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Orienteering; its development, present status, and experimental applications.

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University of Massachusetts Amherst

ORIENTEERING

ITS DEVELOPMENT, PRESENT STATUS, AND EXPERIMENTAL APPLICATIONS

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"Orientation is the lifelong problem of every human being. Happiness, success even survival itself may depend upon our ability to orient ourselves in society, in business and in space."

Bill Whitmore.

TABLE OF CONTENTS

Chapter | Page

PREFACE

Orienteering is the recently coined name for any activity in which individuals use map and compass for way finding. Having originated in Sweden as a competitive sport it has spread to other countries as a recreation, a school subject and a military training method. As an organized movement orienteering is comparatively new in the United States and only a limited amount of information in English is available.

Because of a strong personal interest in outdoor education, orienteering held a particular appeal for the investigator. Two years have been spent in gathering information on the subject and in conducting experiments. The desire was to contribute to our understanding of this rather unusual but basic program. The thesis attempts to answer three questions. What is orienteering and how has it been used in other countries? How might it be adapted to our own schools? and how might it be promoted in the United States?

The first purpose of the paper was to make a survey of orienteering's specific development in various countries. Three methods were used to accomplish this survey. A review of literature was made, interviews were sought, and letters were sent to individuals including American Embassy officials

in twelve foreign countries. The most pertinent information secured from these sources will be found in Chapter 1, Orienteering's Early Development; Chapter 2, The Forms of Orienteering, and in Chapter 3, A Survey of Orienteering as Practiced in Different Countries. Chapter 3 is particularly significant in that it centralizes specific information which heretofore was unavailable to people interested in orienteering. Chapter 2 has been included for reference and to provide a more complete definition of the various types of orienteering. Most of the forms listed in this chapter have been taken from published sources but their grouping is original with the investigator.

The second major purpose of this paper was to determine ways in which orienteering might be applied to public education in the United States. This was attempted in two experiments. In the first, map and compass exercises were prepared and presented to a small number of 9th grade pupils. In the second conducted a year later, a revised set of exercises were presented to a larger number of pupils enrolled in 9th, 10th and 11th grades.

The third major purpose of this paper was to investigate methods for encouraging others to establish orienteering in their own youth-serving programs. This was attempted through printed information and through direct training of leaders. Questionnaires and participant observation were used to evalu-

ate these methods.

The investigator obtained his initial background in orienteering from Dr. William O. Vinal, Professor Emeritus of Nature Recreation at the University of Massachusetts. Later at La Porte, Indiana where promotion of orienteering is carried on the investigator was fortunate in being able to secure additional information, compasses and other equipment. The final important source of information has been Mr. Bjorn Kjellstrom, manufacturer of the Silva System Compass and the foremost authority on orienteering.

PART I

A SURVEY OF ORIENTEERING

CHAPTER 1

ORIENTEERING'S EARLY DEVELOPMENT

The history of orientation is as old as the history of travel. Many civilizations have flourished only because men could use the seas as highways for trade. But until modern times travel with map and compass has been a serious matter. It remained for a Swede to make orientation a popular sport.

Major Ernst Killander, a Swedish youth leader, became deeply concerned in 1918 about a trend that he noticed among the young people of his country. More than ever before, they were content to sit and watch the sports carried on within the stadium. Only in the wintertime when skiing was popular, were they actually participating in outdoor sports. Some challenging activity was needed to fire their interest in recreation out-of-doors. After considerable thought, he planned an experiment based on his military training. In the woods outside Stockholm, he carefully explained the rules of a new game to a group of Swedish boys. Each was given a compass and a topographic map. On the map was marked a certain farmhouse, a small lake and the fork of two streams. The object was to travel on foot to each landmark by the quickest route aided by the map and compass. The boys were enthusiastic about the game and clamored for more! Much encouraged by this success, Major Killander elaborated on his idea and within twenty years, "orientation" became a

major sport in Sweden.[1]

The gradual expansion of the sport mushroomed in 1934 when the easy-to-use Silva System Compass was first marketed in Sweden.[2] (The firm which manufactured it has since helped promote orienteering throughout much of the western world.) Soon clubs with orienteering as their only program began to be formed, and in 1935 the Swedish Orienteering Association was founded.[3] Much support came from military authorities, who recognized the training and morale value of this sport.[4] Educators realized that preliminary orienteering games provided a fresh approach to map reading, so in 1941 it became a required school subject.[5]

After its start in Sweden, orienteering spread to the sports-loving people of the other Scandinavian countries, Denmark, Finland and Norway. In 1935 Reserve Officers from these countries were invited to take part in a special competition near Stockholm. The contest had three parts: pistol

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1. "Compass and Maps, New School Subject in Sweden", The Times Educational Supplement (London, November 7, 1952), A.
2. Gerhard T. Rooth, "Orienteering", The American Swedish Monthly (November, 1948), p. 3, c.
3. Bjorn Kjellstrom, "Orienteering", (Mimeographed text of an address given at the convention of the American Association for Health, Physical Education and Recreation, Detroit, April 18, 1951), p. 2.
4. (Bjorn Kjellstrom), "Some Facts about Orienteering", (Mimeographed fact sheet, March, 1952), p. 2.
5. The Times Educational Supplement (November 7, 1952), col. E.

shooting, orienteering from a station point, and a ten kilometer (6.2 miles) cross-country race in full battle equipment. Since 1936 this event has been on annual rotation among these four northern countries except for the interruption caused by World War II.[6]

In Denmark, the sport was pioneered by one of the Reserve Officers who had gone to Sweden for the first of these competitions. From 1935 until 1940, Mr. A. N. Hvidt traveled through his native country reading papers on the new sport. Youth groups, sports clubs, schools and branches of the military service began to make regular use of orienteering. This was indeed timely, for when Denmark was overrun by German troops in 1940, her small military forces were wiped out. During the five years of occupation which followed, the Danish people fought the invader through underground resistance. "Now it can be told...", writes Mr. Hvidt. Many civilian orienteering clubs were resistance units in disguise. Members kept up their morale, stamina and proficiency by means of frequent competitions. Then, "Pretending they were out on orienteering excursions they were able to devote themselves to all sorts of underground military activities".

Information is lacking concerning orienteering's specific origin in Norway and Finland. The same holds for

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6. Personal communication from Mr. A. N. Hvidt, Copenhagen (November 11, 1953).

France and the Netherlands, where the sport is reported to have spread. In Belgium, orientation has been taught for many years as a required school subject.[7] In Germany it has been an "incidental" subject.[8] A student at the Sporthoch-schule in Koln, Mr. Gunther Siebold, has written a thesis on orienteering.[9]

World War II stimulated widespread interest in the sport among the people of Switzerland. The rapid growth originated in the Voluntary Pre-Military Physical Training organization which had members in youth groups throughout the country. Apparently this development was independent of Scandinavian influence.[10] Dr. Carl Schneiter, Chairman of the Swiss Orienteering Commission was astonished to discover on a trip to Sweden in 1950 how different the sport was as practiced in Scandinavia. He brought back many of the northern forms and has since been encouraging them among the Swiss people. From

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7. Mr. F. Vandenborre, Director General of Educational Services and Cultural Relations, Department of Public Education, quoted in personal communication from Mr. John L. Brown, U.S. Information Service, Belgium (January 11, 1954).

8. Professor Erich Hylla of the University for International Educational Research, Frankfurt, quoted in personal communication from Mr. Edward J. Joyce, Cultural Officer, U.S. HICOG, Germany (November 16, 1953).

9. Personal communication from Dr. Carl Schneiter, Secretary of the Academic Sports Association, Federal Institute of Technology, Zurich, Switzerland (February 12, 1954).

10. Ibid.

its beginning as a military skill orienteering spread to the sports clubs, scouts and other youth groups. A Swiss championship has been organized and in 1952 an Orienteering Commission which sets standards for course layers was established.[11]

From Europe word of orienteering has reached the British Isles. In England a single article in The Times Educational Supplement (November 7, 1952) has created some interest in the sport as a school subject.[12] In Scotland in 1946 a center for outdoor training was opened by the State Department of Education.[13] Interestingly enough, one of the men responsible for the center had previously organized map and compass training for cadets of the Air Training Corps.[14] These tools are now basic equipment for those who attend the center.

At the same time that orienteering as a sport was taking hold in Sweden, an American pioneer in Outdoor Education was using cross-country map and compass games as an educational method in the United States. At least as early as 1917, Dr. William G. Vinal employed this method to instill habits of

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11. Ibid.

12. Personal communication from Mr. Walter James, Editor of the Supplement (February 18, 1954).

13. Catharine M. Loader, Cairngorm Adventure at Glenmore Lodge, Scottish Centre of Outdoor Training (Edinburg, William Brown, 1952), p. 14.

14. Ibid., p. 18.

observation in children, teachers and recreation leaders.[15] Much of the interest in map and compass games in this country can be traced to the teaching and writings of Dr. Vinal. Another American, Mr. Calvin Rutstrum in Minnesota, has popularized "way finding" among children[16] and outdoor-minded adults.[17] It is not surprising that orienteering should have been well received here when, in 1946, Mr. Bjorn Kjellstrom (manufacturer of the Silva System Compass) and Mr. Gunnar Tillander (the inventor of the Silva System Compass) told Americans about the sport which had become so popular in Europe. Educators, recreation people, and youth leaders from coast to coast became interested, and several newspapers carried favorable comments.[18]

Boy Scout leaders were the first to act. The first contest in America based on Swedish principles was held at the Indiana Dunes State Park on November 24, 1946.[19] From this successful beginning, orienteering has spread in the United States, particularly in the Explorer program of the Boy

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15. Personal communication from Dr. Vinal, Professor Emeritus, University of Massachusetts (March 17, 1952).

16. Personal communication from Mr. Rutstrum, Wilderness Director, Lake Hubert Camps, Inc. (October 30, 1953).

17. Calvin Rutstrum, Way of the Wilderness (Minneapolis, Burgess, 1946), pp. 5-8.

18. Booth, p. 2, B, C.

19. Stig Wedenstrom and Bjorn Kjellstrom, The Sport of Orienteering (Toronto, Silva, Ltd., 1948), p. 65.

Scouts.[20] Two years after the Indiana contest, Mr. William Wadsworth, a Scout official in Syracuse, New York organized the first American Ski Orienteering race.[21] Shortly afterward, a National Committee for the Sport of Orienteering was set up by Mr. Kjellstrom. By May 1950, some eighteen individuals representing various phases of recreation and education had become members.[22] Dr. Vinal was asked to serve as President of the Committee.[23]

At present the most active promotion of orienteering in America stems from the office of Mr. E. F. Larson, General Manager of Silva, Inc., at La Porte, Indiana, and from the New York office of Mr. Kjellstrom.

In Canada, as in the United States, orienteering was first recognized for its educational value. Quite unexpectedly in December 1949 the Ontario Minister of Education, the Honorable Dana Porter announced that the revised school curriculum was to include considerable field work in map reading because of its relationship to conservation. For this purpose the use of a simple compass would be required.[24] Thus it was

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20. Mentioned by Mr. Kjellstrom in an interview (April 14, 1953).

21. William H. Wadsworth, "Ski Orienteering -- A New Sport Comes To America" (Mimeographed, Syracuse, n.d.), p. 1.

22. "Orienteering Newsletter", National Committee for the Sport of Orienteering (May, 1950), p. 1.

23. Ibid., p. 2.

24. Kjellstrom, Detroit address, p. 9.

that teachers in seventy-five hundred Ontario schools were suddenly expected to teach this new skill.[25] Through the cooperation of Mr. Kjellstrom and Swedish school authorities, Major Mustard of the Toronto Normal School hastily adapted a Swedish orienteering text for use in Ontario schools.[26]

Orienteering in High School physical education has been started by Mr. Ray Legere, now Supervisor of Health and Physical Education at Moncton, New Brunswick.[27] His Petitcodiac High School Orienteers' Club (which began in 1951) shows that rugged cross-country orienteering can be both popular with Canadian children and beneficial to the school athletic program.[28]

The new sport is promoted in Canada by Silva, Ltd., in Toronto. Mr. William Salo, General Manager, is also secretary for their service agency, the Canadian Orienteering Institute. His desire is to encourage widespread participation in orienteering as a competitive sport and as a school subject.[29]

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25. The Times Educational Supplement (November 7, 1952), col. A.

26. Major C. A. Mustard, Editor, By Map and Compass (Toronto, Macmillan, 1950), Foreword.

27. Personal communication from Mr. William Salo, General Manager, Silva, Ltd., Toronto (May 8, 1953).

28. Personal communication from Mr. Legere (October 15, 1953).

29. Mentioned by Mr. Salo in an interview (April 15, 1953).

In summarizing orienteering's initial development, it can be seen that in many countries some form of orientation was already being taught at the time that the sport of orienteering was introduced. The subsequent success of the Swedish sport is largely due to the fact that the Swedes also invented a clever, easily-used compass. This compass and orienteering have traveled together throughout much of Europe and America. In the Scandinavian countries and in Switzerland, the military and civil defense values of the sport were immediately apparent; in contrast to other European and North American countries, where it was first recognized as an important educational method.

CHAPTER 2

FORMS OF ORIENTEERING[1]

Orienteering is "way-finding" with map and compass. As an outdoor sport it has many competitive forms; as a tool in the hands of teachers it can create interest in many school subjects.

I. INTRODUCTORY ORIENTEERING - Learning the Basic Skills.

In order to prepare for the more advanced forms which are outlined below under Cross-Country Orienteering, beginners take part in frequent competitive games and exercises. These forms help develop the individual's speed and accuracy in using his map and compass.

ESTIMATING DISTANCES IN OPEN COUNTRY. Contestants are penalized for errors in judgment of the distances to certain landmarks visible from a hill top.

CALCULATING DISTANCES ON THE MAP. Participants are graded on their ability to use the map scale.

MAP SYMBOL QUIZ. Recognition of standard map symbols drawn on the blackboard may be varied by having contestants identify all the symbols found in a certain area of a topographic map.

COMPASS POINTS QUIZ. Beginners, each standing over a

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1. Except where indicated these forms are described in either The Sport of Orienteering (Hedenstrom and Kjellstrom), or in By Map and Compass (Mustard).

cross drawn on the ground or floor, turn at the leader's command to face a cardinal point that is called out.

COMPASS COURSE DETERMINATION ON THE MAP. Played indoors, contestants determine the compass bearing to ten different points from a central starting point. Speed and accuracy determine the winner.

MINIATURE ORIENTEERING. Following specific instructions written on a series of cards, competitors walk or run from one control station to the next in a playfield or woodlot.

WALKING BY COMPASS. Contestants walk cross country toward a road or other "catching" landmark while following a given compass bearing. The winner is the one who arrives closest to the true course indicated by a hidden marker at the road.

POINT ORIENTEERING. This is often used for accommodating large numbers of beginners during promotional events. Competitors walk along a course marked by colored ribbons. At each secret control station they must indicate their map position to an official.

INDICATION OF CONTROL STATIONS. Given only written descriptions of the location of ten different control stations, contestants try to mark these stations on their map with pins.

CALCULATING DISTANCES WITH A WATCH OR BY PACING. Competitors walk along a given bearing and stop when they

think they have gone one mile.

IMAGINARY WALKS on large scale maps teach the meanings of map symbols, some concept of scale, and an understanding of topography.

MAP ORIENTEERING. Carefully planned questions are asked to provide practice in finding the information that is printed directly on the map and to interpret other information that is only suggested by the map.

II. CROSS COUNTRY ORIENTEERING - A Rugged Outdoor Sport.

Orienteering across the countryside is the most widely-used form of the sport. Highly competitive, it requires skill and physical stamina. Competitors run to a series of control stations marked with flags. Positions of these are circled on the topographic map carried by contestants. The following are some of the numerous variations of cross country orienteering.

TEAM ORIENTEERING is a popular sport for small groups running together. It is also an excellent promotional device since one runner proficient with map and compass can lead beginners over the trail.

For RELAY ORIENTEERING each member covers a portion of a long course.

In SCORE ORIENTEERING contestants must run to as many unrelated control stations as possible in a given time. The most difficult stations to reach are assigned a corre-

spondingly higher point value by the organizers.

REPORT ORIENTEERING is similar to the above form, except that contestants receive points depending on how well they answer questions asked at the various control stations.

In LINE ORIENTEERING the object is to walk cross country following a line on the map. Those who remain closest to the true course will discover the largest number of secret control stations.

"HANDICAP ORIENTEERING" has evolved in those countries which have cultivated woods and detailed maps. In this variation, technical difficulties are introduced, such as running without a compass, without a map, or without either one. This provides a challenge to even the best of runners.[2]

In NIGHT ORIENTEERING, competitors also try to finish a cross country course in the shortest possible time.

Other variations involve different methods of transportation such as SKIIS, ICE SKATES, AUTOMOBILES, MOTORCYCLES, BICYCLES and CANOES.

III. COMPETITIONS INVOLVING NO PHYSICAL EXERTION - For Older Participants.

When ORIENTEERING FROM A STATION POINT, contestants try to indicate correctly on their map certain landmarks

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2. Personal communication from Dr. Carl Schneiter in Zurich (February 12, 1954).

visible to them from a vantage point.

Competitors in TABLE ORIENTEERING try to find certain landmarks on their maps guided only by photographs or drawings of each landmark in question.

IV. ORIENTEERING METHODS APPLIED TO EDUCATIONAL SUBJECTS

Orienteering has been used as a basic tool to create interest in many educational subjects such as geography, social studies, mathematics, general science, conservation outdoor education[3] and physical education. One example of its application to the teaching of conservation is the OBSERVATION TRAIL. Control points are usually semi-permanent natural features such as a glacial boulder near a patch of poison ivy, or a tree with roots exposed by sheet erosion. Carefully planned questions draw attention to details that would otherwise be missed as the children follow a compass trail through the woods. (See Appendix A.)

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3. William G. Vinal, The Outdoor Schoolroom for Outdoor Living (Cohasset, Massachusetts, Vinehall, 1952), pp. 23-39.

CHAPTER 3

A SURVEY OF ORIENTEERING AS PRACTICED IN DIFFERENT COUNTRIES

A survey was made to determine how orienteering has developed in different countries. Most of the information to follow has been furnished by Embassy officials and by others in twelve different countries. Some has been taken from interviews. Much of this of course has never appeared in writing before. The remainder of the information has been drawn from the few sources that have been published in English.

SWEDEN

Orienteering plays an important part in the lives of many Swedes. First as a school subject, then as a vigorous sport, and finally, as a hobby, thousands take part in this healthy outdoor recreation. Its contribution to Civil Defense has been recognized by the Government.

In Swedish elementary schools, "outdoor days" are a part of the regular curriculum. Six days each term are set aside for excursions and much of this time is used for orienteering.[1] Swedish children who start school at the age of seven receive

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1. The Times Educational Supplement (November 7, 1952), col. B.

their introduction to it in the following manner.

In the first and second grades they play outdoor games designed to instill in them habits of observation and orientation and to make them feel at home in the woods and fields.

Actual classroom instruction begins in the geography classes of the third and fourth grades when children are nine and ten years old. After learning the elementary map symbols, they draw simple maps of their own showing the plan of the classroom, playground or yard at home. Indoors the children take imaginary walks on their maps and later they use large scale maps while walking outdoors. After some practice in judging distances by pacing, they begin to take part in competitive games.

In the fifth grade (age 11) map reading indoors becomes more difficult. Pupils learn to use scale and to recognize more symbols. Then they take imaginary walks on topographic maps describing aloud or on paper what they see en route. Outdoors they practice orienting a map while walking along a country road. From a vantage point they compare their topographic map to the landscape and identify specific landmarks. Next the teacher takes the class on their first cross country walk using the topographic map for a guide. Later they practice judging distances using a watch instead of pacing. While pupils are still in the fifth grade the compass is introduced. As soon as the cardinal points are well in mind children learn that with this special tool they can really find 360 different

"ways to go". They learn to take bearings and to follow a bearing while walking toward a distant fence or road.

In the sixth grade, grid systems are used for locating points on the map. Imaginary walks become even more difficult and for the first time both map and compass are used for cross country hikes.

In the final year at Primary school when children are 13 or 14 years old, they practice with their compass until they can use it swiftly and accurately. Here in the seventh grade they learn to correct for declination so that they can use their compass more efficiently with a topographic map. Then when they can measure map distances easily, most pupils are ready for real cross country orienteering. These courses are simple and the control stations are usually between a half and a quarter-mile apart.[2]

Although it has taken some time to get this program started it now works quite well in Swedish schools. Educators there feel that its greatest contribution to teaching is that it has suddenly given a practical and recreational approach to the subject of map reading. In addition it has stimulated genuine interest in several other school subjects particularly geography, mathematics, drawing, report writing and nature study. The "play way" methods of instruction and the constant introduction of competitive games have made orienteering "a most popular subject" for Swedish school

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2. Ibid., cols. E-F.

children.[3]

Proof of their interest lies in the fact that 60,000 school children compete each year for orienteering "proficiency pins". Testing includes map reading problems and questions based on conservation and nature lore.[4]

Having begun to learn at school to be on their own with map and compass, most children join a club through which they can take part in orienteering as a sport. Sport forms are promoted by the Swedish Orienteering Association whose 1,500 clubs throughout Sweden have a total membership of about 35,000 persons. On certain occasions as many as 1,200 members, divided into classes, take part in a single competition.[5] Recently in a nationwide contest organized to promote the sport, a total of 135,000 people (nearly 2% of Sweden's population) competed for a special lapel pin.[6]

With the coming of winter in Sweden many forms practiced at other seasons give way to ski orienteering. Ideal snow conditions and terrain suited to cross country skiing make this a favorite sport for the cold months.

Older people when they find it hard to match the pace of youth, turn orienteering into a quiet hobby. During the

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3. Ibid., col. 5.

4. Mentioned by Mr. Kjellstrom in an interview (April 15, 1953).

5. Booth, p. 1, col. 8.

6. Kjellstrom, Detroit address, p. 2.

winter indoor map reading and table orienteering are among their favorite pastimes. Map and compass are often carried by many Swedes who spend their leisure time out-of-doors hiking during the warm bright months.[7]

Military authorities help encourage orienteering because they recognize its importance in Civil Defense and national physical fitness.[8] It is part of their regular training program and members of the Reserve Officers' Association take part in international competitions once each year.

Orienteering's popularity has grown in Sweden to the point where over 350,000 people (including 135,000 adults) take part in contests every year.[9] In ten years' time 150,000 copies of the 260 page handbook (Kjellstrom) has been sold.[10] Orienteering has been the greatest single factor in the great peoples' march back to nature and simple outdoor living in this Scandinavian country.[11]

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7. Rooth, p. 3, col. A.
8. Ibid.
9. Yves du Guerny, "...And 3 Miles N.N.E.", UNESCO Features (Paris, March 20, 1953), p. 10.
10. Ibid.
11. Rooth, p. 3, col. B.

NORWAY[12]

Orienteering is becoming more and more popular in Norway, a land of mountains, fiords and forests. Colonel Mons Haukeland in Oslo has described its present development as a school subject, a sport and a military training method.

Norwegian educators feel that an "understanding of map and compass is necessary" if "modern geography as a whole is going to be understood". As a result of this attitude, orienteering is now taught in the geography and physical training courses in Norwegian schools. Ever since the 1936 "Normal Plan" became effective, knowledge and use of map and compass has been a required part of school curricula. Elementary school pupils aged seven to twelve must learn such basic information as map signs, grid systems and map drawing. To stimulate interest in the subject, many teachers arrange outdoor games of increasing difficulty. At the same time pupils are taught "Home Knowledge", a study of their own community. At ten they draw their first maps. These are usually of the school room or school property with north indicated by an arrow. Later more involved tasks are given. Advanced work is given in the Secondary School and some schools hold cross-country competitions.

Interest in orienteering as a sport is stimulated by the

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12. Personal communication from Colonel Mons Haukeland, General Inspector for the Norwegian Homeguard, Oslo (January 9, 1954).

Norwegian Orienteering Association which distributes literature and arranges competitions for its members. Through local clubs nearly eight thousand men and women compete in contests in summer or winter weather. These field competitions, Col. Haukeland writes, "are very popular".

Norwegian military authorities have acted upon their conviction that "a certain knowledge of orienteering is considered a necessity in the armed forces" by adapting orienteering to the practical training of field units. Cross country competitions are often arranged for military personnel. In these, "both officers and men take a keen interest".

The Norwegian Home Guard (Heimevernet) is "also aware of the importance of orienteering". Col. Haukeland, who is General Inspector for the Home Guard, mentioned that the very first course prepared when the Home Guard Correspondence School began was "Map and Compass". It "proved to be a success". Besides this voluntary course, orienteering is a part of the regular Home Guard training program.

The ability to use map and compass which the Norwegians acquire during schooling, sports, or military service is also very useful during the vacation hiking and camping trips which are "very common" there.

