the aviation industry, and be sensitized to their social significance.

54. Appraise their interests and aptitudes as these apply to whatever, if any, of the various aviation occupations they may be contemplating as vocations.

55. Inform themselves concerning the vocational possibilities in the aviation industry; the types of occupations variously included in this industry; and the factors of supply and demand, qualifications and training required, salaries, conditions of work, prospects for advancement, etc., in reference to each.

56. Note at least the high points in the history of the development of transportation since circa 1800 to the end that they may appreciate how drastically, and in recent years how speedily, both their nation and the world have shrunk in point of travel time.

57. Note and understand why every major city on earth is now less than 40 hours distant from any other principal city in any country.

58. Understand why this progressive shrinking of travel time can be expected to continue into the foreseeable future.

59. Note and understand how markedly the development of aviation has changed the direction one travels to get to other countries by the shortest available route.

60. Note and understand how the conventional map (mercator) thus gives a false impression as to where and how far away the cities and countries in other continents and on the principal island land masses actually are.

61. Appreciate the fact that basic resources from many other national states must be secured in order to manufacture a modern airplane, to trace out what these importations are and the countries from which they come, and to note that by its very being the airplane thus symbolizes international cooperation.

62. Understand how and why the development of air transportation has, far more than either the railroad or the automobile, made neighbors of all Americans by the drastic reduction of travel time.

63. Note how and why the linking of two or more unfriendly tribes, cities, regions, or countries by highways, railroads, or water routes has historically contributed to reciprocal good will and mutual well-being; and understand how and why the airplane affords great potentialities in this regard.

64. Understand how the airplane has in effect removed the geographical barriers which formerly separated peoples of various countries from one another and how it has knit them together into an interdependent, one-world community.

65. Understand why, in such an interdependent, one-world community, language versatility is a requisite in modern political and commercial relationships.

66. Acquaint themselves with the geographical location of the major air routes and airplane terminals throughout the world; and trace the mutual benefits thereby derived by the many and diverse peoples thus linked together by air transportation.

67. Understand how good ideas and improved or more enjoyable ways of doing things are exported and imported through air transportation, and how these borrowings enrich the lives of their recipients.

68. Understand how the airplane has altered the significance for human life and happiness of such geographical facts as oil deposits, fissionable materials, and weather and terrain favorable for international air travel.

69. Understand how and why new problems of disease and pest control were created by the use of the airplane; and recognize that these problems can be resolved only by international collaboration.

70. Acquire an elementary knowledge and appreciation of the "freedom of the air" problems which must be resolved if the safest and most efficient system of international air transportation is to be obtained.

71. Understand how, when compounded with the atom bomb, the airplane has brought into being a world situation in which, in the words of Justice William O. Douglas of the United States Supreme