FINLAND[13]

Orienteering is highly developed in Finland. In this heavily-wooded country thousands of people take part in it as a competitive sport, and children are taught the use of map and compass in school. In fact, the general ability to orient oneself and use map and compass is considered to be "characteristic" of a people so close to nature as the Finns. Mr. William H. Witt of the American Legation in Helsinki has provided published material and several opinions concerning orienteering in Finland.

Military authorities recognize the importance of a man's having learned the use of map and compass while young, but they are not in a position to influence to any great degree the training of Finnish youth. The provisions of the Armistice Agreement in 1944 and the Peace Treaty of 1947 have not only reduced their armed forces to "very modest levels" but also have "disbanded auxiliary organizations of a paramilitary nature".

Since the war "orientation" has been taught in both elementary and secondary schools in connection with the courses in gymnastics. Since this is not compulsory the amount of emphasis that the subject receives depends on the individual teachers.

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13. Personal communication from Mr. William H. Witt, Second Secretary of Legation, Helsinki (January 19, 1954).

Schools are sometimes aided by Finland's three orienteering organizations, who cooperate by providing instruction and by securing maps. These organizations promote orienteering, arrange summer and winter competitions for their members and award merit pins for different levels in skill. They are the Finnish Orienteering Association, Finland's Swedish Orienteering Association, and the Orienteering Section of the Workers' Athletic Association. Membership of these three organizations is 63,000 (1.6% of the total population).

Orienteering plays an important part in the lives of many Finnish people. Many men and women not only enter the frequent cross-country and ski competitions in their own country but also take part in the International Meets in which all of the Northern countries participate. A general impression of the popularity of orienteering can be gained by looking over the wealth of material that has been published on the subject. A monthly magazine, "The Orienteerer" is published by the Finnish Orienteering Association. Several books have been written giving rules for competitions, standards for the awarding of merit pins, and directions for laying out courses. More general information is found in the ABC Book of Orienteering and in other popular handbooks. A yearbook records the performance of individuals who competed in the major contests.

Orienteering's wartime importance is brought out in Mr.

Witt's letter. Because of the terrain, the ability of the Finnish people to orient themselves and to travel using map and compass "contributed materially" to the showing made by them against the Soviet Union in 1939-40 and 1941-44. Some of the most outstanding examples are the ski patrols which "operated far in the rear of the Russian forces" and made "valuable contributions" to the operations of the main Finnish forces.

DENMARK[14]

Orienteering has become very popular among the sports-loving Danish people. It is an integral part of their military training program, their skiing and rowing clubs and their youth programs. The following information has been supplied by Mr. Hvidt in Copenhagen.

Danish soldiers from basic training on take part in orienteering contests. Long after they are more or less perfect in map reading and compass use they compete regularly in the cross country sport. Each unit or training center has its own specialist. Teaching is based on a Defense Ministry manual, and the regulation compass (Silva type 15) is used together with the new interatlantic maps in Danish and

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14. Personal communication from Mr. A. N. Hvidt, Copenhagen (November 11, 1953).

English. Officers must of course be more skilled than regular soldiers, so orienteering "plays an immense part" at the officer training schools. With the WAC's and with the voluntary weekend soldiers of the Home Guard (proportionally the largest in the world) the sport is also very popular. The large force of demobilized Reserve Officers are encouraged by defense authorities to take part in annual competitions by means of concrete assistance such as prices, food, transportation and accommodations.

There are two main reasons why military authorities favor orienteering as a training method. They feel that it is a "pure army subject". The soldier who is well-trained in map reading finds that his map tells him a great deal, and he finds that if he can use a compass accurately, he can use his map more effectively. For example, "target-ranging" depends not only on a man's ability as a map reader, but also to some extent on how quickly he can use his compass. In emergencies he "can fire and direct fire from guns, mortars and machine-guns by means of a compass". Experience in the last war has shown that orienteering was "most useful" since many military actions were "confined to the dark hours".

Besides this, orienteering is recognized as being an excellent method for developing a man's morale. Mr. Hvidt writes that orienteering develops "self-reliance, self-respect, fighting spirit, pluck, 'never-give-up-mentality', team spirit, hardship, will power, and nerve-control".

In addition to its being adapted to military uses, orienteering is practiced at the universities and by the many orienteering clubs in Denmark which have this sport as their only program. Denmark's vast number of skiing and rowing clubs train their members "automatically" in the skill, for they "can hardly do without it".

Almost all children in the country join the Boy Scouts or the Girl Guides, where they receive instruction in orienteering. Thus most young people get some initial training before they join the armed forces.

The orienteering which started in the army reserve officers' association, has now spread so that Mr. Hvidt writes, "it is almost the national sport of Denmark".

SWITZERLAND

The healthy outdoor fun and the more serious military importance of orienteering seem to appeal to the people of Switzerland. Thousands participate each year in the favorite Swiss forms of the sport.

The Director of the Federal School of Gymnastics and Sports, Mr. A. Kaech, has supplied the following information about orienteering as it is used in the military program.[15]

The specific map and compass training received by the

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15. Personal communication from Mr. Kaech, Magglingen (February 9, 1954).

regular soldier within the service varies with his job. But in the Swiss Army itself, "there is usually not much time for such training", reports Mr. Kasch, and "the Army relies fastly on the knowledge acquired in the civil practice of orienteering". This will explain its policy of stimulating interest in the sport among civilian youth groups. Military authorities arrange competitions in which members of various youth organizations take part and also provide direct subsidies of one franc for each contestant payable to the organization he represents. About half of all young men of post-school age are trained in orienteering through membership in the Voluntary Pre-Military Physical Training Organization, in which the number of members competing in the sport increased from 2,600 in 1947 to 12,000 in 1952. Non-commissioned Officers' Societies and Officers' Societies also practice map reading and orienteering as a "by-activity". For example; the Swiss Officers' Society and its cantonal sections organize a night contest every year for members, which is also subsidized by the government.

Since its introduction via the military, orienteering in Switzerland has spread to the educational system, the scout movement and other youth groups. A specific idea of its popularity can be gained from information furnished by Dr. Carl Schneiter, Chairman of the Swiss Orienteering Commission.[16]

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16. Personal communication from Dr. Schneiter (February 12, 1954).

At school, pupils are now taught map reading and the use of the compass, and on the High School level relay competitions have been organized for several years. At the universities, competitions are the "most difficult...in Switzerland". Dr. Schneiter estimates that over twenty thousand people in all competed in orienteering contests in 1953. Throughout the country eighty major competitions were held, of which twelve took place at night. The Zurich competition drew about six and a half thousand participants, those at Berne and Basle about fifteen hundred each. At the Zurich competition, sixteen hundred teams competed in different categories at the same time in the same woods. "Everyone who counts in orienteering" took part.

Swiss orienteering differs from the form of the sport that is practiced in Sweden. In fact, Dr. Schneiter does not know of any historical relation to the Scandinavian sport. In Switzerland, three or four men compete as a team, while in Sweden, individuals run alone. Team competitions are "easy" and "fun"; decisions are shared by all and "six or eight eyes see more than only two". "To run with your friends through the woods, to be successful or to fail is a great pleasure." On the other hand, the Swedish type of individual competitions are much more difficult. Success depends upon the skill of the individual, who must carefully observe each stream, hill and path to determine where he is and where he has to run. Dr. Schneiter thinks "that is a very good sport".

Another difference between Swiss and Scandinavian orienteering is that in Switzerland organizers make team competitions difficult by imposing technical hardships. For example, a runner may be required to go without map or compass or without either one. They seem to ignore the fact that by planning competitions for individuals as is done in Scandinavia, they could introduce difficulties that would challenge even the best runners.

Dr. Schneiter emphasizes in his letter how difficult it is to describe orienteering to another person, for to really understand it "...you must have taken part yourself...." In the difficult individual Swedish competitions a person feels that he competes in a "sport for men" where he has to put in all his qualities. But he thinks the most rewarding form is relay orienteering, in which several men run "for the same success". It combines "the difficulties of individual running" with "the fun of team competition".

Dr. Schneiter is enthusiastic about orienteering. "I feel that it is the best sport in the world and I have participated as competitor in more than ten different sports." It is "above all a very good combination between physical movement and brainwork and all...held outdoors in the woods and fields".

GERMANY[17]

German school children have for many years been taught map reading and the use of the compass. Professor Erich Hylla of the University for International Educational Research in Frankfort writes that general instruction is given in geography and that orientation by map and compass is taught in the home environment studies of elementary and secondary schools. This instruction is "incidental" rather than compulsory.

Beginning in about the fourth grade (age 9) all German school children have atlases and learn to read maps. They practice drawing maps of the school surroundings and of the village; and later they learn to use a compass. Scale is introduced as soon as pupils have the necessary foundation in arithmetic. During monthly hikes and during the trips (sometimes yearly) to country school-homes, pupils practice using map and compass in the field. They also learn various methods for telling general directions without a compass. They may use a watch or natural signs. If in a forest, they can tell directions because tree trunks "are likely to be covered with moss on the north-west side, since the rains predominantly come from that quarter in Germany".

Dr. Hylla says that the kind of incidental instruction

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17. Professor Hylla, quoted in personal communication from Mr. Joyce (November 16, 1953).

that is practiced now is so old in Germany that he does not know when and how it began. Even before 1910 a "very good" atlas for elementary schools was published by a school principal in Berlin. To facilitate teaching this atlas contained several maps of Berlin. These demonstrated the great number of details that could be given on a large scale map, and what symbols and other simplifications became necessary for similar maps of smaller scales.

He adds that before World War I youngsters often had to depend upon their ability to find their way through the woods and to read maps correctly. At this time, the German Youth Movement flourished, hostels were few and far between, and hiking was even more popular than hitch-hiking is now. The young people usually had the excellent 1:100,000 government maps and "knew how to use them". "The skills and knowledge acquired in school were soon brought to perfection by their application in practice."

BELGIUM[18]

This small country which lies between France and the Netherlands is characterized by a dense population, great industrial development and an intense land cultivation program. These factors may hinder the development of orien-

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18. Mr. Vandenborre, quoted in personal communication from Mr. Brown (January 11, 1954).

tearing as practiced in Scandinavia. Yet according to Mr. F. Vandenborre of the Department of Public Education, map and compass training is taught both in the schools and in youth programs which include camping and hiking.

In the Primary School pupils aged six to twelve are sometimes taught the principles of orientation during their geography classes, but this depends entirely on the individual teacher. Orientation is a required subject in the geography classes in the sixth grade in the public schools. Three or four classroom lessons and several field exercises comprise the training. First of all pupils determine directions and the meridian of their own village by experimenting with a sun dial. Then they learn the 16 points of the compass and try to remember at least half of them. As an exercise, students orient a map of the community and make a report at school. During the second exercise they orient a topographic map from two different places. Next, several uses of maps and compasses are demonstrated during a hike. They learn orientation by the sun using a watch and by the stars using the polar star. In several places they also make a simple map of the school vicinity and orient it with a compass. Each school owns a supply of topographic maps. Recently the Department of Public Education decided to purchase a considerable number of compasses so that in the future each geography teacher will have at least one.

Mr. Vandenborre adds that Belgian Military Authorities

recognize the usefulness of introducing the use of map and compass to children but they have no influence over youth programs and very little over school curricula.

NETHERLANDS

The Ministry of Education reports that the subject of "orienteering" is not a part of the curricula of the Netherlands schools. Soldiers, sailors and airmen are, of course, trained in map reading and the use of the compass. It is probable that their instruction is nearly identical to the training given to American soldiers. This information has been provided by an official at the American Embassy.[19]

ENGLAND

In England there are very few military and educational authorities who know about orienteering. Mr. William H. Morris of the American Embassy has furnished most of the information which follows.[20]

In the British Army it is felt that being able to read maps and knowing how to use a compass are "necessary in all

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19. Personal communication from Lt. Col. Aldon M. Hoffman, Assistant Army Attaché, The Hague (November 25, 1953).

20. Personal communication from Mr. Morris, Acting Cultural Officer, London (November 21, 1953).

forms of combat". Hence both subjects are an integral part of each soldier's basic training and advanced instruction is given later on. The authorities think that it would certainly be "ideal for all men entering the military service to have had previous training in map reading". But at present only a few men have acquired this knowledge through a study of geography or as a member of organizations such as the Boy Scouts. No program for encouraging orienteering either in military or civilian life has been initiated by the military authorities.[21] However, at least one military man has witnessed a vivid demonstration of orienteering as it is practiced in Scandinavia. The British Military Attaché in Denmark accompanied Mr. A. N. Hvidt of the Danish Reserve to the 1950 international competition for Reserve Officers. Mr. Hvidt wrote that his guest was "much impressed" by what he saw.[22]

In the schools of England and Wales, no compulsory curriculum in map and compass instruction is laid down by the Ministry of Education. Map reading is generally taught as a part of geography courses in secondary schools where students are preparing to go to a university.[23]

Apparently orienteering with its various forms of indoor

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21. Ibid.

22. Personal communication from Mr. Hvidt (November 11, 1953).

23. Morris.

and outdoor games has not been publicized to any extent in England. Only one article on the subject has come to the investigator's attention. The Times Educational Supplement carried an illustrated article in 1952 called "Compass and Maps, New School Subject in Sweden". (See reprint in pocket.) The editor of the Supplement recently wrote that a "number of inquiries" about the article had been received. In fact, the Ministry of Education expressed interest and asked for copies of a book on the subject published in Sweden. The Editor added that there may be a few people who have started orienteering in English schools as a result of this article, but he has seen no evidence of its general acceptance.[24]

SCOTLAND

Scotland, because of its rugged terrain and recent interest in promoting life in the outdoors, may prove to be fertile ground for the development of orienteering. Already the use of map and compass is a basic part of the instruction given young people and adults at the Scottish Center of Outdoor Training near Inverness.

In 1949 the Scottish Education Department, in the first experiment of its kind in Scotland, sent five groups of boys and girls from the Secondary Schools of Glasgow to the Center

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24. Personal communication from Mr. James, Editor (February 18, 1954).

of Outdoor Training.[25] Each group of forty students attended for four weeks. Constant map reading, map making, compass navigation, weather mapping and map and compass games were included in the "way finding" and "physical activities" parts of the program.[26]

This experiment at Glenmore Lodge has been widely publicized, and many education leaders have expressed "great interest" in it.[27]

UNITED STATES

Orienteering has been avidly promoted in this country. Different forms have been adopted by various interested groups, but it seems too early to tell just how widespread it may become. No attempt was made by the investigator to compile a list of groups or individuals using orienteering at present, but the specific cases which follow will provide a sample of its development in the United States.

The Boy Scouts of America are currently making more use of orienteering than any other group.[28] Map and compass training has always been a part of their program, and now

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25. Leader, p. 34.

26. Ibid., p. 36.

27. Ibid., p. 38.

28. Personal communication from Mr. Larson, General Manager, Silva, Inc., La Porte, Indiana (February 19, 1953).

orienteering has been recognized by the National Director of Volunteer Training as an excellent teaching method. It is most popular with boys fourteen years and older in the Explorer program.[29] For example; score, line, point and cross country courses have been in "constant use" at the Syracuse Boy Scout Camps for several years.[30] For the last three years travel scholarships have been provided by Silva and others to send two explorers and an advisor to Scandinavia. In addition to the international good will fostered by the two week trip, this scholarship has definitely stimulated the various scout councils to improve their own map and compass program.[31] These scholarships will be provided again in 1954.[32]

It is doubtful whether any college or university has offered any more than brief sessions in the fundamentals of orienteering to their students. At Mather College in Cleveland, Ohio, it forms a part of the Physical Education Department's Outing Course. Girls there were enthusiastic about the session that included pacing, mapping the area, and

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29. Supplied by Mr. Lawrence, Boy Scouts of America in an interview.

30. Personal communication from Mr. William H. Wadsworth, Member of the National Committee for the Sport of Orienteering (March 8, 1952).

31. Mentioned by Mr. Kjellstrom in an interview (October 15, 1953).

32. Mentioned by Dr. John E. Magnuson, Silva, Inc., upon the return of the 1953 scholarship winners. "Welcome Luncheon", New York Athletic Club (October 15, 1953).

telling time by compass.[33] At the University of Massachusetts, Nature Recreation students thoroughly enjoyed a two and a half mile map and compass hike. Many other college students and teachers have received some instruction in orienteering at various summer outdoor education programs.[34]

A limited survey was made of the literature resulting from the fast-growing public school camping movement in the United States. In several publications, work with map and compass is mentioned in some detail and occasionally orienteering is referred to by name. In the school camps of Michigan, for instance, it is being used "more and more".[35]

Several leaders in education and in camping have become actively interested in this sport because of its relationship to conservation education. A publication of the American Camping Association called Conservation in Camping gives some excellent suggestions for using map and compass to provide children with adventure and an appreciation of the world of nature.[36] At a recent convention of the American Camping Association, orienteering was emphasized during the popular panel on Conservation.[37]

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33. Personal communication from Miss Dorothy L. Heza, Teaching Fellow, Mather College (March 10, 1954).

34. "Orienteering" (Newsletter), National Committee for The Sport of Orienteering (January, 1949).

35. Mentioned in conversation by Mr. Julian Smith, State Department of Public Instruction, Michigan (1953).

36. Page 11.

37. "Conservation in Camp Program", Camping Magazine, Vol. 26, No. 5 (April, 1954), p. 17.

In New England some of the camps sponsored by the Massachusetts Audubon Society have used orienteering for two years. The director of one camp reported that the children enjoyed their trails "immensely", because orienteering "brings about a happy combination of physical and mental effort using brain, muscles and senses together with a spirit of adventure and exploration".[38] During the winter the teaching staff of this Society reaches over twelve thousand children in the elementary schools of Massachusetts. The Executive Director of the program wrote "we think that orienteering offers a very fine means of introducing and developing conservation and natural science in camp and school....We expect to make greater use of it in the future."[39]

The spread of orienteering in this country is encouraged chiefly by two people: Mr. Larson at the Silva Office in Indiana, and Mr. Kjellstrom in New York. Both have given frequent lectures on the subject, often using colored films. The earliest of these films shows the sport as it is practiced in Sweden;[40] the other shows a father and son learning to use a topographic map and a Silva compass.[41] From the Indiana

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38. Miss Phoebe Arnold in her report to the Director of The Arcadia Wildlife Sanctuary (Summer, 1952).

39. Personal communication from Mr. C. Russell Mason, Executive Director (July 1, 1953).

40. "The Sport of Orienteering" is obtainable from Silva, Inc., La Porte, Indiana.

41. "By Map and Compass." Source information available from the International Film Bureau, Inc., 57 East Jackson Boulevard, Chicago 4, Illinois.

Office are distributed books, pamphlets, reprints, magazine articles, and compass game packets as well as compasses which are sold. Orienteering is also encouraged by several of the members of the National Orienteering Committee and others who have initiated various forms of the sport throughout the country. The Committee does not function as a group and only a few issues of their newsletter have materialized.

The Silva Office in Indiana is, of course, in an excellent position to know just how extensively orienteering has spread in the United States. Mr. Larson wrote in 1953 that "...we are constantly receiving evidence of camps and schools adopting some form of orienteering...the program seems to be developing with increasing momentum".[42]

CANADA

Perhaps it is not surprising that in Canada orienteering has become popular both with youth groups and with certain educators. This country, like Scandinavia, has a brisk climate, many forested hills and a scattered population.

Since its introduction into the Ontario Public Schools the main emphasis for orienteering has been in the seventh and eighth grades, each of which had an enrollment of about 60,000 pupils in 1950.[43] Teachers may devote as much as ten

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42. Personal communication from Mr. Larson (February 19, 1953).

43. Personal communication from Mr. S. A. Watson, Assistant Superintendent of Elementary Education, Department of Education, Ontario (March 17, 1952).

hours to the course work, which is spread throughout the year.[44] The purpose is to teach pupils to understand maps so that their work in social studies and conservation will become more meaningful.[45] Two texts are used: Mustard's By Map and Compass, which is essentially a translation of the text used in Swedish schools; and Anderzhon's Steps in Map Reading. Pupils also use compasses, aerial photographs and topographic maps.[46] School curricula are evaluated periodically and in March 1952, the Assistant Superintendent of Elementary Education wrote that the comments which had been received so far were "very favorable" to the map reading program. "Prospects for the future indicate that it will become more widely used as all teachers become aware of the advantages to be gained."[47]

The Ontario program is not without faults, however. While children like the subject and welcome the chance to get out of the classroom, teachers have shown little enthusiasm for this addition to the course material. A local school official has described some of the basic problems that have turned up in the schools of one district.[48]

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44. Personal communication from Mr. Earle Webster, Inspector of Public Schools, Oshawa (March 16, 1953).

45. Mr. S. A. Watson.

46. Ibid.

47. Ibid.

48. Webster.

It is obvious that the teachers have not really felt the need for the teaching of conservation. Many of them persist in treating it as a "frill" or unnecessary innovation. Rural teachers in some cases have shown a more active interest in the subject than have teachers in city schools. Mr. Webster reports that many teachers are still asking, "why teach map-reading?" and consequently they plan few classroom exercises. They seem to take it for granted that maps will be intelligible to children without any help from the teacher; that they know by "instinct" what the map symbols mean. The text reported by Mr. Kjellstrom to have been "hastily-prepared" does not seem adequate to overcome these difficulties. This school official feels that compass work and the use of topographic maps will be difficult to introduce into the traditional public schools. Perhaps the program should be more closely related to the work already under way in Social Studies. Schools should take the opportunity to arouse interest in and develop an appreciation for the types of maps the average citizen may use later on, such as road maps, air route maps, rainfall, soil and drainage maps and maps of land use.[49]

Provincial school officials have tried to anticipate the problems created by the introduction of the new curriculum.

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49. Ibid.

Special instruction for teachers has been provided at summer school, conservation work shops, in-service training sessions and courses at the Normal schools.[50]

Other provinces, especially Alberta, have shown considerable interest in Ontario's venture.[51]

Besides its use as an educational method, orienteering has also made headway with certain youth groups as a sport. Officials of the Boy Scouts Association have come to recognize it as "a healthy, useful activity which readily lends itself to the outdoors aspect of the Boy Scout programme".[52] The Association encourages its use through training courses, literature and the film, "The Sport of Orienteering". The Executive Commissioner of the Training Department says that "It has been given a warm reception in most parts of Canada and its popularity is spreading, especially among older boys".[53]

Recently orienteering has been added to the program of the Canadian Forestry Association's summer training camp where in the last several years over 2,000 boys from all parts of British Columbia have been taught the "wise use"

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50. Ibid.

51. Mentioned by Mr. Salo in an interview (April 15, 1953).

52. Mr. J. L. MacGregor, Executive Commissioner, Training Department, Canadian Boy Scouts Association, quoted in personal communication from Dr. Doris W. Plewes, Department of National Health and Welfare, Ottawa (June 9, 1953).

53. Ibid.

concept of forestry.[54] The Secretary-Manager of the Association believes that because orienteering combines the attractions of a keen competitive sport with highly practical training values, it is a happy addition to any youth training program.[55] The skills acquired in the sport also make for greater self-reliance and a higher safety factor in woods travel.[56]

A dramatic example of the importance which orienteering might eventually have in High School athletics has taken place in an eastern province.

A former coach in New Brunswick, Canada, has described the Petitcodiac Regional High School Orienteers' Club.[57] In 1951 and 1952, club members met on Saturdays for long cross-country orienteering contests. They covered nearly every mile within a twenty-mile radius of Petitcodiac as well as other areas outside this circle. The spirit shown by the boys and girls and the proven benefits of the program have convinced Mr. Legere that such a club is worthwhile. The field experiences of this club director and the direct results of this program should be of interest to School

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54. "Important Youth Training Program...", Forest and Mill (August 22, 1952).

55. Ibid.

56. Ibid.

57. Personal communications from Mr. Ray Legere, Club Director (October 15, 1953, and February 12, 1954).

Administrators, Physical Education Instructors, and Athletic Coaches.

Mr. Legere's introduction to orienteering came in Teachers' College where the film "The Sport of Orienteering" was shown. He "decided there and then that it was the sport". This belief and the showing of the same film in Petitcodiac led to the founding of their orienteering club.

He is really enthusiastic about its value. "Orienteering in secondary schools is a tremendous conditioner for athletics, a cooperative effort for the students, an opportunity for outdoor lore, and a good influence on the physical well-being of each individual participating...." As an athletic coach, Mr. Legere found the results "most rewarding".

> I stressed that my basketball players take part in the Orienteers Club. Now, my basketball teams (both boys and girls varsities) were only two years old at the time. Both teams went to the New Brunswick finals the year they took up orienteering. The reason is quite apparent. They ran circles around every team they met. Most New Brunswick coaches will agree that teams with such speed and endurance as mine had that year were few in number. My senior high team of boys even defeated a University Varsity team in a home and home series. My opposing coaches often asked me for the key to such speed as that exhibited by my boys and girls and my reply was always the same: orienteering. The results were not limited to basketball. In football our boys team was undefeated; in soccer our girls team captured the New Brunswick Championship.

Girls "show a slight edge in enthusiasm", mainly because they do not have as many athletic opportunities as boys. Members learned the map contents through their weekly contests and also acquired knowledge of the area in which they lived and

the characteristics of their natural resources. They orienteered in temperatures below zero and above 75 degrees, and still they came back for more. "Among these Orienteers there was a spirit that I have found no other place."

Mr. Legere is quite emphatic about the importance of leadership. "Without it, and the proper kind of it, an Orienteers Club cannot exist. It takes plenty of initiative, hard work, planning and time. But the reward is great, greater than in any other activities in the field of athletics."

Boys and girls who are active members orienteer each Saturday. Associate members participate once a month. The club also had a few older members who worked in the community. The boys' and girls' sections were each divided into three groups or "squads". Members were always taken by car out of town to points sometimes twenty miles from Petitcodiac. In this way, the country was unfamiliar to them each time. "Hilly country is probably the best for orienteering because of the greater interest on the part of the participants." Courses were limited to ten miles for boys with six control stations and six miles for girls with six control stations. Mr. Legere experimented with the distance problem and found this to be the most satisfactory. Red and white flags marked control stations. Headquarters for an event is usually the first or last control station. Participants ate their lunches at the third control station. The club emblem was a runner and the club had a flag and a weekly bulletin. Members

carried membership cards and abided by an Orienteers' Code. (See Appendix B.)

Safety precautions were taken. Squad members traveled together in daylight contests. It was considered unwise for students who were just beginning to orienteer alone or at night. Each squad had a leader especially trained in compass and cross-country work. In addition to compasses and maps, each orienteer carried extra socks, handkerchief, a pocket first aid kit, a hunting knife and matches. The courses were constantly patrolled by a group of "spotters". In the hundreds of miles covered by the club nobody was ever lost. Without the spotters, however, it might have been different. When an orienteer ran into any sort of trouble he used his whistle to signal the nearest spotter to the rescue. Some had painfully cold feet, some twisted their ankles, some were sick. The spotters used cars during most of the contests to keep up with the contestants and to reach more quickly those who had gone astray. As a final precaution each participant carried an emergency Petitcodiac phone number in case he should reach a farmhouse with a phone. Borrowed cars were not entrusted to student drivers when they were used to convey students. The club director did most of the driving and some of the spotting too.

To help meet expenses each participant paid weekly dues of 25 cents. Public support was shown whenever the club sponsored entertainments to raise funds. Many residents also

helped by lending their cars to the spotters. The Canadian Government provided the maps and the compasses were purchased in Petitcodiac for $9.00 each. "We found the Swiss "Recta" compass the most suitable. The Silva is also a good compass..." School officials backed orienteering to the letter. Never was there any trouble in obtaining equipment.

Occasionally the club held special activities such as outings, excursions and picnics. They also held weekly dances at the High School for members and their guests. An orienteers' summer camp was held two summers. Members camped in tents for two weeks at the Fundy National Park. Each day they did orienteering of various types throughout the park. "National Parks provided terrific opportunities for orienteering."

The people of Petitcodiac have gone to considerable effort to get their Orienteers Club going. They are "sold on this sport" and feel that they should do their best to promote it. They are anxious to give "whole-hearted support to the Canadian Orienteering Institute".

Mr. Legere sees in the future an international organization with representatives from the United States and Canada. In such an organization, "the representative members should not be limited to High Schools but should follow through into orienteering for adults".

"Here is the solution to our countries' lack of activity due to modern inventions", for example television and auto-

mobiles. "To sell orienteering to the public however will not be an easy task but if done the right way through the right hands, it should become one of the most popular activities for adults and High School students."

"There is no 'spectatoritis' in orienteering. Either you participate or you miss the boat."[58]

Summary

To summarize, orienteering is known to have been promoted in at least 12 different countries. In Sweden, Finland, Denmark, Norway and Switzerland, it is well entrenched in education, recreation and in military training. In Germany and Belgium the recent interest in orienteering follows on the heels of an existing interest in orientation as a school subject. Little has occurred in the Netherlands, Scotland and England but in the latter case, some interest has been shown by educators and military officials. In Scotland, leaders in outdoor education are teaching the use of map and compass to school age children. In the United States orienteering is becoming increasingly popular with conservation, recreation and outdoor education people. In Canada Ontario public

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58. Legere (October 15, 1953).

schools are teaching orienteering during regular class hours and in New Brunswick the interest primarily is in orienteering as a conditioner for athletics. Scout leaders in both Canada and the United States are doing a great deal to encourage the spread of orienteering.

PART II

APPLICATION TO HIGH SCHOOL

CHAPTER 4

EXPERIMENT I, AMHERST, 1952

Purpose

This first experiment was conducted in order to evaluate the effectiveness of a trial series of lessons in the use of map and compass for high school classes.

Methods and Materials

In the spring of 1952, sixteen students (thirteen boys and three girls) were observed as they took part in a trial series of map and compass lessons. These students, representing a wide range of intelligence, were enrolled in a ninth grade general science class at Amherst, Mass.

Six lessons in the use of map and compass were taught. The lesson plan for the Unit and most of the exercises are included in Appendix C. The first five lessons were given during the regular forty minute class periods, but the final lesson required two hours. The first lesson was designed to teach students to read direct and indirect information from a road map; a combined state and U.S. road map was used. The eighteen questions of the exercise were concerned with scale, grid system, population, geologic history, topography and time zones. During the second lesson students were quizzed on their knowledge of topographic map symbols. In the third lesson eighteen questions were used to help teach fundamentals in the use of a topographic map. The topographic map used was

of the local quadrangle. These questions dealt with scale, symbols, topography, grid system, geologic history and drainage pattern. In lesson four, held in the school yard, students first determined their own step by pacing along a hundred foot cord. After practicing with the compass they took part in a compass pacing game. Guided by bearings and distances printed on a card they traveled around the school yard. In lesson five they were taught to use the inch rule on the compass for computing distances and to use the compass as a protractor for plotting courses on a practice map. For the final lesson, students were taken by car to the recreation area at the University of Massachusetts. There they traversed a previously-prepared orienteering trail. The purpose of this trail was to stimulate independent thought. It was intended that an individual's success should depend upon his own ability to follow written instructions, use his compass, estimate distances and answer a number of questions about the course. Contrary to Swedish principles, time was not a factor, and control stations were identified only by a written description instead of being visibly marked.

In most of the exercises students worked alone while answering the questions. Specific instructions and definitions were included in the text of the map exercises. Both the regular teacher and the investigator assisted those who were having difficulty. Students were told that the exercises would probably be difficult and that they should not be dis-

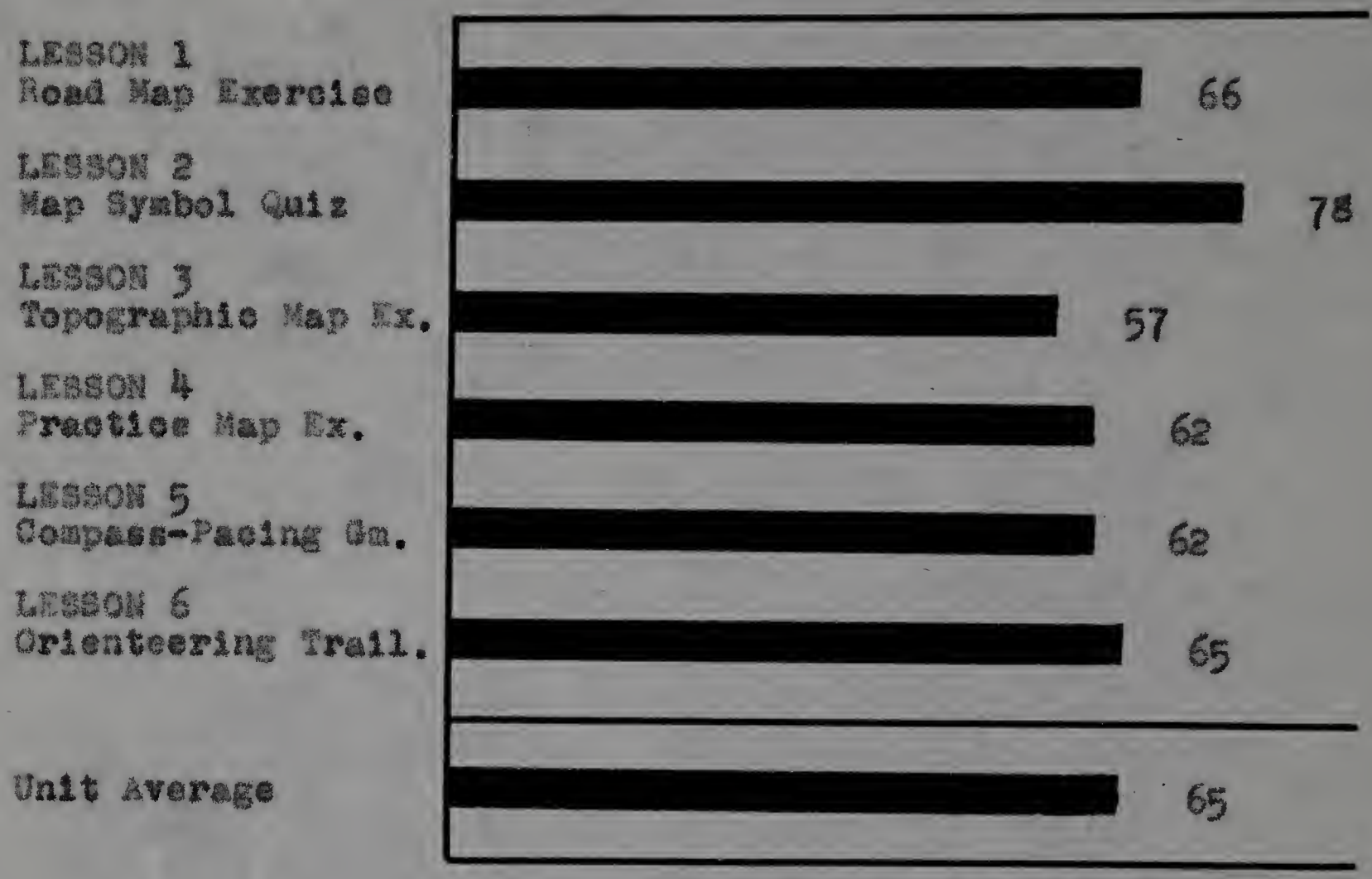
couraged by low grades. They were able to see their corrected papers each day and time was reserved for reviewing the errors. In marking the exercises percentage grades were based on the number of correct answers. There was no direct attempt to stimulate competition among students during any of the exercises.

Materials needed for teaching this type of activity included mimeographed copies of the answer sheet, the map symbol study sheet, the road map exercise, the topographic map exercise and the orienteering trail. A cord a hundred feet long tagged at five foot intervals and held in place by wooden pegs was prepared for use in the compass-pacing game. Also necessary were: compasses; road, topographic and practice maps; "compass game" packets; and cardboard clipboards.

Observations

During the experiment several mechanical difficulties came to the attention of the investigator and some areas of promise were noted. In graph 1 the percentage grades which the students received for the various exercises are indicated. It may be seen that the average was considerably higher on the map symbol quiz for which they had studied the previous night. The average grade on the entire unit of study was 65%, indicating that in general the students found it difficult.

The first exercise given was the road map exercise.



Graph 1.

Performance of 16 Ninth Grade Pupils at Amherst on the Exercises of the Unit.

During this several students found it hard to handle a large map, a question sheet, an answer sheet and a pencil all at the same time. The printing on the particular road map used was too small for comfortable reading. In addition some of the questions were poorly worded. Partly as a result of this the average grade was low (66%). Fortunately the students who finished the exercise early occupied themselves by helping those nearby. The teacher, who did the exercise along with the students, felt that the road map exercise was "in general excellent - for this particular group". He also thought that "at least one more period could be profitably spent on explanation...". Six students were of the opinion that there should be more time allowed, and one student was not interested in reading maps. Nearly everyone in the class thought it was interesting and worthwhile to learn how to use road maps.

On the following lesson when the map symbol quiz was given, the average grade was relatively high (78%). Apparently the homework assignment, a sheet giving map symbols and their meanings, had been effective even though it had been poorly mimeographed.

In spite of this preparation, the next exercise, which dealt with the topographic map, left some students puzzled. Even with assistance two students were not able to understand more than two or three of the eighteen questions. This made the class average grade only 57%, the lowest grade on any of

the exercises.

Learning to determine length of step by pacing back and forth along a hundred foot cord did not seem very popular. Using the compass to take bearings and find landmarks was enjoyed much more. The compass-pacing game seemed a little too difficult for some to grasp.

Although the average grade was not high on the practice map exercise (62%), the children seemed to enjoy doing it. They liked to use the compass to answer questions on the practice map.

During the final lesson at the University recreation area the compass-pacing game was repeated to provide activity for those not yet started on the trail. It still did not appeal to all the students. Contrary to what had been hoped, the orienteering trail did not provide the opportunity necessary to cause individuals to think for themselves. Lack of time in the field made it necessary to have students travel in small groups. Although groups started on the trail at five minute intervals they still tended to "bunch up". For these reasons it was not possible to prevent individuals from being influenced by others. Although some found the trail much too difficult and were hostile, others who were able to meet the challenge successfully were enthusiastic.

Discussion

This experiment was intended to be exploratory. It was

hoped that by observing the student reaction to a trial unit of map and compass activities, the most serious areas of weakness in lesson content and method could be discovered. In evaluating the unit the investigator had to rely on personal observation rather than objective data. A very small number of students was involved. But since the class was "average" and since some of the student reactions were clear-cut, it is possible to regard some of the information gathered as being "suggestive".

The students' difficulty in the road map exercise handling map, papers, and pencil at one time would be lessened if in future it were possible to write answers directly on the question sheet. A map with larger printing and more colors might win over students who are not interested in reading maps. In a class of varied intelligences, the exercises sould be easy enough for the slower members, while purposeful activity should be provided for those who finish early.

The fact that students did twelve percent better on the map symbol quiz than on any other indoor exercises may reflect nothing more than an easy quiz. They also had the advantage of studying the map symbols as part of their homework before the quiz.

This experiment points out clearly that special pains must be taken when planning to teach students how to understand and use topographic maps. Probably very few of them had ever seen one before. It might have been easier for them

to understand the most confusing factor, i.e. contour lines, had this exercise been preceded by the film "My Map and Compass" which explains contour lines very clearly. In addition it would be advisable to have the practice map precede the topographic map exercise. This would be particularly valuable in teaching the concept of "scale". Having a topographic map of the area hung in the classroom for a few weeks before the study of it began might be one way of familiarising the students with it.

Determining step length could probably be made more purposeful by following Dr. Vinal's example. His students first determined their own step length over a hundred foot course, then tested their own accuracy by attempting to step off an even hundred feet in a new direction.

The compass-pacing game was difficult partly because students were still not at ease with the compass. In addition some students had considerable trouble in making the mental calculations necessary to convert "feet" into "steps". More practice in using the compass, and a similar game with distances in round numbers should precede this game if it is to be used again with students of this age.

The flexibility and the popularity of Silva's practice map suggests that here is an excellent teaching aid.

The orienteering trail was a disappointment because even with this small number of students it was not possible to have each one travel alone over the trail in the time avail-

able. The trail's primary purpose was to provide opportunity for individual thought, observation and action which certainly was not accomplished. However, the fact that some of the students were enthusiastic is reason enough to attempt to overcome the difficulties. If time is always to be an inhibiting factor, perhaps high school students could check out a compass and go over a trail in pairs after school or on the weekends. Even traveling in twos would be more desirable than traveling in larger groups for this type of trail. Such extra-curricular activity could be a part of the program of a high school Orienteering Club.

Conclusions

No definite conclusions can be reached because of the limited number of students involved.

In general the procedure used in this limited experiment to teach the use of map and compass to ninth grade students was satisfactory. The students appeared capable of understanding most of the material presented in this unit.

A revised unit incorporating the improvements as suggested by this experiment will be necessary. Two points should be kept in mind; the unit should be capable of being presented by the regular classroom teacher; and it should have real appeal for students.

CHAPTER 5

EXPERIMENT II - SOUTH DEERFIELD 1953

Introduction

Permission to present a Unit of map and compass exercises at the Amherst High School was sought on March 26, 1953. Nearly two months later this request was refused by the school committee. Fortunately, the school authorities at South Deerfield were more receptive. By conducting the experiment at South Deerfield, however, the objective value of the investigation was sacrificed. A school crisis at the time of the experiment created conditions for teaching and testing that were far from normal. The popular principal of the Deerfield High School had just been dismissed by the school board. Spirits were low at school and the townspeople were in an uproar. Many angry parents even refused to send their children to classes and as a result, attendance was extremely irregular. Such a combination of poor morale and poor attendance ruined all hopes for results that could be considered reliable.

Purpose

The purpose of this experiment was to evaluate the teaching effectiveness of a revised Unit of map and compass exercises on three different age levels.

Methods and Materials

Five lessons (a total of 7 exercises) in the use of map and compass were given to pupils enrolled in a 9th grade general science class, a 10th grade biology class and an 11th grade English class. The lesson plan and the 16 page Unit of exercises are included in Appendix D. As in Experiment I, all but the last lesson (which required two hours) were given during the regular class periods. These exercises contained subject matter similar to that used in Experiment I, but the order in which they were given was completely changed. A new exercise, taking up an entire period, was presented each day, leaving no time for discussion and review. Answer sheets were graded after the final lesson by percentage grades based on the number of correct answers. There was no direct attempt to stimulate competition among the pupils during any of the exercises. The lessons were planned so that pupils would work alone trying to answer the exercises instead of depending on direct instruction on the part of the teacher throughout the lesson. Brief instruction was given at the beginning of the period, however, in all exercises except Part I of Lesson 5. Due to the arrangement of class schedules, the investigator met with grade 10 first for all but Lesson 1.

In the very first lesson, the compass used as protractor was introduced. In Experiment I the corresponding lesson had been given next to last. The second lesson was held in the school yard. The pacing exercise was altered to include

pacing over an unknown distance as suggested in the discussion of Experiment I. The compass-pacing game which had proved difficult for 9th grade pupils was again used because older pupils were involved. The third lesson dealt with the road map. The map used (Esso: Pennsylvania) was chosen from among several because of its vivid colors, content of information and relatively large clear printing. In the previous experiment, the road map had been inadequate. The fourth lesson was on the topographic map. The film By Map and Compass could not be shown to the three classes prior to giving them the exercise on topographic maps due to inadequate facilities at the school. Having relied on being able to show the film, the investigator did not make use of a map symbol study sheet or map symbol quiz to introduce the unfamiliar topographic maps, as had been done the year before. Instead, one page of the unit (p. 7) was devoted to "Using a Topographic Map". The final lesson took place outdoors within a half mile of the school. Each pupil carried a compass and a six-page set of field exercises consisting of three parts. Part I was a "Map Quiz" in which a map drawn by the investigator was used to provide field experience in map reading, pacing, judging distances and compass use. Each pupil answered questions as he walked with the class using the map. Nothing comparable to this map quiz was used in the field the previous year. Part II consisted of questions to be answered by small groups while they awaited their turn to go on the "orienteering

trail". These questions were aimed at providing experience in pacing, judging distances, and comparing a topographic map to the visible landscape. Part III was an "orienteering trail". As pupils walked through pasture and woods, they tried to answer questions requiring keen observation.

Materials needed included the revised Unit of exercises and new road maps. The 100 foot cord from the year before was improved by substituting wire pegs for the wooden ones. Wire markers were prepared and a plane table borrowed from the University Engineering Department. Other materials were the same as had been used the previous year.

The above-mentioned information on Methods and Materials applies to Sections A and B which follow. Methods for Section C will be described later under that section.

A. Evaluation by Comparing the Performance of the Three Age Levels.

Observations

Out of a total of 71 pupils enrolled in these classes, only 30 took part in all 7 exercises of the Unit. (See Table 1 below.) Since the majority did not have time to

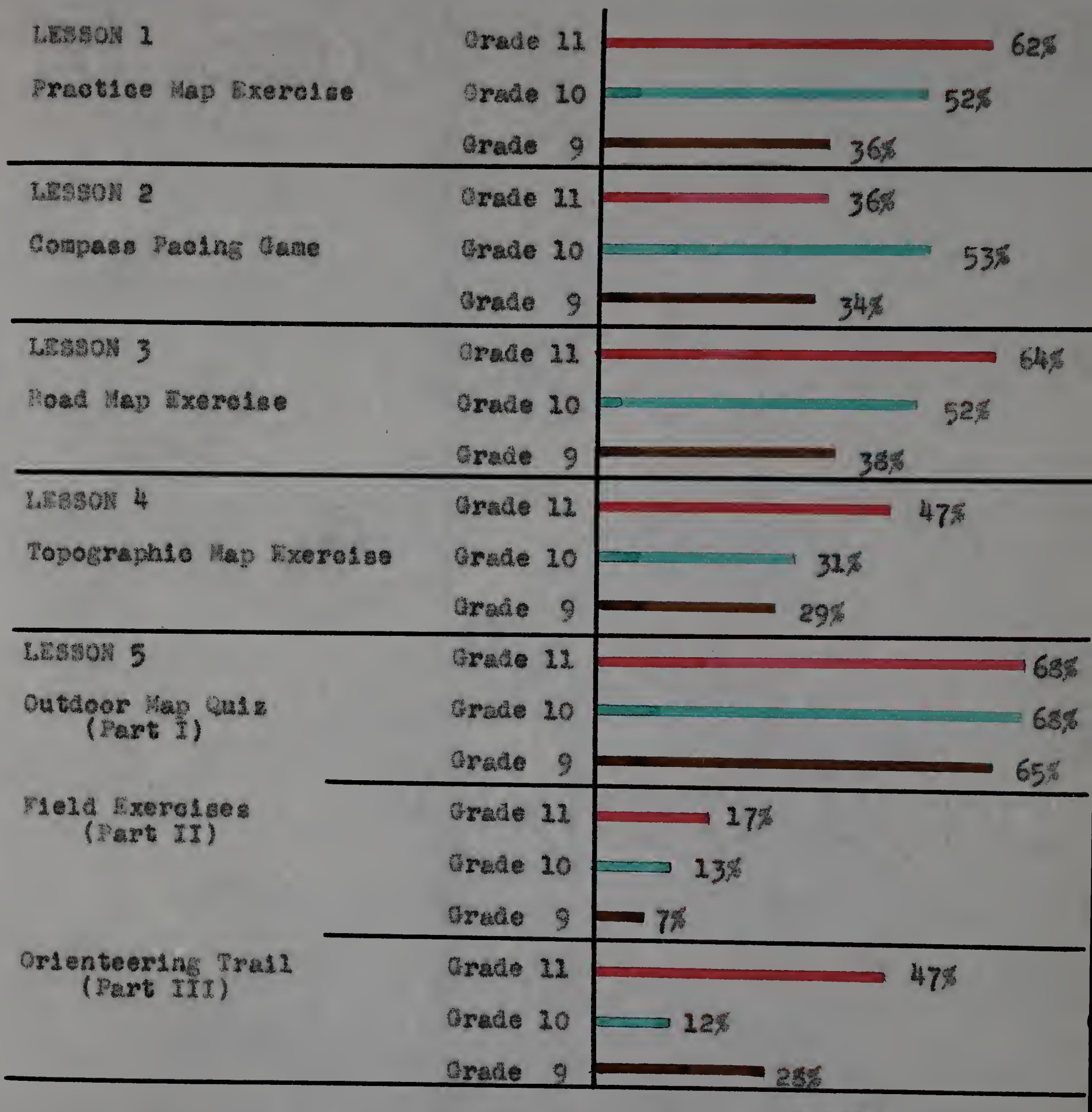
Table 1.

Showing enrollment and the number who participated in all exercises.

	9th grade		10th grade		11th grade		
	boys	girls	boys	girls	boys	girls	Total
Class Enrollment	10	8	17	13	2	21	71
Pupils who took all exercises	4	8	3	6	0	11	30

finish the exercises and since there was no time for review, the numerical grades were very low. The average of the 30 pupils on all parts of the Unit was only 43%.

In comparing the average grade on all exercises with the three different classes involved, it is clear that in general the oldest pupils had the highest numerical grades and the youngest pupils had the lowest. (Grade 11, 50%; Grade 10, 44%; and Grade 9, 34%.) This pattern of performance is most clearly illustrated in the three indoor map exercises (Lessons 1,3,4) in which the time and amount of instruction given were most nearly standardized (see Graph 2). The sharpest divergence from the pattern occurred in the compass-pacing game of Lesson 2, in which the 10th grade average outstripped both 9th and 11th grades. All classes made equally high grades on the outdoor map quiz (Lesson 5, Part I). This was the only exercise where the investigator helped pupils by directing thought-processes throughout the exercise. This enabled the 9th graders to perform as well as the older pupils did. In the field exercise of the final lesson (Lesson 5, Part II) the numerical grades were exceptionally low in all three grades, though the older pupils still made higher grades than their juniors. Pupils were discouraged at having so many questions to answer in the time available. The apparent divergence from the age pattern on the part of 10th grade pupils in Lesson 5, Part III was caused principally by an unexpected cut in lesson time.



Graph 2.

Showing relative class performance on the separate exercises of the Unit. 30 pupils participating.

Discussion

Considering the handicaps with which the pupils had to cope, it is surprising that they were able to do so well as they did on the various exercises. A principal underlying difficulty was the defeatist attitude of many of the pupils over the current school crisis. Irregular attendance made it impossible to establish lesson continuity with all students. The exercises themselves were too long for any but the most intelligent to finish in the time allotted. Another serious mistake was that no time was left for review. Had the investigator had more teaching experience, he might not have tried to present so much new subject matter in only five days. Another factor tended to reduce the value of the experiment. The exercises were written to serve two purposes; the investigator designed some questions to be instructive and others to test whether they had been. By confusing these two aspects, the teaching value of the Unit was largely sacrificed to its testing function.

Despite the difficulties just discussed, some comparisons between classes can be made from the data of the experiment.

The fact that the 11th grade pupils were able to adapt to the difficulties better than the others was undoubtedly due to their age. Their better performance on indoor rather than outdoor exercises may reflect the rather sophisticated attitude of girls of this age. In the case of the 10th graders, the handicaps were not so well surmounted. They

were the first to be taught in all but one lesson. Thus, at their expense, the 9th and 11th grade pupils received improved instruction. This was an unfortunate situation because, in the opinion of many teachers, 10th grade pupils are a particularly difficult age group to teach. In contrast to the 10th graders, 9th grade students turned out to be generally enthusiastic. The indoor exercises as presented were much too difficult for them to grasp. But with more guidance on the part of the investigator, the material might have been grasped by this age level. The fact that these youngest pupils responded well to the outdoor exercises may reflect their general pliability.

B. Evaluation through Analysis of Lesson Content and Sequence.

Observations

Some observations were also made by the investigator which might point the way to improving the content and sequence of the various exercises in future work. In reviewing these, it must be kept in mind that in all but one exercise pupils were on their own. The investigator intended that the exercises should serve as test of the pupils' ability to learn from working out problems alone instead of from direct instruction on the part of a teacher. Unfortunately this resulted in very low grades for those who were not especially intelligent.

In the first lesson on the practice map, pupils were definitely puzzled by having the compass introduced as a pro-

tractor before they had studied the magnetic needle. In the second lesson, the compass was used to show "360 different ways to go" and they began to understand it. It was in this lesson that they were required to practice pacing, which was quite unable to hold their interest. They were bored even before they tested themselves over the course of unknown length. In Lessons 3 and 4, some pupils spent much of their time hunting aimlessly for the answers to questions on the road and topographic maps. The brief introduction on how to use the maps was not specific enough to be of real help to them. In Lesson 5, the amount of time spent by the investigator before the lesson preparing a map of the vicinity for the map quiz seemed unreasonably long. The questions intended to keep pupils interested while they were waiting to go on the "orienteering trail" failed in their purpose because many of the pupils lost interest. Even the "orienteering trail" which the investigator had relied upon to give pupils a sense of real accomplishment, failed in its aim, because only 11 pupils had enough time to finish it. Those who finished were enthusiastic about the experience, however.

Discussion

The low grades which the pupils earned throughout the Unit (see Graph 2) are a definite indication that much more guidance from the teacher is necessary before pupils attempt to answer questions alone. Pupils and teacher should work together at first and every pupil should be shown the thought-

processes necessary for answering questions and finding information on the map. Testing should serve only to measure how much improvement has taken place; it should never be a measure of intelligence only, as in the present investigation.

The magnetic needle is the basic part of any compass and the very first lesson should point out its use. The use of the Silva compass as a protractor should not be attempted until its primary use as a magnetic compass is clearly understood. In the investigator's opinion it seems unfair to pupils to introduce material to be learned which has no visible purpose. For example, if pupils were helped to realize the importance of being able to estimate distances during a compass hike, they would be more receptive to learning their step-length and to practicing pacing. A vocabulary of map symbols and abbreviations is a necessary prerequisite to understanding maps. Initial lessons should deal with teaching this special language in order to provide a sound basis for later exercises dealing with interpretation information not printed directly on the maps. Obviously, the presentation of topographic maps was still not properly done in this experiment. Shaded relief maps, plastic relief maps, and the film By Map and Compass could be used in future to make the subject clearer. So few teachers could take the time to prepare a map of the neighborhood as did the investigator, that it would be better to depend on getting copies of city maps from city officials. Using these maps, the class could walk together

and answer the prepared questions. This would be comparable to the elementary forms of "point orienteering" used in Swedish schools. Since the field exercise questions which preceded the "orienteering trail" had little appeal for pupils, Swedish competitive forms of orienteering such as "orienteering from a station point" and "estimating distances in open country" should be attempted in future work. It hardly seems possible that the type of orienteering trail used in this experiment could ever become popular with school administrators, because any deviation from the established time schedule is disrupting to the regular program. However, it would be excellent if organized as an extracurricular activity, and it may well be applicable to public school camping.

C. Evaluation by Means of Student Questionnaire.

After all the work on the Unit was finished, pupils at South Deerfield were given an opportunity to express in writing their likes and dislikes on a form previously prepared by the investigator (see Appendix E).

Observations

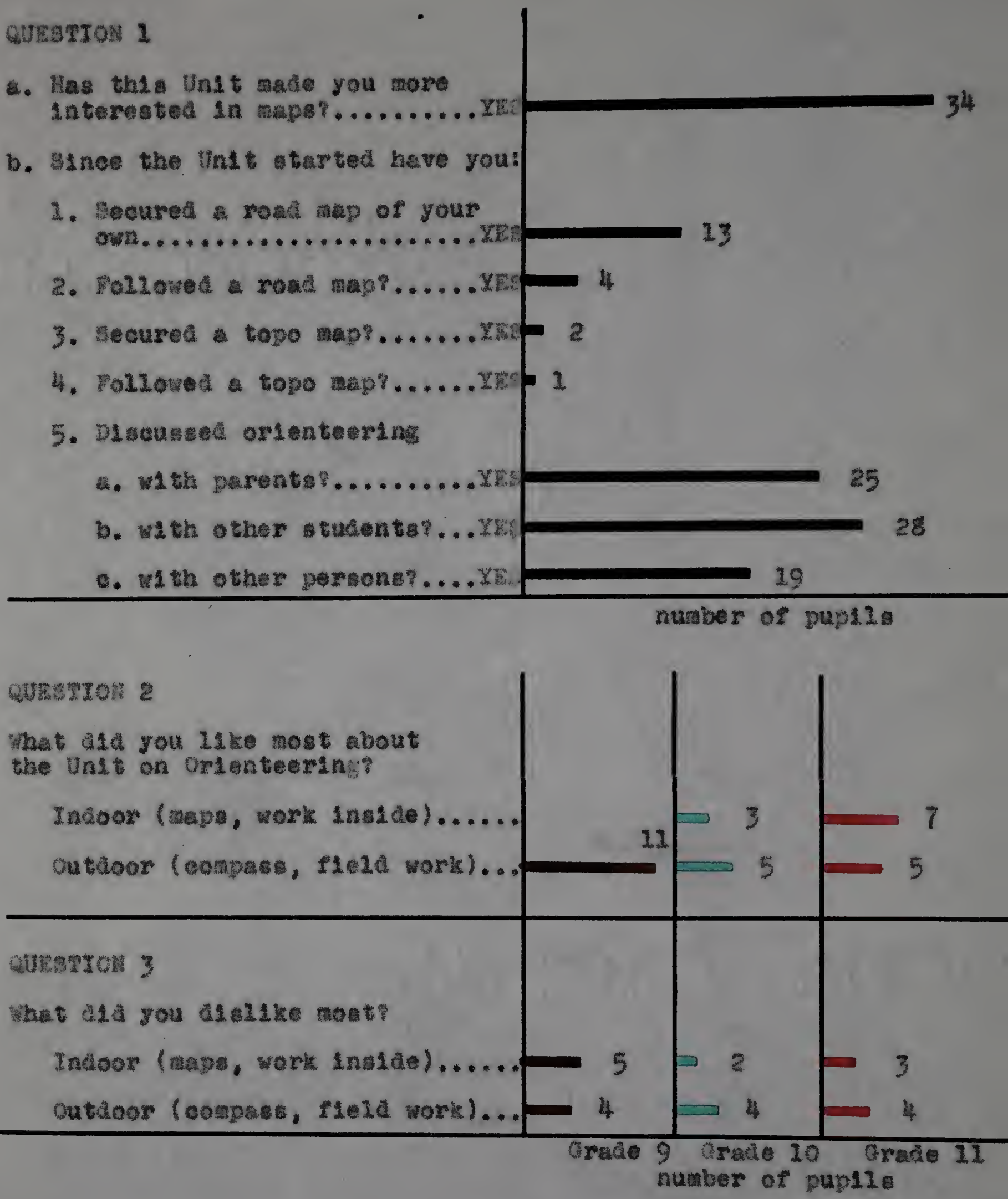
Thirty-eight pupils returned the questionnaire (see Table 2).

Table 2.

Showing the number of pupils returning the Student Evaluation Questionnaire.

	9th grade	10th grade	11th grade	Total
Boys	6	5	1	12
Girls	6	7	13	26
Total	12	12	14	38

Nearly all wrote that the Unit had made them more interested in maps, and one-third had gone to the trouble of securing a road map of their own. (See Graph 3, question 1.) The 9th graders showed a very strong preference for the outdoors aspects of the Unit in contrast to the 11th graders who showed a slight preference for the indoor exercises. (See Graph 3, question 2.) They showed a greater dislike for indoor exercises than did the older pupils. (See Graph 3, question 2.) Both 9th and 11th grade students agreed that the explanation had been poor throughout the Unit. Oddly enough, only one 10th grader had a negative comment; there were too many questions on the exercise. Lack of interest in general seems to be characteristic of half the 10th graders and many 11th graders. (See Graph 3, question 4.) Approximately one-third of the 9th and 11th graders suggested improvements but only one 10th grader offered a constructive comment. Most frequent suggestions were for "more and clearer explanations". (See Graph 3, question 4.) About three-



Graph 3.

Showing results of Student Evaluation Questionnaire, 36 pupils participating.

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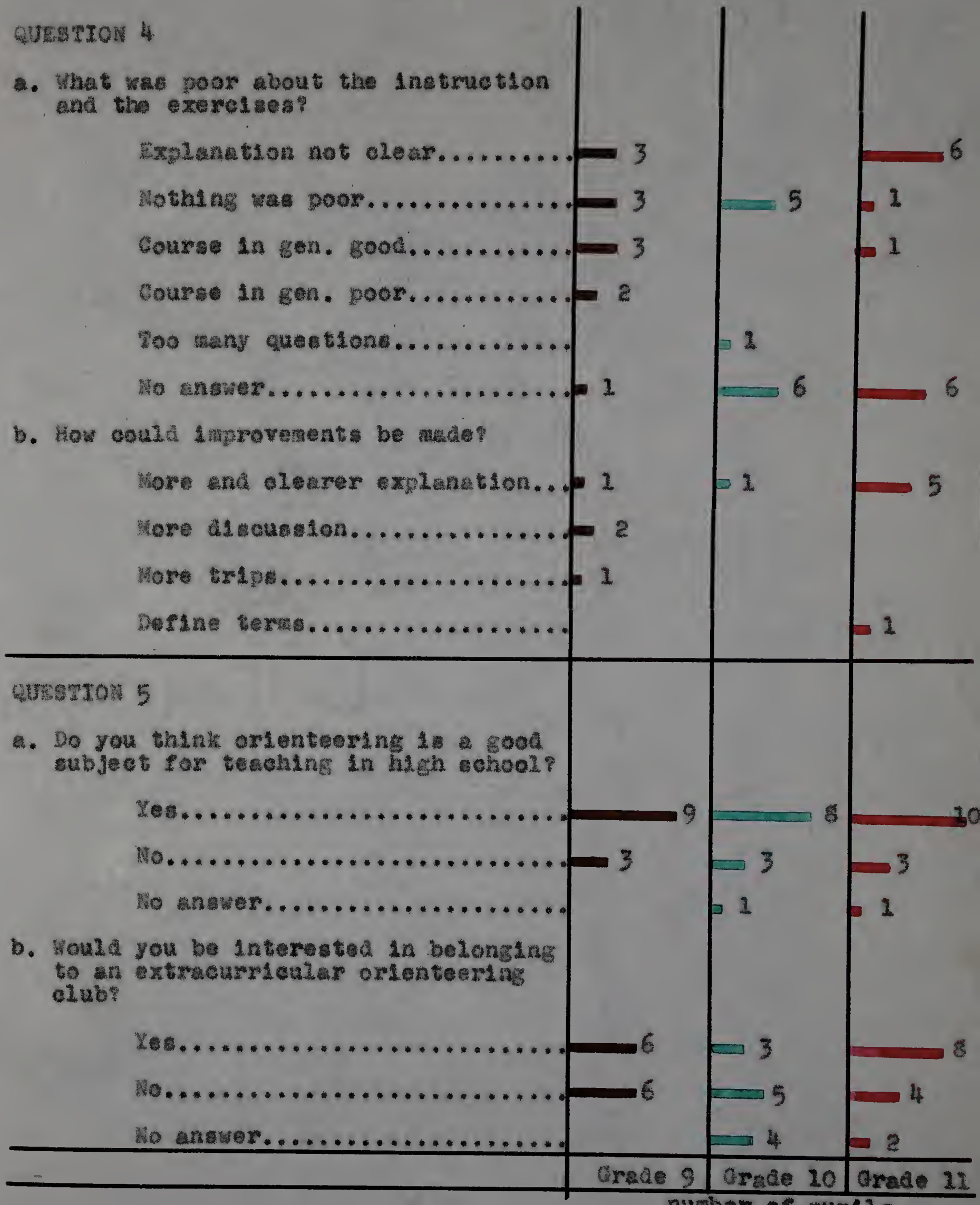

Graph 3 (concluded)

fourths of the pupils in each class thought that orienteering would be a good subject for teaching in high school. (See Graph 3, question 5.) Apparently about half of the 9th graders, one-third of the 10th graders and over half of the 11th graders would join an orienteering club if the opportunity presented itself. (See Graph 3, question 5.)

Certain pupils in the three different classes showed rather remarkable understanding when they evaluated the unit. Many of the reasons for failures and successes are revealed in their comments. A few opinions are reproduced below.

The two 9th graders whose remarks follow clearly favored the outdoor activities, as did nearly every one of their classmates. Donald M. wrote: "I liked the finding of landmarks, because it gives you experience, a nice job and an understanding of the different terrains and vegetation". Asked what he disliked most he wrote, "Nothing really, except the way they (the exercises) were worded. Improvements could be made by: 1) Guidance when you are astray from the problem. 2) Examples of this type of work. 3) General experience like on our last trip. 4) A clearer explanation." Nancy M. wrote: "I liked to work with compass best and pace off steps, measure distances, go and seek different places, such as we did in the woods. There's more action to it." She adds, "I don't like to work with maps too well, they are boring. You just sit and look, read, and there's no action to it. Not much fun. If they had different maps, maybe it would be more interesting."

"We could have gone on more trips in the woods or gone outdoors and worked more with pacing off and compass." Nancy suggested several improvements. "In orienteering I think it would be more interesting to have a group of about 2 or 4 people work on a project using maps. Each group could report on what they learned and did. Maps would be more fun then. You could also still use compasses and pacing off...."

Tenth grade students showed an equal preference for indoor and outdoor exercises. This is reflected in the opinions of three of them. Others showed that they were disinterested and confused. Margaret F. liked most "figuring out the questions on the sheets because it helps you to use common sense and also shows you how to use a map when the occasion arises". She disliked "the hike up Sugarloaf because I couldn't find any of the places which we were assigned to find, and also because I don't like to hike". Another girl suggested an improvement. "Don't have so many questions on the papers to answer. On the trip to Mt. Sugarloaf we didn't even finish half of the questions." Richard D. liked best "the exercises we had on Sugarloaf Mountain, and learning to read compass. It will benefit me greatly in learning to follow trails and to keep my bearings on trips...." He thinks orienteering should be taught in schools because "in a section like Deerfield, there are many woods and roads to follow. There are a lot of sportsmen who would benefit by it." Richard was one of the two 10th grade pupils who had

time to complete the orienteering trail during the Unit.

The 11th grade students, mostly girls, showed a slight preference for the indoor exercises. Nancy M. wrote that she "liked everything about the course....It makes you think and decide for yourself. You do this in other courses but this hits you personally...so you don't mind it." "There wasn't one part that I disliked, maybe it is because we didn't work on it long enough." "The instructions were brief but thorough." "I think if the instructor had done this for a year, he could have expressed himself better." She wrote that orienteering is a good subject for school and should be "a class of its own". "I think it would be used more often than any other subject." Marcella S. liked the field trip most. "...I could apply the newly-acquired knowledge and find out just how much I knew and didn't know. Also, I liked the independence required of us in the course. We weren't babied as in most courses." "My main criticism on the instruction is that I feel the topographic maps should have been explained to us before having a test on it, for I know that few if any of the class had ever seen one before - let alone trying to read one." She felt that it is good to know how to read a compass and that orienteering should be taught in high school. "We are all potential drivers and should know how to read road maps."

Discussion

A detailed discussion of the student questionnaire hardly seems necessary. It is interesting to note that by comparing pupils' written evaluations with their numerical performance that in general the classes performed best numerically on those parts of the Unit which they "liked", and poorest on those which they "disliked".

Conclusions

This Unit of exercises as it stands is better suited to the 11th grade age level than to either 9th or 10th, as is shown by the numerical averages of the three classes.

The students did better numerically on the exercises which they said they "liked" than on those which they "disliked".

The Unit could be improved by: more explanation by the instructor before pupils attempt to work out exercises alone; fewer exercises for the allotted time; discussion and review after the pupils have finished the exercises.

PART III

PROMOTION OF ORIENTEERING

CHAPTER 6

SOME METHODS FOR ENCOURAGING LEADERS TO ESTABLISH ORIENTEERING PROGRAMS

Youth programs, other than in the public schools were investigated. The problem was to determine the most effective method for encouraging leaders to introduce orienteering activities into youth-serving programs. Two principal methods were investigated: encouragement by means of printed information; and encouragement by direct training. The data were gathered by questionnaires and participant observation.

A. Printed information alone as a means of encouraging leaders.

In June 1952 printed information was mailed to twenty-four camps representing a cross-section of camp types which were found listed in the 1952 Directory of Camps Located in and near Cleveland Ohio. The printed information consisted of three items: a mimeographed introductory letter, a copy of Mr. Larson's pamphlet "Orienteering in Camp" and a questionnaire. (See Appendix F.) The letter was intended to stimulate interest in orienteering, the pamphlet provided some explanation of how it could be taught and the questionnaire aimed at discovering the success of the first two items. Recipients were urged to return the questionnaire by September 1, 1952, whether or not they had made any attempt to initiate orienteering in their own organization, but in spite of this only two questionnaires were returned.

One reply was made by the director of a "private agency camp" operated by the Cleveland Girl Scout Council. In describing attempts made in her camp, this director reported that "some of the simple preliminary games were used but we did not get to orienteering with all the skills it implies". The factor that prevented initiation of orienteering was "lack of personnel with any experience in it". Asked whether orienteering is a worthwhile activity the director wrote, "depends on how used. I feel activities are not worthwhile in and of themselves, but only as they are used to contribute to growth and development of campers. Orienteering like other camp activities can be well- or ill-used."

The other questionnaire was returned by a college student, a division counselor in a private day camp near Cleveland. He worked with a division of about twenty boys nine years of age. Most of these were enrolled for five or ten weeks. In describing his attempts at orienteering the counselor wrote, "we tried a few compass games...in preparation. The fellows seemed interested, but too immature." The inhibiting factor listed was "I feel that nine year olds are too young for orienteering - at least in the ratio that we had them". He feels that orienteering is a worthwhile activity "for fellows a little older".

Since only two replies were received out of twenty-four questionnaires sent and since those two indicated failure, it is apparent that the printed material used in this attempt

to interest leaders in introducing orienteering into summer camp programs was not effective.

B. Printed information preceded by lecture and film as a means of encouraging leaders.

In late June 1952 the printed material mentioned in the previous section was sent to the Massachusetts Audubon Society's Nature Workshop at Barre, Mass. This was returned in July. Several of the staff members of the workshop who received the printed information had previously seen the film "The Sport of Orienteering" and had attended a thirty-minute talk on orienteering at the 1952 Recreation Conference at the University of Massachusetts. They had some previous knowledge of orienteering, though no actual training, when Mr. Larson's pamphlet came into their hands. Also, a file of orienteering information was on hand for them to consult during the camp session. With this background, the workshop staff members made a relatively successful attempt to teach orienteering to the campers. After orienteering's purpose had been described, campers were given instruction in pacing and use of the compass. The entire group followed a pre-laid trail. Then they divided into sections which practiced laying out a trail and following another which was unfamiliar.

In this instance the staff members of the workshop, perhaps inspired mostly by the film they had seen, were determined to establish an orienteering program at the Nature Workshop. The arrival of printed information gave them a method

of procedure. Their attempt was successful enough to encourage them to continue teaching it the following summer (1953). Real proof of the success of this first workshop in orienteering is the fact that trainees from Arcadia Natural History Day Camp who attended the workshop later sought additional training.

C. Direct training as a means of encouraging leaders.

The investigator was present during the course of three different workshops conducted for the purpose of arousing the interest of leaders and giving them training in orienteering. The first was a part of a college course for recreation students, the second was organized by the American Camping Association and the last took place at a trailside museum.

1. The college class workshop

In November 1951 Dr. Vinal's Recreation students at the University of Massachusetts were given training in orienteering. The one hour instruction period included pacing exercises, the use of the military lensatic compass and a compass pacing game. Later, students traveling in pairs followed a two mile map and compass hike using a topographic map. In late May 1952, questionnaires were given to ten of these students who were planning to work in the general field of recreation that summer. Only one questionnaire was returned to the investigator.

This recreation student had worked at a summer playground

in Massachusetts. Two reasons for lack of success were expressed in the letter which accompanied the unanswered questionnaire. "The area we now have is scarcely large enough to accommodate our present program. Also, there was the fact that we do not have enough time for orienteering because our playground runs for three hours only during the day." She also wrote that she knew beforehand that "the present administration would not try to fit it in". She says further, "I do believe that time could be found and that it can be fitted into a summer playground such as ours...the children would enjoy it".

2. The American Camping Association workshop

The American Camping Association workshop in Outdoor Education was held in Cleveland at the Hiram House Camp in December 1951. Those attending included camp counselors, camp directors and staff members from the Cleveland Heights Public School Camp. Dr. Vinal instructed about twenty persons in the use of topographic maps while the investigator prepared a quarter mile long trail nearby. After compass and pacing instruction, small groups started on the trail at five minute intervals.

Several persons who were there showed considerable enthusiasm for what they learned about orienteering. Partly as a result of this workshop the Cleveland Heights Public School Camp now uses orienteering in its program.

3. The trailside museum workshop

In connection with his duties as Ranger-Naturalist at the Trailside Museum of the Mt. Tom Reservation (summer 1952), the investigator gave some orienteering instruction to several camp leaders. Directors of three day camps were invited to send staff members to a two hour orienteering workshop. Those who attended were four staff members of the Arcadia Natural History Day Camp who had just recently had training in orienteering at the Barre Workshop (1952) and two unit leaders from the Holyoke Jewish Community Center Day Camp who had had no previous training. The director of a Y.M.C.A. Day Camp expressed "interest" but sent no one. The instruction consisted of explanation of map use, pacing practice and compass use. Variations of orienteering which might fit into different programs were outlined. Staff members then followed a quarter mile long demonstration trail made up of several forms of orienteering. (See Appendix G.)

Following this workshop the staff members from Arcadia successfully introduced orienteering into their day camp program of 1952. The assistant director provided a complete report of the orienteering program which was used. Three trails patterned somewhat after the demonstration trail were prepared. After preliminary practice with compass and pacing, groups of three to five campers followed the trails. The most serious obstacle was the time required to prepare the trails, but it was felt that the good results justified the

time spent. This assistant director felt that orienteering should be continued the following year because "the children enjoy it immensely", "it can be directly tied in with nature observation" and "each child feels important as an individual". (See Appendix A.)

Of the two leaders from the Community Center Day Camp who received instruction in orienteering, only one attempted some compass and pacing exercises with his unit. He was apparently unable to make orienteering interesting for his campers. Lack of experience in it, a wide age range among his campers and lack of time to pre-lay a trail hampered him. Asked if orienteering is a worthwhile camp activity he replied, "Yes, especially [for] scouting age [children]".

In contrasting these two day camps it is significant that the camp leaders who were successful in establishing an orienteering program had been given training prior to that given by this investigator. They also had the advantage of living on the camp property and being able to prepare trails ahead of time. In the camp which was not successful the leader had only one training period and no opportunity to lay out a trail.

In evaluating the concrete results of all three workshops it must be kept in mind that most of the leaders who received this type of training had had no previous instruction in orienteering and no strong interest in acquiring it. But in the course of learning orienteering through direct train-

ing, a number of people became convinced of its value as a teaching aid and carried their enthusiasm to the organizations which employed them.

It is difficult to reach a decision on the basis of this study alone as to whether printed information or the training of leaders is the more effective method of spreading orienteering. It may well be possible that colorful illustrated information sent periodically to leaders might provide the stimulus necessary for them to establish their own orienteering program. But this study would seem to point out that the better method of promoting orienteering is to give direct workshop training to leaders.

SUMMARY AND IMPLICATIONS FOR THE FUTURE OF ORIENTEERING IN THE UNITED STATES

The first problem of this paper was to survey the development and present status of orienteering in Europe and North America. Orienteering has spread as an organized movement throughout Sweden, Finland, Norway, Denmark and Switzerland as a sport, a school subject and a military training method. Common factors in these five countries are believed to have influenced this development. These include proportionately large rural populations, invigorating climate, forests, rolling topography, interest in outdoor education, interest in field sports, concern for national health and civil defense, the availability of an easy-to-use compass, and the scarcity of automobiles. In several other countries, the educational aspects of orienteering have received a greater emphasis than has orienteering as a sport. In Canada and the United States the growing concern for conservation education has encouraged interest in orienteering as a teaching method. Neither government, however, has recognized "orienteering" as having military significance.

The second problem was to evaluate methods for teaching the subject in public schools. An intensive unit of map and compass exercises was more successful with 11th

grade pupils than with 9th and 10th graders. The seven hours used to present the unit were not sufficient for teaching the subject material contained in the unit. Indications are that the fundamentals of orienteering should be presented first to children of elementary school age.

The third problem was to investigate procedures for encouraging others to establish orienteering programs in youth groups. Both recognition of orienteering as a worthwhile program and a practical understanding of orienteering teaching methods seem necessary before individuals can introduce orienteering to others. This study indicates that both of these objectives could be obtained through direct contact. Printed information alone did not motivate others to establish orienteering in youth programs as far as could be ascertained.

In future years in the United States, the military services may recognize orienteering for its morale value and for its contribution to physical fitness and map reading proficiency. Its future as a civilian cross country sport will undoubtedly be influenced negatively by the dependence on the automobile and by the popularity of spectator sports. In the field of education, orienteering will probably be difficult to introduce into the curriculum of the traditional public school. The indications are that most significant development in the United States will be

as an outdoor recreation for children and as a conservation teaching method in flexible programs such as school camping.

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APPENDIX A

REPORT CONCERNING ORIENTEERING IN A NATURAL HISTORY DAY CAMP OF THE MASSACHUSETTS AUDUBON SOCIETY SUMMER, 1952

ORIENTEERING

Orienteering with the Silva Compass was done with all three groups and was highly successful. The camp staff was lucky to receive special instruction in this sport from James Manley, Ranger Naturalist at the Mt. Tom Reservation, who is writing a thesis on Orienteering at the University of Massachusetts. His excellent advice and encouragement, as well as the loan of four compasses, inspired us to give orienteering a major place in our program.

The following steps were taken in carrying out the program:

1. Instruction in use of the compass. The children were very interested in the movable housing and seemed to have no trouble in learning to use the compass properly after it had been explained to them step by step.

2. Practice pacing. A hundred foot track was set up with stone markers on the driveway and the children paced this until they had adjusted their pace to 5 feet. Ideally the smaller children should probably work out a shorter pace as the 5 foot pace called for rather longer than normal strides.

   (Pacing was also practiced on trail hikes. This proved to be a good means of keeping the group happy and moving on long hikes where some children tend to lag behind or get ahead.)

3. Trails were pre-laid by the staff, directions were typed and stapled onto heavy cardboard. Laying the trails is fun, although it is time-consuming. We tried to start off on one of the regular trails and then head off cross-country until we came to something of natural interest which would serve as a good stopping point. We found that almost anywhere you look you can find a good marker! Attached are samples of the trails used this summer. They were planned in a rather hit or miss fashion in the early morning hours or after a long hard day and could certainly be improved, but no serious flaws were discovered. We also tried a trail by giving directions on tags which were placed along the way, each tag giving the directions to the next point. This worked very well.

4. The children were divided into groups of 3 to 5, each child given a compass, a leader picked to carry and read off the directions. The groups started at 10 or 15 minute intervals. In the first and second sessions a counsellor went with each group and in the third session the campers managed very successfully on their own.

There seem to be many advantages to Orienteering in a Natural History Day Camp.

1. The children enjoy it immensely because:
   a. They each have a compass to keep them occupied;
   b. They can go off the trails into new territory;
   c. Following the directions and looking for answers to questions is a good challenge.
   This brings about a happy combination of physical and mental effort, using brain, muscles and senses, together with a spirit of adventure and exploration.

2. The points used in the trail can serve as a review of various kinds of natural history knowledge that have been acquired. Also, the children seem to become unusually alert while orienteering and often observe things which they overlook on ordinary hikes.

3. Each child feels important as an individual because he does pacing and compass following for himself and uses his powers of observation in finding the proper destination. At the same time, good team work is encouraged as the compasses and paces always vary slightly and decisions must be made as to which is the nearest correct.

In view of our experiences this summer I would recommend that Orienteering be included in next summer's program. Also I suggest that when future trails are laid out it would be well to bear in mind the fact that the same directions can be used over and over again and therefore that the destinations picked be as permanent as possible. Perhaps some of the transient visitors as well as the day campers may wish to Orienteer at Arcadia in the future.

SAMPLE TRAILS

The following directions were used at Parents Night of the second session. The children, dressed in paper bag masks as Indian Guides, led their guests around this trail.

ORIENTEERING- to see some of the plant and wildlife attractions of Arcadia.

START AT THE TRUNK OF THE BIG SUGAR MAPLE.

1. Direction of travel, 56 degrees. Pace 100 feet. From here you can see the Grange Memorial, a demonstration of what can be done in planting to attract the birds.

2. 295 degrees, 130 feet. Look up and find the nests of the Cliff Swallows.

3. 94 degrees, 30 feet. How many four-legged animals can you find here? (turtles)

4. 163 degrees, 165 feet. A sign will tell you the interesting facts about this shrub.

5. 112 degrees, 75 feet. The abundance of wildlife in and around this pool demonstrates the value of water and water plants.

6. 12 degrees, 110 feet. From here you can see Bee Balm, a plant which has a bright red flower and is especially attractive to hummingbirds.

7. You may now return to the starting point where you will be served BEE BALM TEA, made from the leaves of the plant you have just seen.

ORIENTEERING- to find things that grow high and low.

START AT THE BIG SUGAR MAPLE TREE.

1. Direction of travel, 156 degrees. Travel until you reach something that stays green all winter. (Spruce tree)

2. Direction of travel, 92 degrees. Travel for 70 feet. What do you find here? (The sun dial)

3. Direction of travel, 360 degrees. Travel for 75 feet.

4. Now travel towards 70 degrees until you come to a larch tree. Does this tree stay green all winter? (Sign by tree says "no".)

5. Direction of travel, 340 degrees. Walk until you come to the home of something with feathers. Who lives here? (Wren)

6. Direction of travel, 256 degrees. Walk in this direction until the ground cover changes. (Meadow becomes sand path)

7. Direction of travel, 320 degrees. Go this way for 725 feet!! Now look around for the twins who have lost their heads. (Chestnut stumps)

8. Direction of travel, 278 degrees. Keep going until you find something grayish-green that grows low on the ground. It grows in most countries where this game is played and it might remind you of Rudolph. (Reindeer moss)

THIS IS THE END OF THE TRIP. Sit down under a white pine tree

and wait for the others to arrive.
What kinds of trees can you see from where you are sitting?
What kinds of ground cover?

EXPLORING ARCADIA...START FROM THE WEATHER FLAG.

1. 324 degrees, 455 feet. Find a place where a Screech Owl might live. WHAT KIND OF TREE IS IT IN? (red oak) 5 points.

2. Now go to a very large white pine tree close by. From the southwest side of this tree set your compass at 226 degrees. Keep going until you come to a fencepost. Near the fence you should find a red maple tree. WHO LIVES UNDER THIS TREE? (woodchuck) 5 points. HOW MANY DOORS CAN YOU FIND TO HIS HOUSE? (one point per door)

3. 330 degrees. Go this way until you come to a large oak tree. Under this tree are shoots of a tree which used to grow very large before it was killed by a blight. BRING BACK A LEAF OF THIS TREE AND TELL US ITS NAME. (chestnut) 5 points.

4. 28 degrees. Walk until you come to something that is marked on your map. (Old Coach Road.) Now follow the map northwest for 40 ft. Now travel due north and try not to fall down as you keep going in this direction to a trail thru a grove of Shagbark Hickories.

5. 130 degrees, follow the trail. Take turns pacing 100 feet until you come to a bench. HOW MANY FEET IS IT TO THE BENCH? (5 points if you come within 100 feet of being right) (1100 ft.)

6. Sit down here and listen for birds. CAN YOU NAME ANY BIRDS THAT YOU HEAR? (5 pts. per bird. Prepare to imitate song)

7. Now continue on trail until you come to a clearing with a large patch of white flowers. NAME THE FLOWER. (Queen Anne's Lace) 5 points.

8. From the eastern end of the largest patch of flowers set your compass at 23¼ degrees. Walk in a straight line until you come to a white pine tree. Now follow your map back to Headquarters and turn in this card to get your score.

APPENDIX B

CODE
OF THE PETITCODIAC HIGH SCHOOL
ORIENTEERS' CLUB

P. H. S. O R I E N T E E R S C L U B Form 1-A

I, The undersigned, do hereby make application for enrollment as an active member of the Orienteers Club, and if I am accepted, I promise to comply to the following regulations of the Orienteers code.

CODA:

1. The Orienteer is always willing to act as a guide to partake in a search in case of emergency.
2. The Orienteer is always ready for active participation in contests between sunrise and sunset when called upon. (Certain Saturdays and holidays.)
3. The Orienteer takes great pleasure and honor in being a member of his or her distinct and highly-competitive group.
4. The Orienteer is a great lover of the out-of-doors.
5. The Orienteer takes exceptionally good care of his or her guiding instruments.
6. The Orienteer is an athlete, takes excellent care of his or her mind, spirit and body at all times.
7. The Orienteer is clean-living and a good citizen of his or her country.
8. The Orienteer is highly co-operative at all times.
9. The Orienteers Club always takes careful and definite precautions to assure the safety and location of its fellow members.
10. The Orienteer shall always double-check his or her directional findings.

ENDORSEMENTS:

I. PROSPECTIVE MEMBER.

Signature.....
Date.....

II. PARENTS' APPROVAL.

Signature.....(Father)
Date.....

III. SCHOOL APPRAISAL.

Signature.....(Principal)
Date.....
Signature...(Physical Director)
Date.....

IV. PHYSICIAN'S REPORT.

I, the undersigned, believe that the person whose signature appears in Section I of this form is physically fit to take part in active games and contests.

V. CLUB ACCEPTANCE.

Signature.....(President)
Date.....
Signature.....(Squad Leader)
Date.....

APPENDIX C

LESSON PLAN AND EXERCISES
USED DURING EXPERIMENT I, AT AMHERST
SPRING 1952

LESSON PLAN: AMHERST

Lesson 1

Introduction
Exercise No. 1 (Road Map, Ohio)
Review of Exercise No. 1
Map Symbol Study Sheet ("Homework")

Lesson 2

Discussion and questions from students
Quiz on Map Symbols
Introduction to Topographic Map

Lesson 3

Exercise No. 2 (Topographic Map, Mt. Toby)
Review of Exercise No. 2
Introduction to Compass

Lesson 4 (Schoolyard)

Pacing, Practice over 100 foot course
Bearings, Practice taking and following
Compass Game (Silva)

Lesson 5

Introduction to use of compass with map
Exercise No. 3 (Practice Map, Silva)

Lesson 6 (Recreation Area, University Campus)

Compass Game (repeated)
Orienteering Trail No. 1 (Students follow in groups of three)

Recreation Dept., Fernald Hall
Univ. of Mass., J. Hanley
(Ohio-Amoco-AOC 546, Gen. Sci.)

OHIO ROAD MAP
EXERCISE NO. 1.
Please do not write on this sheet- use answer sheet.

(Side with Ohio State Map up)

Does this map have a scale? (1) : 1 inch = (2) miles. Does it have a key to symbols? (3), Does it have directions, that is, is N marked? (4).

What makes up the N boundry of Ohio? (5), (6).

Road Maps and Topographical Maps use the grid system as a means of location of points on the map. Along the top and bottom margins are numbers; along the sides are letters (on this map). To find a certain town, look in the Ohio Index and note the grid key given after the city. Then draw imaginary lines across, and up and down; near where these two lines cross is your town. Give the grid key for Tiffin, Ohio. (7). What city of about 30,000 is located 13 miles NW of Milan, Ohio? (8).

What directions do you go if you drive from Springfield, Ohio along route 40 to Columbus; then on route 23 to Chillicothe? (9), (10).

About 10 miles N of Dayton, Ohio notice the two "jogs" in the road (route 40). How do you account for this? (One word) (11).

Route 42 leaves Cleveland going SW. How far is it from Medina (Jct. of 42 & 18) to Mansfield (Jct. 42 & 30)? (12).

What happened near Pleasant City, Ohio? (13).

Much of Ohio was covered with glaciers in the past. When a glacier "retreats" it leaves piles of dirt and stones behind. These are called moraines. Now find Painesville (30 miles NE of Cleveland). One long moraine runs roughly E-W from Painesville through Austinburg toward Pennsylvania. Find Parkman. Notice how the Grand River starts 4 miles N of Parkman; then flows S, then E, then N for 25 miles. Then what direction does it go? (14). Why? (15).

Because of the melt water left over from the glacier, Lake Erie was at one time much larger, and had a different name. A new outlet was formed, and the water level dropped; then again. Just W of Cleveland notice the E-W routes 254, 113, and 10. These roads follow the old sandy beaches of these post-glacial lakes. Which route follows the oldes lake shore? (16).

Now turn the map over.
If it is 4 o'clock in Cleveland, what time is it in Great Falls, Mont?? (17)

How far is it from Boston, Massachusetts to Columbus, Ohio? (18).

While you are waiting for the others to finish, see if you can discover the numbering pattern for the major U.S. highways.

MAP SYMBOL STUDY SHEET
FORM 1

Recreation Dept. Fernald Hall
Univ, of Mass., J. Manley
(Topol map symbol study sheet)

This is for you to look over in preparation for a short quiz.

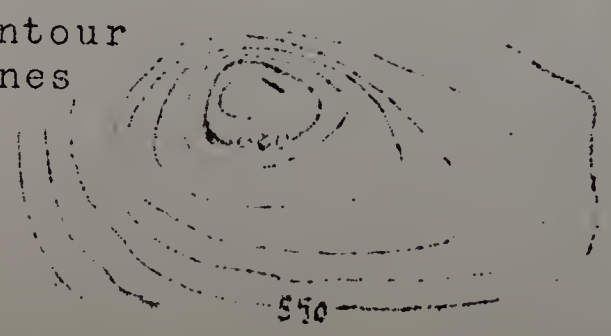
These symbols are some of the ones used on the Topographical Maps of the United States Geological Survey. However, they are larger on this sheet than they are on the topographical maps. Many of the symbols look exactly the way you would expect them to look. The fact that different colors are used for different types of symbols is also helpful.

CULTURE (MAN MADE)
Printed in BLACK

1. School
2. Church
3. Houses
4. Buildings
5. Good Roads
6. Poor Roads
7. Trails
8. Railroad
9. High Tension or Power lines
10. Bench Mark BM x 361
11. Cemetaries CEM

RELIEF Printed in BROWN

12. Contour Lines



WATER Printed in BLUE

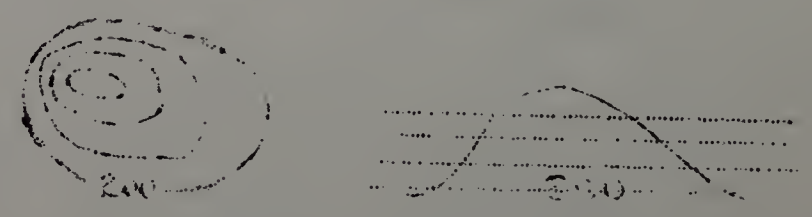
13. Streams
14. Intermittant Streams
15. Lake; Pond
16. Marsh

ROADS Printed in RED

17. Hard Surface
18. Other Surface Improvements
19. U.S. Route 5
20. State Route 3

If the Contour Interval is 10 feet, (Distance between the contour lines equals 10 feet) how high is this little hill?

TOP VIEW SIDE VIEW



Answer: We can tell the hill is more than 30 and less than 50 feet from top to bottom. -----

TOPOGRAPHICAL MAP, MT. TOBY QUAD.
EXERCISE NO 2

Recreation Dept. Fernald Hall
Univ. of Mass., J. Manley
(Topol-Mt.Toby Quad., Gen. Sci.)

Please do not write on this sheet, Use answer sheet.

This kind of map is used by Foresters, Geologists, Sportsmen, Scouts and many others. It is a large scale map. The distance from N border to South border of the map is only about 8-1/2 miles.

Find the scale at the bottom. 1/31680 means that 1 unit on the map equals 31680 units on the ground. Therefore, 1 foot on the map equals (1) on the ground. Where is the key to symbols? (2). Two "Norths" are given on the map. Which one will your compass point to? (3)

Find the Amherst High School. ow find the school at North Amherst. How far apart are they? (approximately) (4). Stay on route 116; go N to BM 192. How high above sea level are you? (5). What county are you in? (6). Follow 116 for about 3 miles to the x-roads. Where would you be if you went straight ahead? (7). Let's turn right. Go 1/2 mile, and stop. Where are you? (one word) (8). In South Deerfield, turn NE and drive 3/4 of a mile, and get out of the car. You should be between the "D" and "E" in "DEERFIELD". Suppose you wanted to walk to the Pine Nook Cemetary 1-1/2 miles away. How would you go? (9). (4 or 5 words)

While we are in the North Sugarloaf Mountain area, can you tell which side would be easiest to walk up, carrying a pack? (10). Why not the other sides? (11).

The grid system is used on topographical maps to locate points. However, instead of letters and numbers, "degrees (°), minutes ('), and seconds (") are used. For example: 42°25'00" (written at the sides), and 72°32'30" (written at the top and bottom) is the location of a point halfway between the Great Swamp and (12).

In Hatfield is a "C" shaped string of ponds. This used to be the path of the river. But it took a short-cut and the loop or "Ox-Bow" is becoming filled with dirt. Soon it will become a "Slough".

Find Chard Pond. (top, center). A type of dotted line crosses the pond. After this line crosses route 63, what direction does it go? (13). What is it? (14). Would it be a good landmark? (15).

The glacier left its mark as can be seen from the map. In Amherst, see the two oval hills between East Pleasant St. and North Pleasant St. These are Drumlins, piles of glacial material. Do you think Wildwood Cemetary is on a drumlin? (16).

Find Factory Hollow Pond (Puffer's Pond) between N. Amherst and Cushman. Suppose you floated a bottle on this pond, and it went over the dam. Where is the furthest place on this map that it could drift to? (17).

If you still have some time left, follow the 300 ft. contour line on the map. This was the shore line of Lake Hadley, an old glacial lake. Was the Amherst High School above or below the water? (18).

When you find a delta on the map, hold up your pencil.

Recreation Dept. Fernald Hall
Univ. of Mass., J. Manley

ANSWER SHEET for exercises in Orienteering:

Student's name _____ Age_____ Grade_____

School_____ Town_____State_____

Class title_____

Quest. No.	A N S W E R S			
	EXERCISE NO__	EXERCISE NO__	EXERCISE NO__	EXERCISE NO__
1.				
2.				
3.				
4.				
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19.				
20.				

ORIENTEERING TRAIL NO 1 (Spring)
Nature Recreation Area, Campus

Recreation Department, Fernald Hal
Univ. of Mass., Amherst, Mass.
(Junior High, Gen Sci. 9) J. Manle

Start at large oak tree, NW quarter of junction of Lovers Lane and road in front of Lewis and Thatcher dorms.
From tree go 80° for 65 feet. (80° is almost what direction? (1)____
Go 210 feet along road that runs 34°.
Stop at large oak tree on left with poison ivy on its trunk. (the tre is in a small clearing with several large boulders.)
Now for a little cross-country. Set your compass for 104°, and walk this bearing to road. (trust your compass) You should hit the road where two large trees have their trunks twisted together. How many feet away from these trees did you hit the road? (2)_____
Follow the road E until you are opposite the corner of wire fence on your right. Go 200 feet S on the path along the fence.
On your left, see the 6" diameter tree that has been cut, and is lyin at an angle to the ground. Did the sprouts grow before or after th tree fell? (3)_____. See the thorns? Are they in three's or in pairs? (4)_____. This is the common or black locust tree. Right beside the fence are several interrupted ferns. See how the leaves are "interrupted" by the brown spores or seeds?
Follow the path S along the fence until fence and path separate. (Poison Ivy- 3 leaves- at your feet on left.)The bearing of the pat ahead is (5)_____degrees.
Follow it until it comes to the fence again, and turn right. Estimat distance between fence posts. (6)_____. Now pace it. (7)_____
At the corner, what is the ecact bearing of the fence that runs rough S? (8)_____. How close to a fence post can you hold your com before it is affected? (9)_____. How many feet to the post where the old sign was? (10)_____. See the bird feeding she
Find the big hemlock that was blown over in the 1938 hurricane. Were the branches all cut in the same fashion?(11)_____. What is the exact bearing of the direction the tree fell? (12)_____.
Go to the top of the tree. Now for some real cross country work! Follow carefully the bearing 304° until you cross a path and come t an outdoor classroom with log seats. Hope you made it! What does this outdoor ampitheater have that you have in your classroom at school? (13)_____. Walk east 50 feet to path.
Follow red and black Nature Trail markers N for 1-1/2 football fields until you come to a log across the path. Where you step across log, look W to tree 10 feet away. What part of the tree seems unusual? (14)_____. What happened? (15)_____. This cherry tree had a 4-footed visitor. How can you tell? (16)_____ _____. What do you think it was? (17)_____.
Now continue along path to the "topless" tree. What kind of animal has been fed near by? (18)_____.
See the"telephone pole"with the wire basket on top? If there were foo in the b sket, do you think a squirrel could get to it, and why? (19)_____.
From topless tree go 330° to big oak where you started. How far to th oak? (20)_____.
The hill that you have been on for this hike is a "drumlin" left by th glacier. Find it on the topographical map.

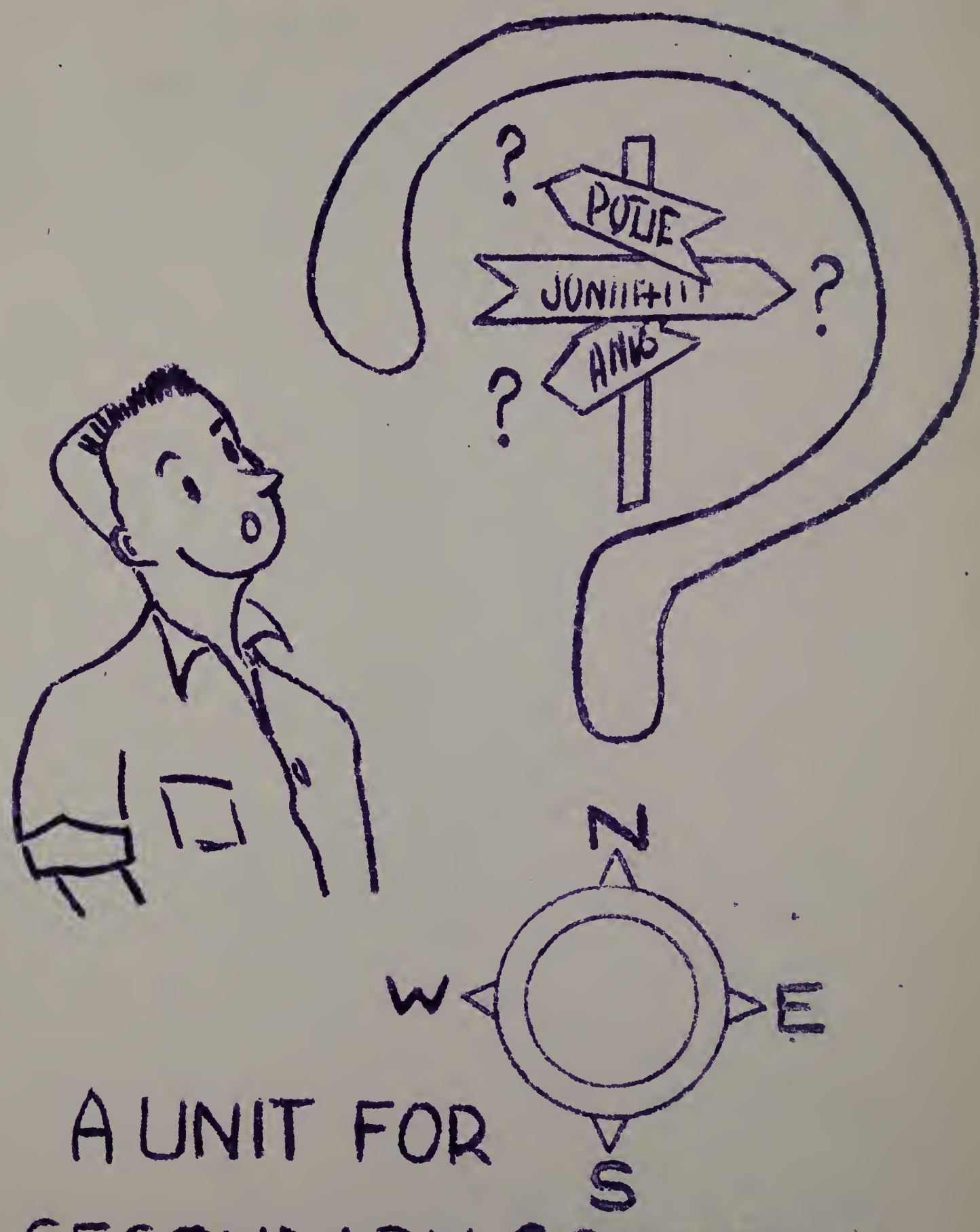
Hope you enjoyed your hike.

Score:_____

APPENDIX D

UNIT USED
DURING EXPERIMENT II, AT
SOUTH DEERFIELD
SPRING 1953

ORIENTEERING



A UNIT FOR
THE SECONDARY SCHOOLS

CONTENTS

(Unit to be accompanied by copies of:)

PRACTICE MAP (Silva)

PENNSYLVANIA ROAD MAP WITH PICTORIAL GUIDE, 1952. (General Drafting Co. Inc., N.Y., for Esso)

MT. TOBY QUADRANGLE, MASSACHUSETTS. TOPOGRAPHIC MAP, 1941. (United States Geological Survey)

ORIENTEERING

UNIT LESSON PLAN

LESSON	TIME (MIN)	PLACE AND EQUIPMENT*
Lesson 1	**40**	**Classroom**
INTRODUCTION	3	Pages 1, 2, and 3.
USING A COMPASS	12	Compasses & Demonstration C.(1)
PRACTICE MAP: EXERCISE 1	20	"Practice Maps" Answer Sheets"
Lesson 2	**40**	**School-yard**
SCHOOL-YARD ACTIVITIES		Page 4.
Pacing	10	100' measured cord: E-W. (1)
Compass instruction	10	Wire markers (2)
Compass-Pacing Game	15	Compasses "Compass Game" (1/20 students)
Lesson 3	**40**	**Classroom**
USING A ROAD MAP	5	Pages 5 and 6.
ROAD MAP* PENNSYLVANIA: EXERCISE 2	30	Road Maps: Penna. '52, Esso. Answer Sheets
Lesson 4	**40**	**Classroom**
USING A TOPOGRAPHIC MAP	5	Pages 7 and 8.
TOPOGRAPHIC MAP- MT. TOBY: EXERCISE 3	30	Topographic Maps; Mt. Toby, Mass. Quad., $7\frac{1}{2}$' series. Answer Sheets

(Final Lesson, ORIENTEERING FIELD EXERCISES, is for a specific area, and is bound separately.)

Lesson 5	**2 hours**	**Prepared Area: Out of Doors**
ORIENTEERING FIELD EXERCISES		"Orienteering Field Ex.",6 p. Plane Table (1) Topo Maps (4) (STATION 5, II)
MAP QUIZ	45	100' measured cord
FIELD EXERCISES	25	Wire markers (4)
ORIENTEERING TRAIL	45	Compasses Cardboard clipboards, and bands. Yardsticks (3) Carpenter's folding rule (1)

*EQUIPMENT: One piece of equipment needed for each student unless otherwise indicated. Pencil needed all lessons.

INTRODUCTION

Orienteering is an Educational and Recreational program based on "learning by doing". It provides theory and instruction toward developing skills in using map and compass, and it provides environment toward creating a positive appreciation for Natural Resources. It also provides opportunity for useful and healthful outdoor experiences through games and sports.

The purpose of this Unit is to help the student learn the theory of map and compass, and to learn the practical use of these tools for travel. The Unit is meant to aid the student in correlating specific facts interpreted from the map, into a broad understanding of a cultural area. A further desire is that interest may be aroused for extra-curricular activities in Orienteering.

The method used in this unit is "learning by doing". Map and compass exercises indoors form a basis for applying this knowledge to outdoor use. The student will have opportunity to use a compass in the school-yard and for travel in unfamiliar territory. He will use three kinds of maps-- a simple practice map, road maps, and a topographic map. He will learn fundamentals of measuring in the field, and will have opportunity to develop a personal unit of measure- his own step.

Such a unit requires keen observation, personal accuracy, and very careful reading. It requires the student to search out pertinent material that has bearing on thequestion at hand, and answer accordingly. In several instances, the Unit requires imagination.

Student reaction to the Unit in the form of a theme or report is encouraged.

ORIENTEERING

USING A COMPASS

Let's find out what makes this compass work. First, we should learn the names of the parts.

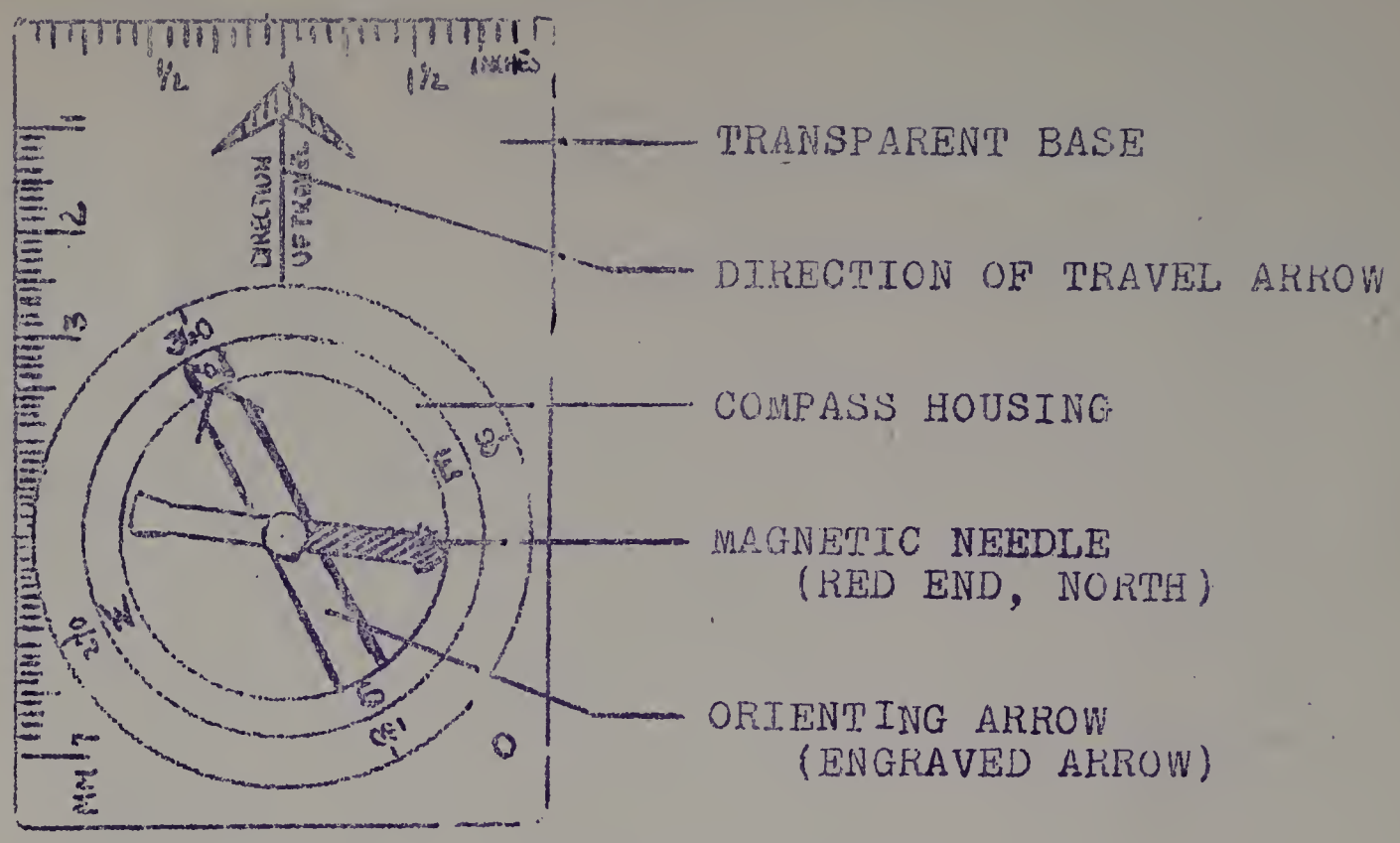
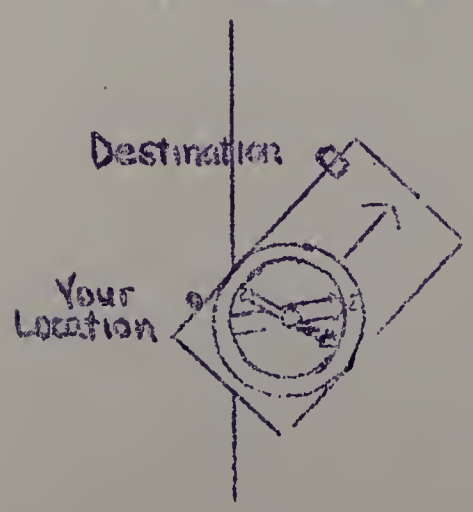


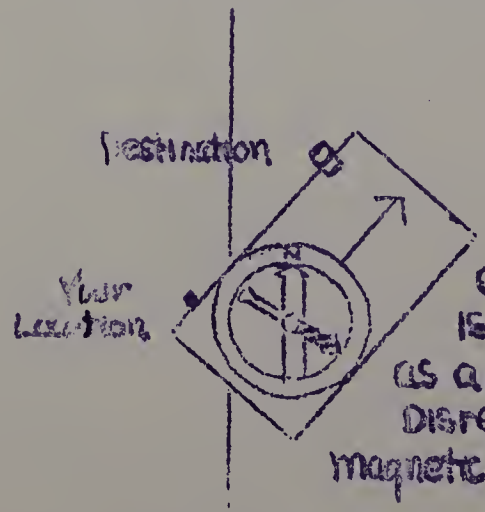
Fig. 1. Parts of a Silva Compass.

(1) Transparent Base, on one end of which is the Direction of Travel arrow; along one end a 2 inch rule, and along one side a $7\frac{1}{2}$ mm. rule, (The ruled portions are helpful when using this compass with a map). (2) Compass housing, around which are 2 degree graduation marks and on top of which are marked the cardinal points, N, E, S, W. Inside the housing is the orienting arrow which rotates whenever the housing is rotated upon the base. (3) The magnetic needle is the very important part which always points to Magnetic North.

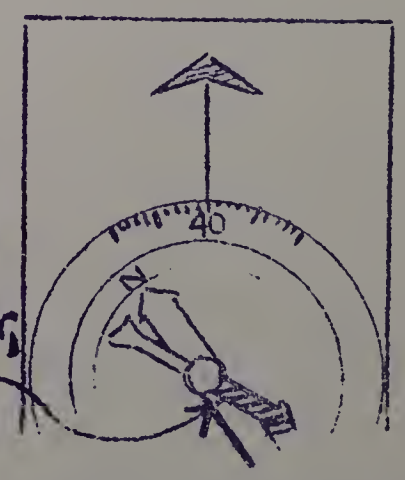
Now we will see how to use this compass as a protractor to find bearings of various destinations on a map.



1. Place edge of compass along desired line of Travel.



2. Turn housing until orienting arrow points to North on map.



3. Pick up compass and read bearing at end of direction of travel arrow.

ORIENTEERING

PRACTICE MAP - EXERCISE 1.

This Practice Map has two of the three main features of a good map. It has a SCALE, 1 inch equals (1) feet, and it has DIRECTIONS given (lower right corner). It does not have a KEY however. Do you think the numbered dots could represent: Houses? (2) ; Towns? (3) ; or Trees? (4) .

SCALE: Suppose you started at #1, and walked to #2. How far did you walk? (5) . Now go east to #11. How far have you gone since you left #1? (6) .

If the scale were 1 inch equals 25 miles, how far would it be from #6 to #9 via #5? (7) .

Suppose the GROUND DISTANCE from #9 to # 12 equaled 100 feet. Then the scale would have to read: 1 inch equals (8) feet.

If this were a map of a Community (1 inch equals 1/8 mile), where should the Playground be: #3 or #10? (9) .

Pretend this is a map of a jungle with a scale of 1 inch equals 25 miles. The dots are Native Villages. Pretend also there is an 8,000 ft. Mountain Range running from #1 to #7. You've probably heard about the many different dialects or languages used by Jungle Dwellers. The people of which villages would be best able to understand each other: Villages #4 and #2, or #2 and #11? (10) .

COMPASS BEARINGS: You are at #2. What is the Bearing of #8? (11) . Also from #2, what is the Bearing of 13? (12).

From #11: What is the Bearing of #5? (13).
From #7; What is tne Bearing of #1? (14) .

Suppose you were sleeping at #5 in a tent that opened toward #8. Would the sun's rays enter the tent in the morning? (15) .

Now the map is of an Ocean, and the dots are Islands. One inch equals 100 miles. The Ocean Currents on the map are from W to E. At one time Island #2 had no Coconut Palms. Then the trees were discovered growing on Island #2. Which side of the Island? (16) ; and where did they come from? (17) .

Time: just before sunset. Scale: 1 inch equals 1 mile. Place: Equator. You are at #2, adrift in a boat. Could you send a signal with a mirror to a rescue boat at #11? (18) . To a plane at #6? (19) . To a boat at #4? (20) .

ORIENTEERING

SCHOOL YARD ACTIVITIES

Pacing: Only when very accurate measuring is done is it necessary to use a tape measure or surveying chain. At other times, it is sufficient for a person to know his pace or length of step. Of course your step will become somewhat longer as you grow taller- so it might be well to check it from time to time.

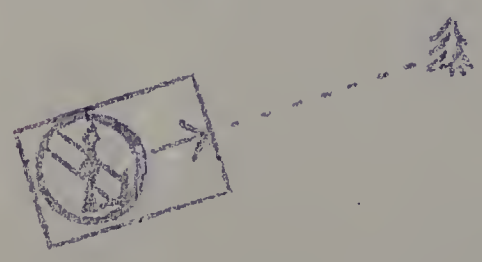
In the school-yard is a 100 foot course. You can determine your approximate pace by counting your natural steps as you walk the 100 feet. If your count is about 40, you should practice a 2-1/2 foot step- best for measuring. If your count is about 33-1/3, you should practice a 3 foot (yard) step. Note: it is better to lengthen your step than to shorten it.

Practice pacing a few times over the 100 foot course. You might set up your own 100 or 50 foot course at some place where you often walk near your home.

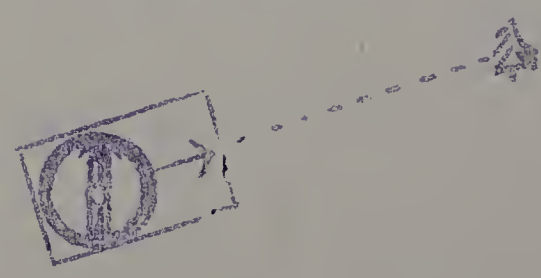
For long distances, pacing is not very practical. If you know how long it takes you to walk a mile over certain types of terrain, you can use a watch to help determine a distance covered. With practice, judging distances becomes more accurate.

The Compass Outdoors: In preparation for a compass-pacing game, we must learn-

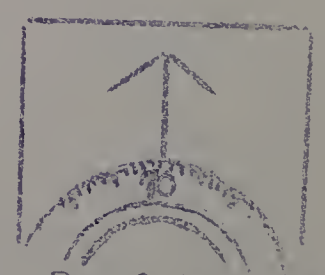
A. To find the magnetic bearing or the magnetic AZIMUTH of an object, follow these three steps:



1. Point Direction of Travel arrow toward object.

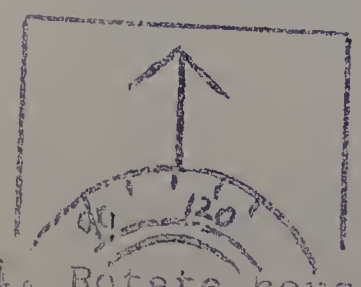


2. Rotate housing until orienting arrow is directly under magnetic needle.

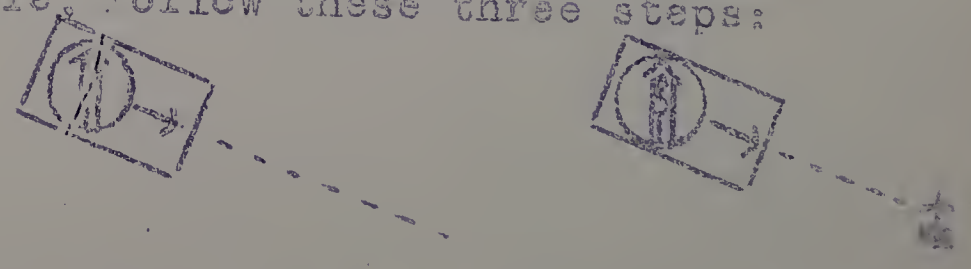


3. Read bearing at end of D of Travel arrow.

B. To follow a given Azimuth or magnetic bearing - of 110 degrees, for example. Follow these three steps:



1. Rotate housing until 110° is at end of D of T arrow.



2. Hold comp. waist high. Turn body until magnetic needle points to N on housing.

3. Pick land mark and walk toward it.

ORIENTEERING

USING A ROAD MAP

A good road map contains a wealth of information. Usually in one of the corners is found the LEGEND or KEY to map SYMBOLS. The SCALE of miles is generally close by.

Numbers at the sides, and letters at the top and bottom help in locating cities and towns. Imaginary lines between these numbers and letters form a GRID. The INDEX gives a letter and number for each city and town. These are used with the grid.

Mileage tables are often included to give distances between the major cities on the map.

The largest cities in the state are usually shown in detail on an enlarged "Info" Map.

A Pictorial Guide Map helps you to see at a glance what the tourist attractions of each area are. Historical events are colorfully depicted on such a map.

Public Recreation Areas are often included on a map and the facilities of each are listed.

Some POLITICAL information is provided in that County and City boundaries are defined, and County Seats and Capitals are indicated. Comparative Population densities can be estimated by noticing the number of roads and the size of cities.

For the convenience of the motorist, the legal speed limits are often given and the State Highway Laws are briefly outlined.

Many of the PHYSICAL characteristics of a state can be read from a road map. DRAINAGE PATTERNS are apparent when the courses of the major rivers and streams are traced. TOPOGRAPHY can be judged by noticing the drainage patterns and the number and pattern of highways. For example, a grid-like pattern of roads indicates flat or sloping land. Roads closely paralleling streams is an indication of very rugged topography.

Some insight into the culture of the people may be learned from the names of towns and cities, and from the number and condition of roads. Many road maps show by symbols, the predominant industry of a specific area.

As the student develops more skill in map reading, he will soon be able to interpret with considerable accuracy maps of completely unfamiliar territory.

UNDERSTANDING [illegible] Pennsylvania with
Pictorial Guide Map

[illegible] MAP

PENNSYLVANIA- EXERCISE 2

The LEGEND or KEY gives information that is helpful in reading this map. Note the cumulative (red) and the intermediate (black) mileages given. On this map cumulative mileage is the distance between two red (1) According to the scale, one inch equals (2) miles

What is the Child MEMORIAL FOR Altoona? (3) four miles west of Altoona is the railroad's famous (4) Curve.

The (5) Trail which enters the state from the south near Mouzerville, leaves near the Delaware (6)

The Monongahela and the Allegheny rivers meet in Pittsburgh to form the (7) River. The Allegheny rises near what town? (8) Which River is more shallow and slow moving: The Allegheny or theSusquehanna? (9)

One part of Pennsylvania that was once forested has been severely lumbered, and is now virtually a wasteland area Where in Pennsylvania is this area: N.W., S.W., N.Central, S.Central, N.E., or S.E.? (10) What do you notice about the roads and streams in this area, that tells you that the terrain is rugged? (11)

Notice how the mountains in S.Central Pennsylvania control the direction of roads and streams. The ridges resemble the folds of a curtain. What is the general direction of the ridges? (12)

Western Pennsylvania is famous for its Natural Resources. Which Resource has been found in and near OIL? (13) In what part of the state are most of its lakes? (14)

People from what European country first settled in and near the triangle formed by Allentown, Philadelphia and Harrisburg? (15)

Turn the map over: On the Pictorial Map, find the Drake Well Memorial. How many years since the first drilled oil well? (16) Whose military career ended near Fort Necessity? (17)

Where would it be easier to get lost: Downtown Pittsburgh, or Downtown Philadelphia? (18)

Can you swim at Cook Forest State Park? (19)

How long would it take on the Pennsylvania Turnpike to drive from the Allegheny Valley Interchange to the Carlisle Interchange, if the average rate of speed, including a 1 hour lunch stop, were 40 m.p.h.? (20)

USING A TOPOGRAPHICAL MAP

A topographic map is a line picture of part of the earth's surface which shows relief and culture. The margins and back of a topographic map are the places to look for helpful information. The KEY to SYMBOLS is on the back. The SCALE is given at the bottom. The scale is also expressed as a representative fraction. On this map fraction is 1/31680.

A Contour Line connects all points of equal elevation above or below sea level. The CONTOUR INTERVAL- vertical distance between contour lines- is given in the lower margin. Elevations at BENCH MARKS are provided.

"Topo" maps are usually named after the principal town or an outstanding physical feature within the QUADRANGLE. The date of survey, and the surveyors' names are given. The names of the eight adjoining quadrangles are indicated.

Instead of using letters and numbers as on road maps, a GRID system is set up based on LATITUDE, the distance north or south of tne Equator; and on LONGITUDE, the distance west of the PRIME MERIDIAN. Latitude and Longitude are measured in DEGREES (°), MINUTES ('), and SECONDS (").

Four standard colors are used for the conventional signs or SYMBOLS on topographic maps of the United States.

CULTURE- Man made objects, such as buildings, bridges, roads, and boundaries are printed in Black.

RELIEF- Contours, elevations, depressions, mountains, etc. are printed in Brown.

WATER- Streams, canals, lakes, springs, and marshes are printed in Blue.

ROUTES USUALLY TRAVELED- are printed in Red on some maps.

The first glance at a "topo" map tells much about the general TERRAIN. If there are few contour lines, the land has little RELIEF. It would be a flat, sloping, or gently rolling TOPOGRAPHY. But if there are many contour lines close together, the land is more mountainous. In the West, where there are young rugged mountains, the contour interval must be increased to 50 or 100 feet to avoid having the mountains appear solid brown on the map.

When topographic maps are used, we learn that there is more than one "North" to consider. TRUE NORTH is the direction of the North Pole from the observer. MAGNETIC NORTH is the direction tne magnetic needle of the compass points. The difference between the two, measured in degrees, is called MAGNETIC DECLINATION. The geographic (True) North Pole and the Magnetic North Pole are actually about 1400 miles apart-- which is equal to the distance from Boston to Tampa, Florida!

ORIENTEERING (Topo- Mass. Mt. Toby Quadrangle, 1911)

TOPOGRAPHIC MAP

MT. TOBY QUADRANGLE- EXERCISE 3

This large scale map is used by Foresters, Geologists, Sportsmen, Scouts, and many others. The north-south extent of the map is only about (1) miles.

Find the scale at the bottom. One foot on the map equals (2) feet on the ground. Two "Norths" are given. Which one will your compass point to? (3) ✱. What is the magnetic declination in this area? (4).

Find the Amherst High School. About how far is it to the school at North Amherst? (5). Stay on State Route 116; go north to BM 165. How high above sea level are you? (6). What County is the bench mark in? (7). Follow 116 for about 3-1/4 miles to the x-roads. Where would you be if you went straight ahead? (8). Turn right; go 1/2 mile; turn left, go 1/4 mile and stop. Where are you? (9).

Go to South Deerfield; turn NE and go past past a school off to the left, and a (10) near the school on theleft. Continue across a stream. What is the next distinctive building on the left? (11).

From this building suppose you wanted to walk to the Pine Nook Cemetary between N. Sugarloaf Mt. and the River. How would you go? (12). How far? (13). How far as the crow flies? (14).

Notice the stream that crosses the top of the letters "..FIE.." in DEERFIELD. What direction does it flow? (15). Which side of N. Sugarloaf Mt. would be easiest to walk up carrying a pack? (16).

Latitude 42°25'0", Longitude 72°32'30" is thelocation of a point half way between the Great Swamp and (17).

In Hatfield is a "C"-shaped string of ponds. This used to be the path of the River. But ✱ it took a short-cut and the loop or "ox-bow" is becoming filled with silt. Soon it will become a "slough".

Find Chard Pond between Mt. Toby and River (N). A type of dotted line crosses the pond. Would this line be a good landmark? (18).

Find Factory Hollow Pond between North Amherst and Cushman. If a floating bottle went over the dam. where is the furthest place on this map it could drift to? (19).

Follow the 300 foot contour line around the map. This was the shore line of Lake Hadley, an old glacial lake. Find a delta on the map. What state building(s) is it near? (20).

GLOSSARY

AZIMUTH- "the way" to an object; bearing of an object.

BEARING- the position of one place from another. On basis of degrees, one of 360 different "ways to go".

BENCH MARK- a point marked by a bronze plate indicating the exact elevation of this point above sea level.

CARDINAL POINTS- the four chief compass points; N, E, S, and W.

CONTOUR- the outline, as of a hill shown in cross-section.

CONTOUR INTERVAL- vertical distance between contour lines.

CONTOUR LINE- an imaginary line (represented in brown on topographic maps) connecting all points of equal distance (elevation) above or below sea level.

CULTURE- on a topographic map means all man-made things such as roads, buildings, bridges, boundaries, etc.

DRAINAGE PATTERN- paths established by the rivers and streams.

GRID- a pattern of squares, useful in locating places on a map. Most topographic maps have 9 grids.

HIGHWAY NUMBERING PATTERN- in the United States has origin in the North East. Even-numbered U.S. highways run east and west. Odd-numbered highways run north and south. Low numbers in both cases are in the north eastern states.

INDEX- a table, usually alphabetical. On maps, such a table is useful in locating cities and in finding populations.

KEY- an explanation; a legend. For example, a key to the meaning of map symbols.

LAND MARK- a conspicuous building or other stationary object, such as a mountain peak, waterfall, or tree which may be used as a guide in traveling.

LATITUDE- the distance north or south of the Equator measured in degrees, minutes, and seconds. It is represented on the map by "parallels"- lines parallel to the Equator.

LONGITUDE- the distance west of the Prime Meridian measured in degrees, minutes, and seconds. It is represented on the map by "meridians"- lines which go from pole to pole.

MAGNETIC DECLINATION- the difference, measured in degrees, between true north and magnetic north.

MAP- a line picture or chart representing a portion of the earth's surface.

MILEAGE TABLES- give air or ground distances between cities.

(Continued)

NORTH, MAGNETIC- the place toward whidh the magnetic needle of a compass points. Located about 1400 miles from true N.

NORTH, TRUE- The location of the geographic North Pole.

PACE- a step; a unit of measure that may vary from 30 to 60 inches. Sometimes considered to be 2-1/2 feet.

PACING- measuring by steps.

PHYSICAL- features on a topographic map which pertain to such natural characteristics as rivers, mountains, and valleys.

POLITICAL- pertains to significant geographical things such as boundaries, capitals, county seats, etc.

PRIME MERIDIAN- the basis for longitude; an imaginary pole to pole line which passes through Greenwich, England.

PROTRACTOR- an instrument, marked in degrees, used for measuring and drawing angles.

QUADRANGLE- a square, such as a topographic quadrangle, bounded by parallels and meridians.

RELIEF- the elevations and depressions of land surface caused by mountains, valleys, etc.

ROAD MAP- a line picture of part of the earth's surface which shows principal routes of automotive transportation between cities and towns.

ROUTE- a way or road which is traveled.

SCALE- a line of distances; also, a representative fraction whereby one unit on the map equals a certain number of the same units on the ground. A unit may be expressed in inches, feet, yards, or miles in the United States.

SYMBOL- a sign or picture used in place of printed words. Conventional signs as used on U.S. topographic maps include: Culture in black; Relief in brown; and Water in blue. The meaning of symbols on other types of maps may vary. Therefore, see the legend.

TERRAIN- a military term meaning ground considered from the standpoint of its fitness for some special purpose, as an airport or fortifications.

TOPOGRAPHIC MAP- a line picture of part of the earth's surface which shows relief, culture, and water.

TOPOGRAPHY- all the physical features of a region or locality which form the present landscape.

Student _____.

Class___ Age ____ Date _____.

Class Title _____.

School _____.

Score: I___,II____,III____

Tot.66 Tot. ___ Ave._____.

ORIENTEERING FIELD EXERCISES

To accompany

ORIENTEERING

A UNIT FOR

THE SECONDARY SCHOOLS

Specific area:

South Deerfield, Mass.

South Deerfield High School
To West Side of
North Surarloaf Mountain

May 1953

Recreation Curriculum
University of Massachusetts
Amherst, Massachusetts

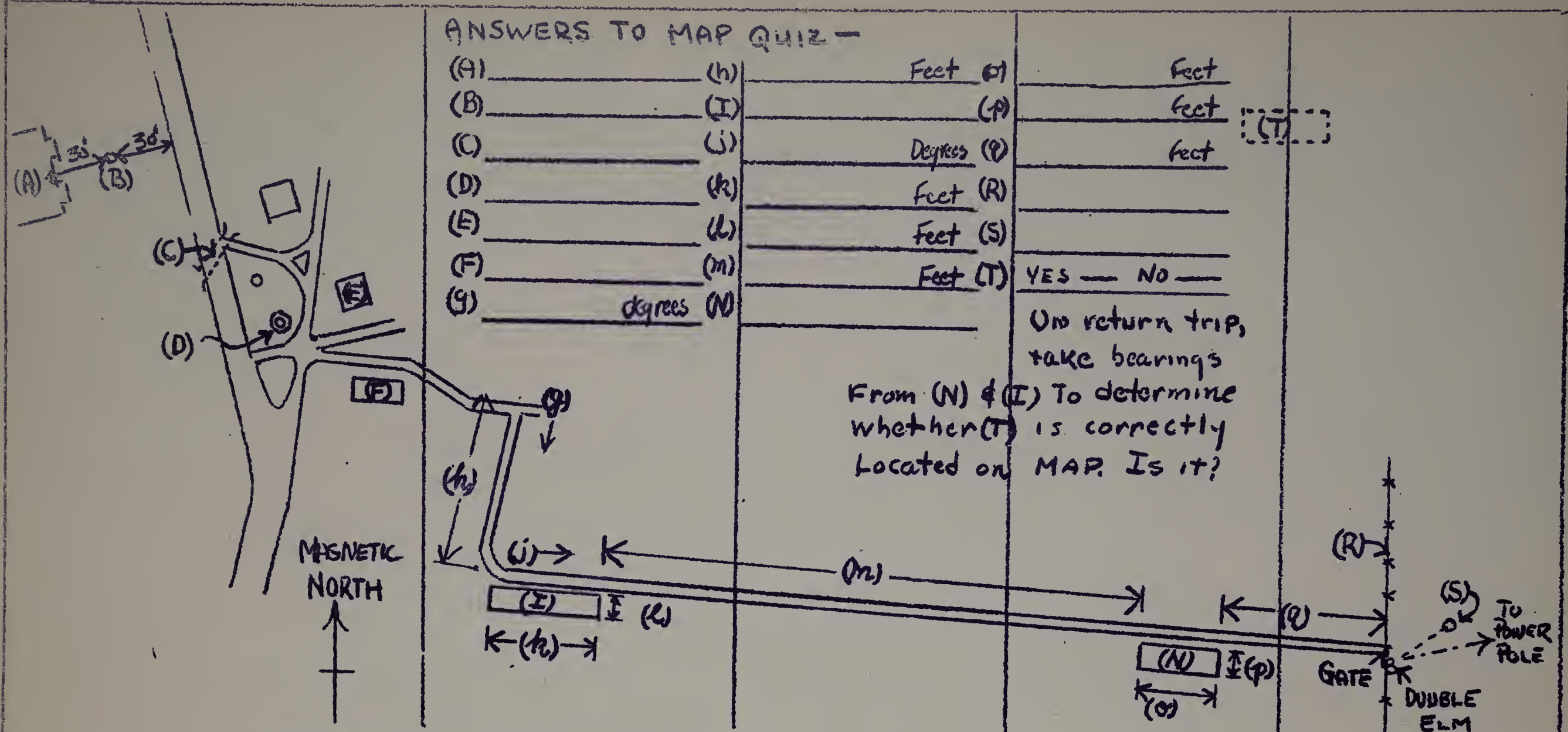
J. Manley

ANSWERS TO MAP QUIZ —

(A)		(h)		(o)	Feet
(B)		(I)		(P)	Feet
(C)		(j)		(Q)	Degrees
(D)		(k)		(R)	Feet
(E)		(L)		(S)	Feet
(F)		(m)		(T)	Feet
(g)	degrees	(N)			

(T) YES — NO —

On return trip, take bearings From (N) & (I) To determine whether (T) is correctly Located on MAP. Is it?



ORIENTEERING - MAP QUIZ

MAP OF AREA BETWEEN SOUTH DEERFIELD HIGH SCHOOL AND WEST SIDE OF NORTH SUGARLOAF MOUNTAIN, MOSTLY ON PROPERTY OF MR. ALEC BOZO.

SOUTH DEERFIELD, MASSACHUSETTS

0 100 200 300 400 500 600 700 800

Scale: 1 inch = 200 feet.

UNIV. OF MASS.
MAY 1953
J. W. MANLEY

ORIENTEERING FIELD EXERCISES

Name _____
Class Title _____

Headquarters for the day will be the plane table. It is on a direct line between the double Elm at the gate, and the power pole above. It is 45 feet uphill from the little N-S ridge.

While you are waiting for your turn to go on the Orienteering Trail, there are several skills that you can practice near here. The procedure will be for you to go to each of the 5 near-by stations in turn, and follow the proper instructions. Possible score in ( ).

STATION 1. (Location from H.Q.: 110°- 180')

		Uphill	Down-	
a. Pace up and down the 100' course 3 times each way. Write number of steps.	a. 1.	_____	_____	(2)
	2.	_____	_____	(2)
	3.	_____	_____	(2)
b. Add; Get total no. steps.	b.	_____	_____	(2)
c. Divide by 3; get average.	c.	_____	_____	(2)
d. Compute ave. step length.	d.	_____	_____	(3)
e. Step longer-shroter - up?	e.	_____		(2)
			TOTAL	(15)

STATION 2. (Location from H.Q.: 78°- 120')

a. See if you can figure out a way using compass, to determine degree of slope of hillside under cord.	a. _____	degrees.	(5)
b. What is percent of slope?	b. _____	percent	(5)
c. Go where you can see steep hillside above pond. Degree slope here?	c. _____	degrees	(3)
d. What is percent of slope?	d. _____	percent	(2)
		TOTAL	(15)

STATION 3. (Go to where you can see top and bottom of power pole above us.)

a. Guess the height of pole.	a. _____	feet	(2)
b. See if you can figure out a simple way to use a twig or pencil to help estimate height of power pole.	b. _____	feet	(4)
c. Which is more accurate?	c. _____		(2)
d. You guess high or low?	d. _____		(2)
		Total	(10)

STATION 3.4. Personal. (Use yardstick or fldg rule)

a. What is your arm-span?	a. _____		(3)
b. Height: eye above ground.	b. _____		(3)
c. Length: 1st thumb joint.	c. _____		(3)
d. Width: spread hand tip thumb to tip little finger.	d. _____		(3)
e. Step length. (should know)	e. _____		(3)
		TOTAL	(15)

(Continued-)

STATION 5. Plane Table.

(scratch work area)

A plane table is used for more precise mapping in the field. The topographic quadrangles on the table are of Williamsburg, Shelburne Falls, Greenfield (part), and Mt. Toby (part).

a. Is the map oriented- does N on map match N on ground? a._____ (1)

b. Can you find our location? b._____ (1)

C. Possible to see Mt. Toby? c._____ (2)

d. How much higher are we than cultivated field below? d._____ (3)

e. 300' contour line was once Glacial lake shore line. What landmark near-by is on this old shore line? e._____ (2)

f. What is elevation of little N-S ridge below? f._____ (3)

g. Do you think this ridge could have been a shore line at one time? g._____ (1)

h. Distances to:

	By Judge	Map Scale	Diff	Judge too hi or too low?	
1. South Deerfield H. S.	____	____	____	_____	(4)
2. 2 churches $\frac{1}{4}$" below "o" in"South Deerfield"	____	____	____	_____	(4)
3. Aluminum Silo (NW)	____	____	____	_____	(4)
4. Firetower 1 mile E of Shelburne Falls (1588)	____	____	____	_____	(4)

I. Bearings to:

	Mag Fld Bearing	True Map Bearing	Diff.	Which hi-r Map-fld?	
1. S.D. H.S.	____	____	____	____	(4)
2. 2 churches	____	____	____	____	(4)
3. Al Silo	____	____	____	____	(4)
4. Firetower	____	____	____	____	(4)
				TOTAL	(45)

PART II Time in _____ Name _____
ORIENTEERING TRAIL start _____ Class Title _____
TOTAL _____ May 1953

(W side N.Sugarloaf)

This is training in observation. The trail begins where the map ends - at the gate separating cultivated field from pasture.

1. From the double Elm tree at gate: At bearing _____deg. is a power line pole. Walk uphill toward this pole until you reach the little N-S ridge where the ground becomes more level. How many feet straight up do you think you have come since you left the level of the field?_____. (2)

2. Adjust your position so that pond below is directly between end of nearest barn and you. Bearing of this little ridge is_____degrees. (1)

3. Set your compass for 14 degrees, pick out a fence post for a landmark, and walk to it. You should have come out at the post 45 feet up from the double post on the ridge. Did you? _____. Cross the fence carefully. (1)

4. At the double fence post: Now we shall see how accurately you can follow a given bearing for a long distance (about 1/6 of a mile). Set your compass carefully for a bearing of 31 degrees, pick out successive land marks in turn, and walk 'till you come to a fence. Stop. Measure uphill along the fence until you reach a big Sugar Maple. Write this distance here:_____. (How many woodchuck holes did you see along the way?_____. Did you see an old well on the way? _____. (7)

5. At the Sugar Maple: North of the fence, bearing 66 deg. is a large glacial boulder. Go to it. Watch for tent caterpillars. Eastern Tent Caterpillar has solid white stripe down back; Forest Tent Caterpillar has row of white dots down back. Which one do you see?_____. (1)

6. At boulder, face uphill. On left notice this power line in the distance. How does power line look as it crosses slope beyond the red barn? (sketch in box)
Is a power line a good landmark? _____. (2)

POWER LINE

7. At 86 deg., 200 feet away is an old apple tree. When you reach the tree, notice what is causing damage?_____. Is damage serious?_____. Other trees being hurt? _____. damaged? (3)

8. Subtract 6 degrees from your bearing. Follow new bearing to White Pine tree 225 feet away. A White Pine has how many needles in a cluster?_____. The slender tree is a Red Cedar or Red Juniper. Its wood is used for fence posts and "Cedar Chests". It has two types of leaves. Is either type of leaf sharp? _____. (2)

ORIENTEERING TRAIL (Continued)

9. Now go 170 deg. to the big Sugar Maple along the fence. Cross fence. Sketch in box a leaf of this tree. (1)

S
U M
G A
A P
R L
E

10. Just 25 feet away, downhill along the fence, is a large Ironwood tree- your next station. Best name for this tree is American Hop Hornbeam. Its wood is used for mallets and tool handles. Is the wood tough?_____. (1)

11. Now go 100 feet downhill along the fence and stop. (Be careful of the mud) Sixty feet south-west of where you are beside the fence, is the entrance to a hidden road. Its azimuth at the beginning is 260 deg. Follow this road until you hit a clearing. This is the right-of-way that is maintained by the power company. Did you see the bracket or shelf fungi growing on a Grey Birch tree as you came down the road? _____. (1)

12. What is the number of the nearest power pole? _____. Between here and next pole south, how many splices have been made in the wires? _____. (2)

13. Write your estimate of the distance to the next pole south._____. Now pace it. and write this ans. down._____. Did you estimate too high or too low? _____. What is the number of this pole?_____. What do you think would be the number of the next one to the south?_____. In the country particularly, numbered poles are a good means for giving directions to another person. (5)

14. Continue S to the fence and cross it. Near the fence, on the bottom edge of the right-of-way are several small cherry trees. Look at them closely. Sketch one of the egg clusters on a twig- not the tent. Are the egg clusters of the tent caterpillar empty or full? _____. Are the tents of these caterpillars strong?_____. (3)

EGG CLUSTER

15. Walk west to the corner of the field about 75 feet away. On other side of the fence, the low plant with fern-like leaves is Sweet Fern. Crush a leaf and smell it. Like it? _____. Leaves of the sweet fern may be crushed, dried and used in pillows for fragrance. (1)

16. Go to the double fence post near-by. At 220 degrees is H.Q. for today's Orienteering . Report, and get your time checked. Feel pretty badly? Tired? Walk back with your head up and your shoulders back- and wear a smile. It will make you feel much better.

Congratulations! You have completed your first Orienteering Hike. Hope it was fun for you. Also hope you learned something.

******

Number right x 3 = Score PART II _____

APPENDIX E

STUDENT QUESTIONNAIRE
USED AT SOUTH DEERFIELD
SPRING 1953

Class _____ Age _____ Date _____
Class Title _____
School _____

ORIENTEERING- A UNIT FOR THE SECONDARY SCHOOLS

1. a. Has this unit made you more interested in maps?_____.
   b. Since the unit started, have you done any of the following things, other than with the instructor; yes or no:
      1) Secured a road map of your own?_____.
      2) Followed a road map while driving in a car?_____.
      3) Secured a topographic map of your own?_____.
      4) Followed a topographic map- driving or walking?_____.
      5) Discussed Orienteering-
         a) with parents?_____.
         b) with other students in different classes?_____.
         c) with other persons?_____. Who?_____.

2. What did you <u>like</u> <u>most</u> about this unit on Orienteering, and why?

3. What did you <u>dislike</u> <u>most</u> about this unit on Orienteering, and why?

4. What was poor about the instruction and the exercises that you received, and how could improvements be made?

5. a. Do you think Orienteering is a good subject for teaching in High School, and why?

   b. If so, in what class(es)?
   c. Would you be interested in belonging to an extra-curricular Orienteering club?

(Please return to: J. Manley, Fernald Hall, University of Massachusetts, Amherst Massachusetts; Recreation Curriculum)

(Feel free to use reverse side for any further comments you may wish to make)

APPENDIX F

QUESTIONNAIRE UNIT
SENT TO CAMP DIRECTORS
SPRING 1952

Recreation Department, Fernald Hall
University of Massachusetts
Amherst, Massachusetts
May 26, 1952

To Camp Director and Staff:

Certainly it is apparent to experienced workers that a camp program c either remain static year after year, or it can become a series of mo dynamic experiences which are inspirational and educational to both campers and staff. A good program based on foresight, imagination an iniative is necessary to create the type of experience that encourage repeat campers.

Perhaps one of the most significant means of vitalizing a camp progra is through "Orienteering", an activity of Swedish origin based on the use of map and compass. The idea is not new, having been used and taught in this country by such persons as Cap'n Bill Vinal as far bacl as 1917. The recent increase in popularity of orienteering is due largely to the efforts of Biorn Kjellstrom and to the availability of an inexpensive compass with built-in protractor. This recent inventic is extremely simple to use and can be readily understood by children.

Such groups as the Boy Scouts of America, the Girl Scouts, and the Campfire Girls apparently recognize value of orienteering to their program for they have officially adopted this Silva System Compass.

Private camps have added incentive for keeping their programs attracti to campers and parents.

Mr. E. F. Larson has anticipated the need of summer camps for instruct ion and guidance in setting up fundamental exercises using map and compass. The accompanying mimeographed pamphlet Orienteering In Camp includes tested and workable methods particularly suited to camp use.

It is hoped that through the returns on the enclosed questionnaire, the problems met by representive camps in adopting such a program can be determined. Therefore, your cooperation would be most helpful. The request is made that the questionnaire be filled in and returned to the address above by September 1, 1952.

Should problems or questions arise, please feel free to contact Silva, Inc., LaPorte, Indiana, or myself.

Thank you for your time and consideration.

Cordially yours,

James W. Manley

J. [illegible]. Manley, ecreation Departmen
Fernald Hall, Univ. of Massachuset
Amherst, Massachusetts
May 26, 1952

QUESTIONNAIRE: ORIENTEERING IN CAMP, Summer, 1952

The purpose of this questionnaire is to determine the problems and obstacles met by representive camps in adopting such a program as "Orienteering", defined as an activity based on the use of map and compass. I would be very greatful for your answering as many of the questions as apply. Please return this sheet to the address above by September 1, 1952. Thank you.

(Answer I, and II or III)

I. GENERAL
Camp Name_____ Address_____

Director_____ Person answering Q. _____

Enrollment _____ Camper/Staff Ratio _____ Length Season ____

Type of camp Underline: Community supported; Tax supported; Privat

II. UNABLE TO INITIATE ORIENTEERING in camp this summer.
Briefly describe any attempt that was made.

What factor(s) prevented initiation of orienteering?

Do you think orienteering is a worthwhile camp activity?

Suggestions and Remarks: (Please feel free to use additional paper preferably with letterhead)

III. SUCCESSFULLY ESTABLISHED ORIENTEERING in camp this summer.
Briefly outline steps taken:

What do you consider most serious obstacle(s)? How overcome?

Evaluation of program: Expect to continue orienteering next year?

Suggestions and Remarks: (Please feel free to use additional paper preferably with letterhead)

ORIENTEERING IN CAMP

by
Elston F. Larson

Perhaps the newest development in camping programs is "orienteering". The essential tools are as old as the hills, because orienteering is a program using map and compass.

But a new dress has been added. The compass has been modernized. The program has been streamlined. Being both simple and fun, orienteering can lift the moderately successful camp program to become outstandingly successful.

CAMPSITE REQUISITES FOR ORIENTEERING

There are no real limitations regarding the area. Some advanced programs require a vast expanse of unfamiliar wilderness. At the other extreme, small back yards or even indoor rooms are usable.

For normal camp purposes, an ideal arrangement would include a level playground area at least one hundred feet square plus two or more acres of traversable wooded area.

THE PROGRAM ARRANGEMENT

Program possibilities are infinite. Orienteering can be dovetailed into the overall camping program and used to "point-up" the entire program, or it can be confined to a single simple game. The arrangement depends on the situation. As a consequence, it is wrong to say that any special program arrangement is better than another.

The following suggestions are based on an arrangement that has been used under a variety of conditions. It is helpful to examine them for your own program.

Divide program into three main parts, (1) Preliminary Instruction, (2) Compass Games, (3) "Point-up" the General Camping Program.

(1). Preliminary Instructions.

Preliminary instruction can be part of an evening program, indoors, or may immediately precede the compass games. Essentially its purpose is to teach the simple use of a compass in preparation for other parts of the program.

The ideal size group to instruct at one time is about 20. For large groups, have several instructors working simultaneously, or divide the program time so that the instructor has several sessions to accomodate the group. One hour is normally more time than needed for each group, although active groups having a good leader may ask many questions and extend the time. Normally, the minimum age of the participant should be about nine to ten years old.

The preliminary instruction will hold the interest of the campers as much as any other activity if certain rules are followed. First, keep it simple and explain one step at a time. Second, keep the campers busy handling their compass, doing the things explained by their instructor. For best results, sufficient compasses should be available for everyone in the class and all compasses should be alike. Don't give a lecture. Encourage questions.

On page 5 is a tried and proven text which the instructor may use.

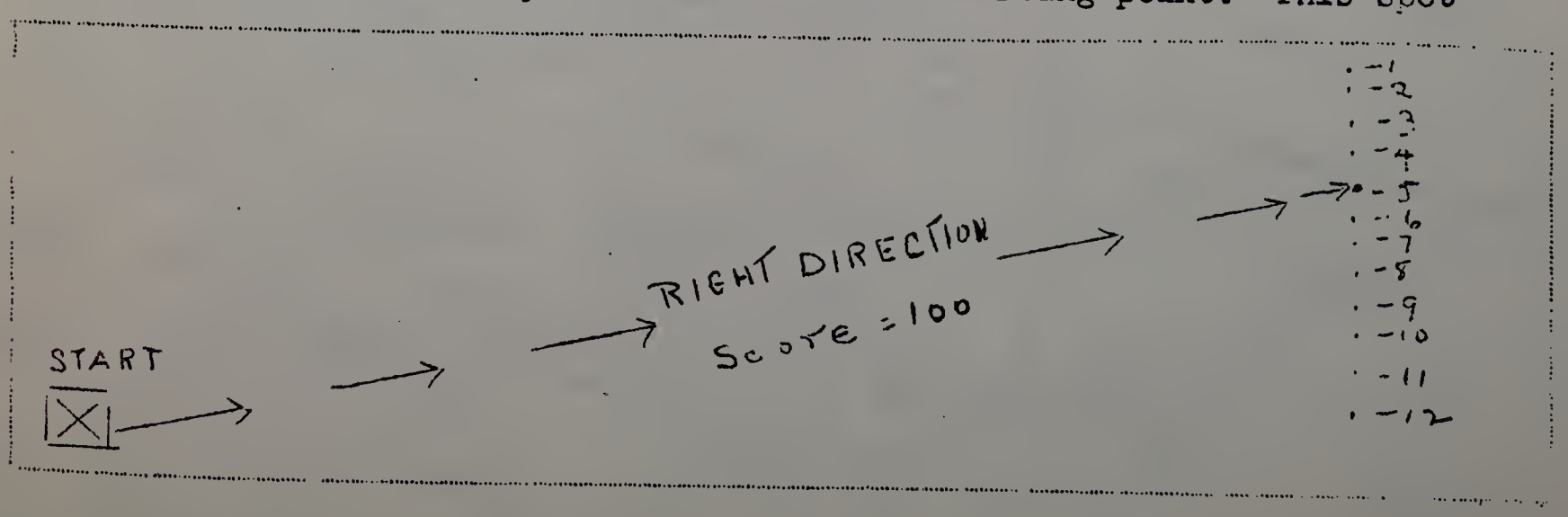
An essential part of the training is the measuring of distance by stepping. On page 6 is an approved method. If the compass instruction is done inside after dark, step-length training can logically follow on the next day, just before the Compass Games. In fact, it is advisable to have a short compass review and a bit of step-length practice before the games anyway.

(2) Compass Games

One recommended game called "Competitive Compass Game" is available by writing to Silva, Inc., La Porte, Indiana, enclosing 20¢ for printing and mailing costs. It is especially designed for use at day camps or similar functions and is played on an area of 100 by 100 feet. The game accomodates 20 players although 40 to 60 players can participate simultaneously by having two or three sets of the game cards. As with the preliminary instruction, 20 is an ideal size group to work with. This game consists of 20 score cards and one answer card. The only thing to set up for the game is a straight row of twenty numbers, five feet apart. These numbers are starting and ending points for twenty separate three-legged compass courses which are precalculated on the score cards. Instructions on the score cards tell the participants where to go. The answer card tells whether or not participant has gone correctly. If the participant arrives at the correct destination, the score is 100. Otherwise, a deduction is made according to the amount of error. Scores may be kept individually, or patrol score averages may be used. It's fun for both children and adults. And incidentally, Silva, Inc. have no objections to reproducing the cards, so one set may be used over and over again by making copies.

Another game is a simple compass walk and is suitable for elementary use. It requires more "set-up" time by the leader than the game mentioned above, and requires about 1000 feet by 100 feet. The object of this game is to walk accurately by compass to a given distant fence post, although the contestants do not know in advance which is the correct post.

Preliminary set-up is as follows: a row of fence posts are numbered with chalk or by thumb-tacking numbered cards onto the posts. One of these posts is chosen at random to be the destination - - preferably not the exact center one, but definitely not too close to the end either. Suppose it is #5 in the drawing. Then a distant spot is chosen as the starting point. This spot



may be 500 to 1500 feet from the numbered posts. The leader determines the exact compass direction, (the degree reading) from "Start" to post #5 (Suppose it is 85°).

Playing the game is simple, but good fun. Contestants are led to the "Start" and the game explained. One by one, they are to go 85° by compass until reaching the fence, note the number of the nearest post, then return to the leader for scoring. They are told before starting that arrival at the correct number gives a score of 100, otherwise 10 is subtracted for each post in error.

In this particular example, a person arriving at #5 is scored 100, but a person arriving at #3 receives a score of 80 because the error was two posts from the correct one.

If patrol scores are desired, use the average score for the patrol. That is, add the individual scores and divide that sum by the number of persons in the patrol.

Caution: If the groups are large, more starting points are required. Otherwise the game will be slow. Calculate one starting point for every six or eight contestants. Each leader can handle two or three starting points with little difficulty.

(3) Pointing-up the General Program

The third phase of this orienteering program is a compass hike combining various outdoor skills into a unified adventure. It is sometimes used to point-up the general camping program in one grand finale. The compass itself becomes a tool to accomplish a purpose -- and that is really the prime purpose of a compass.

Repeating, again, that there is no single procedure which is best, the following outline is one method proved to be successful and applicable to small or large camps. In general, various stations are located around the camp (see page 8) and are identified by numbers. A 3"x5" card bearing the appropriate station number is suitable. At each station there is a job to do, or some information to receive, or some beauty to see, or some spring water (tested) to drink, or some skill to be tried, or a chance to swim -- or what have you on your camp? In addition to those specific reference, the hike has one central theme such as conservation, or trees, or geological formations or general nature study. By compass, the various patrols go from station to station. The hike ends at the cooksite. And very important, a report is made of the adventure later at dinner or campfire.

Preliminary preparations are quite important. If swiming is involved, a life guard or other protection is necessary. If cooking is involved, a menu must be prepared and food must be secured, etc. Stations must be chosen and the compass directions determined. An instruction card for each patrol should be prepared.

When the day arrives for the big adventure, the group is formed into patrols (maximum of 8 to a patrol). Each patrol leader receives an instruction card. A sample is shown on page 7.

Upon giving the instruction cards to each patrol leader, time is allowed to study the instructions. The patrol which is ready first is led to Station #1 and told to start immediately. Other patrols are started at five minute intervals.

Notice the instructions for Station #3. In our example, a person located between Stations #2 and #3 was lying side of the road, unquestionably injured (tallow from a red candle, or mortician's wax colored with lipstick can be used to create a realistic injury). While no instructions were explicitly given, the situation obviously demanded that a doctor by called immediately. (A less serious injury might only require first-aid attention).

The scribes' reports are usually the highlight of the day. These reports should be given in the evening so that the scribes will have time to write them out in an interesting fashion. Evening campfire is an excellent time, but in any event, not sooner than the evening meal.

You will feel well paid for your planning, time and efforts if it happens that one of the reports is written in the poetic rhythm of "Hiawatha" or is put to the tune of the "Whippenpoof Song".

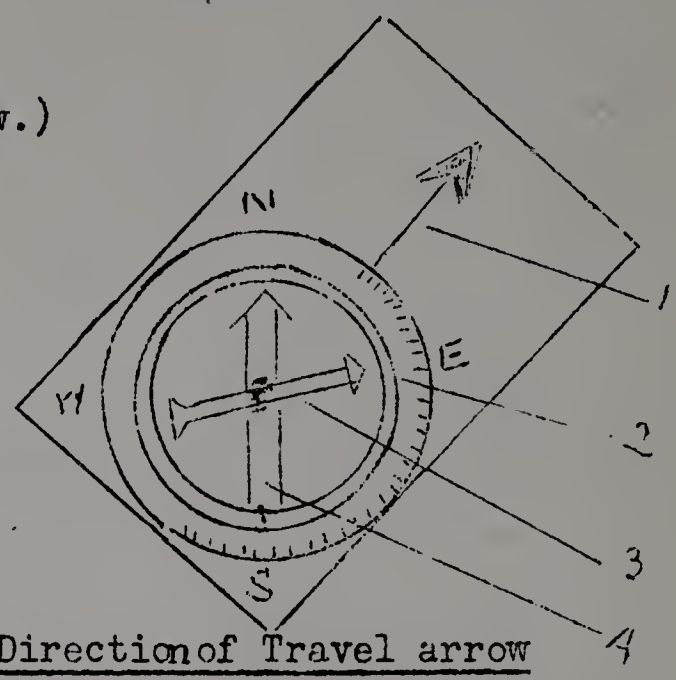
H A P P Y O R I E N T E E R I N G

HOW TO TEACH

THE SILVA COMPASS

Let's suppose that an airplane crashed in a nearby woods and your group were asked to rush there to help out. In the woods there are no street signs no road markers to show the way so the leader simply says that the wreckage is 40 degrees, 1,000 feet from the entrance to Jones Woods. When we arrive at the entrance, we can quickly go there if we know how to use our compass. Here is how; (Explain slowly and carefully and by individual steps).

Silva Compass Parts



1. Direction of Travel arrow
2. Housing with degree marking on side.
3. Magnetic needle
4. Orienting arrow

Notice several parts to the compass.
The "Direction of Travel" arrow is on the plastic base. This is the arrow that shows which way to walk after our compass is set. (Point out the arrow.)

This is the housing.
It turns -- try it. (Demonstrate).

The numbers around the outside of the housing are degrees. Whichever degree number is at the "Direction of Travel" arrow is the degree setting of the compass.

Inside of the housing is an arrow needle which swings on a pin. It is the "magnetic needle". It always points North and therefore is not the way to go. The "Direction of Travel" arrow points the way to go.

Now let's determine which way is 40 degrees - the way we want to go.

First, turn the housing until the figure "40" is at the "Direction of Travel" arrow. Now the compass is set -- do not turn the housing any more.

Second, hold the compass level, about waist high - or a little higher - and be sure the "Direction of Travel" arrow points straight ahead of you - not towards you nor to one side. If you hold the compass with both hands and keep your elbows tight against your sides, you can hold it steadier.

Third, rotate your body and watch your compass. Keep turning until the red end of the magnetic needle points to the letter "N" on top of the housing. As you turn, do not twist the compass in any way. Keep the "Direction of Travel" arrow pointed straight in front of you at all times. When you have turned far enough so that the red end of the needle points to "N", then you are facing the correct direction to walk.

Look up and sight an object straight ahead, such as a tree in that direction. Then forget the compass and walk to that object. When you arrive there, repeat the process and pick out a new objective. Repeat until you reach your destination.

(Demonstrate and repeat until each person can set the compass to a degree reading and determine his direction of travel).

MEASUREMENT OF DISTANCE

The compass shows the direction of travel but usually it is also desirable to know how far to travel. Measuring and judging distances therefore should be a part of most orienteering programs.

Timing

One method is by timing your walk. If you normally walk 4 miles per hour, and your destination is two miles away, you will reach it in a half hour of normal walking speed. In woods or places where walking speed is retarded, you must estimate whether your speed is retarded and how much. If, for example, you think you are walking about one-half normal speed, you will allow yourself an hour to reach the destination two miles away.

Mental Measurement

Another method is by estimation or judging of actual distances. Use several distances with which you are acquainted and apply them to unfamiliar places. For example, if you recall that your boyhood home was 1/4 mile from the main road, you probably have a very good idea how far away 1/4 mile would be. Then use it as a mental measuring stick when judging distances. Almost everyone knows how far it looks along the length of a football field. It is 100 yards and you can also use that as a mental measuring stick.

Stepping

For shorter distances, stepping is ideal and can be one of the most accurate methods to estimate distances. Measurement is done by walking at your normal speed and counting your strides (two steps) as you walk. Then if you know the length of your stride, you can convert into feet, yards or miles as desired. For example, if the distance is 200 strides, and your stride is 5 feet long, the distance would be approximately 1000 feet.

Finding Length of Your Step.

Measuring off a straight distance of 200 feet with a tape measure, marking each end of the distance with stones or stakes. The return trip distance, down and back, will therefore be 400 feet or 48 inches. Now walk down the course and back again at your normal speed, counting your steps, for the round trip. Then divide 4800 by the number of strides you counted. This will give you the length of your steps in inches. For example, if you counted 160 steps, then your step is 30 inches long, because 4800 divided by 160 equals 30. (A stride (two steps) would be 60 in. or 5 ft.)

INSTRUCTIONS

Read all before starting

A. Appoint a scribe - to record the adventure.

B. Appoint two guides to lead the way (change guides at each station so everyone has a chance to lead the way).

C. All other members are observationists who will report things of interest to the scribe.

D. This will be a wild-life hike. Scribe keeps record of all wild life seen by patrol, of signs of wildlife.

E. Important -- Scribe keep record of anything of special interest on the trip. Examples: patrol member sits on a briar; guides lose the way; last night's rain raised the lake level; patrol member rebuffed for raiding food bag.

F. Scribe will compose an interesting report of the trip to be read at campfire tonight.

G. Get your swim suits and report immediately to leader, west of Dining Lodge.

H. When leader gives the signal, go to Station #1 and follow instructions.

THE TRIP

Station #1 Co 170° - 200 ft. to #2

Station #2 Give three safety rules for highway hiking.
Go 85° - 425 ft. to #3

Station #3 What first aid treatment or other help, if any, did you give between station #2 and #3.
Go 330° - 300 ft. to #4

Station #4 What is the degree reading and estimated distance to the flag pole.
Go by canoe 20° to #5 on shoreline
Bank your canoe. (The ranger will get it later).

Station #5 Note view to the South. Look North West and notice the mounds. They are Indian Mounds. Chiefs and others of importance were buried in a vertical position under such mounds, and lesser persons in a horizontal position.
Proceed upstream to #6.

Station #6 This is a beaver dam. Note the tree stumps nearby. The trees were cut down by the beaver, not by man. Identify each kind of tree you can see from here and give a principal use for its lumber.
Go 190° - 300 ft. to #7.

Station #7 Give three waterfront safety rules. You may now go swimming. Follow the rules of the beach. When life guard says time is up, dress immediately and proceed to cooksite (100 feet east).

Station #8 The end of hike. Find your box of food on table, build a fire where leader designates, and cook your lunch according to menu in food box.


TREES
Beaver Dam
6
5
PICNIC AREA
7
Beach
Pond
CANOE LANDING
4
Beach
CABINS
CABINS
Hospital
PLAY GROUND AREA
1
DINING LODGE
3
Main Road
2

APPENDIX G

ORIENTEERING TRAIL

USED AT

TRAILSIDE MUSEUM WORKSHOP

SUMMER 1952

Orienteering Trail No. 2 — Mt. Tom State Reservation
WORKSHOP-TRAIL TYPE SAMPLES — July 18, 1952 J. Manley

The flagpole in front of the Trailside Museum is the starting point.

Toward what would the shortest shadow of the Flagpole point? (1). From the flagpole, what bearing would you follow to reach the N.W. corner of the green shelter? (2).

What is the bearing of the museum road? (3). Estimate the distance from the flagpole to the main Reservation road (Smith Ferry Road) beyond the green shelter. (4). Now pace it. (5). (You should have gotten 100 yards.) Did you have less than 10% error in judging? (6); in pacing? (7).

Turn and go uphill on Smith Ferry Road until you reach a dirt road on left.

Follow dirt road SW until you reach a 9" diameter stump beside a rock. From the stump and stone, set your compass for 300° and walk to where the next step might mean a broken leg.

Almost opposite the direction of the Northstar is the largest tree nearby. Go to its base.

Now, how 'bout a small sample of cross-country! Set your compass carefully for 138°; pick out a land-mark, and start. Half a football field away is a stump, the next station.

At the stump, perhaps your eyes are good enough to tell how many different kinds of tools were used to fell the tree. (8). Which was used least? (9).

Now go toward the rising sun until you reach the Hemlock Quintuplets. From here, estimate the distance to the museum flagpole. (10). Estimate the length of the Museum building. (11); then check it for your own information.

What is the azimuth and back azimuth of the ridge of the museum building? (12), (13).

This has been an attempt to show the possibilities of Orienteering in a camp program. Please realize that you have seen only brief samples of several different ways to use map and compass exercises for different age groups. Further realize that various interest areas can be catered to - or even created in children.

The hope is that some of this has appealed to you and that you can see its application to your own camp situation.

Thank you for your time and interest.

ACKNOWLEDGMENTS

Many different individuals have helped to make this study possible. I wish to especially thank Larry and Isabelle Lussier and Col. and Mrs. R. W. Axup for their kind assistance. Mr. Larson, Dr. Magnuson, and Mr. Salo have furnished much helpful information and equipment. Dr. Ainsworth at Smith College very graciously helped me gain a basic insight into Scandinavian culture.

I am particularly grateful to the many individuals in Europe, Canada and the United States who have furnished the information that comprises the survey part of this study. The cooperation shown by children and by school officials at Amherst, South Deerfield, and Belchertown is greatly appreciated.

The advice given and criticisms made by the thesis committee, Dr. Grimshaw, Dr. Driver, Dr. Alexander, and Dr. Rutting have been invaluable. Special thanks are due to Dr. Vinal for his continued interest and to Mr. Kjellstrom for his generous assistance throughout the development of this paper. I am grateful to Mrs. Leslie Rowell for her typing of the final draft. My wife Doris has not only prepared the graphs but also has been a source of constant encouragement. I thank her and all the others who have helped in this undertaking.

Approved by:

William B. Kutting

Charles P. Alexander

Edwin D. Driver

Thesis Committee

Date: June 1, 1954

THE TOPOGRAPHIC MAPS OF THE UNITED STATES

The United States Geological Survey is making a series of standard topographic maps to cover the United States. This work has been in progress since 1882, and the published maps cover more than 17 percent of the country, exclusive of outlying possessions.

The maps are published on sheets that measure about 16½ by 20 inches. Under the general plan adopted the country is divided into quadrangles bounded by parallels of latitude and meridians of longitude. These quadrangles are mapped on different scales, the scale selected for each map being that which is best adapted to general use in the development of the country, and consequently, though the standard maps are of nearly uniform size, the areas that they represent are of different sizes. On the lower margin of each map are printed graphic scales showing distances in feet, meters, miles, and kilometers. In addition, the scale of the map is shown by a fraction expressing a fixed ratio between linear measurements on the map and corresponding distances on the ground. For example, the scale $\frac{1}{62,500}$ means that 1 unit on the map (such as 1 inch, 1 foot, or 1 meter) represents 62,500 of the same units on the earth's surface.

Although some areas are surveyed and some maps are compiled and published on special scales for special purposes, the standard topographic surveys and the resulting maps have for many years been of three types, differentiated as follows:

1. Surveys of areas in which there are problems of great *public importance*—relating, for example, to mineral development, irrigation, or reclamation of swamp areas—are made with sufficient detail to be used in the publication of maps on a scale of $\frac{1}{31,680}$ (1 inch = one-half mile) or $\frac{1}{24,000}$ (1 inch = 2,000 feet), with a contour interval of 1 to 100 feet, according to the relief of the particular area mapped.

2. Surveys of areas in which there are problems of average public importance, such as most of the basin of the Mississippi and its tributaries, are made with sufficient detail to be used in the publication of maps on a scale of $\frac{1}{62,500}$ (1 inch = nearly 1 mile), with a contour interval of 10 to 100 feet.

3. Surveys of areas in which the problems are of minor public importance, such as much of the mountain or desert region of Arizona or New Mexico, and the high mountain area of the northwest, are made with sufficient detail to be used in the publication of maps on a scale of $\frac{1}{125,000}$ (1 inch = nearly 2 miles) or $\frac{1}{250,000}$ (1 inch = nearly 4 miles), with a contour interval of 20 to 250 feet.

The aerial camera is now being used in mapping. From the information recorded on the photographs, planimetric maps, which show only drainage and culture, have been made for some areas in the United States. By the use of stereoscopic plotting apparatus, aerial photographs are utilized also in the making of the regular topographic maps, which show relief as well as drainage and culture.

A topographic survey of Alaska has been in progress since 1898, and nearly 44 percent of its area has now been mapped. About 15 percent of the Territory has been covered by maps on a scale of $\frac{1}{500,000}$ (1 inch = nearly 8 miles). For most of the remainder of the area surveyed the maps published are on a scale of $\frac{1}{250,000}$ (1 inch = nearly 4 miles). For some areas of particular economic importance, covering about 4,300 square miles, the maps published are on a scale of $\frac{1}{62,500}$ (1 inch = nearly 1 mile) or larger. In addition to the area covered by topographic maps, about 11,300 square miles of southeastern Alaska has been covered by planimetric maps on scales of $\frac{1}{125,000}$ and $\frac{1}{250,000}$.

The Hawaiian Islands have been surveyed, and the resulting maps are published on a scale of $\frac{1}{62,500}$.

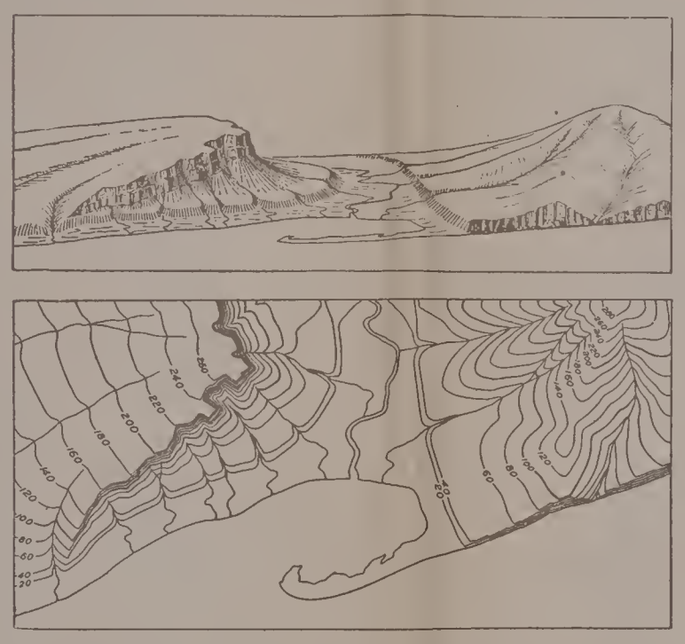
A survey of Puerto Rico is now in progress. The scale of the published maps is $\frac{1}{20,000}$.

The features shown on topographic maps may be arranged in three groups—(1) water, including seas, lakes, rivers, canals, swamps, and other bodies of water; (2) relief, including mountains, hills, valleys, and other features of the land surface; (3) culture (works of man), such as towns, cities, roads, railroads, and boundaries. The symbols used to represent these features are shown and explained below. Variations appear on some earlier maps, and additional features are represented on some special maps.

All the water features are represented in blue, the smaller streams and canals by single blue lines and the larger streams by double lines. The larger streams, lakes, and the sea are accentuated by blue water lining or blue tint. Intermittent streams—those whose beds are dry for a large part of the year—are shown by lines of blue dots and dashes.

Relief is shown by contour lines in brown, which on a few maps are supplemented by shading showing the effect of light thrown from the northwest across the area represented, for the purpose of giving the appearance of relief and thus aiding in the interpretation of the contour lines. A contour line represents an imaginary line on the ground (a contour) every part of which is at the same altitude above sea level. Such a line could be drawn at any altitude, but in practice only the contours at certain regular intervals of altitude are shown. The datum or zero of altitude of the Geological Survey maps is mean sea level. The 20-foot contour would be the shore line if the sea should rise 20 feet above mean sea level. Contour lines show the shape of the hills, mountains, and valleys, as well as their altitude. Successive contour lines that are far apart on the map indicate a gentle slope, lines that are close together indicate a steep slope, and lines that run together indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below.



The sketch represents a river valley that lies between two hills. In the foreground is the sea, with a bay that is partly enclosed by a hooked sand bar. On each side of the valley is a terrace into which small streams have cut narrow gullies. The hill on the right has a rounded summit and gently sloping spurs separated by ravines. The spurs are truncated at their lower ends by a sea cliff. The hill at the left terminates abruptly at the valley in a steep scarp from which it slopes gradually away and forms an inclined tableland that is traversed by a few shallow gullies. On the map each of these features is represented, directly beneath its position in the sketch, by contour lines.

The contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval differs according to the topography of the area mapped: in a flat country it may be as small as 1 foot; in a mountainous region it may be as great as 250 feet. In order that the contours may be read more easily certain contour lines, every fourth or fifth, are made heavier than the others and are accompanied by figures showing altitude. The heights of many points—such as road intersections, summits, surfaces of lakes, and benchmarks—are also given on the map in figures, which show altitudes to the nearest foot only. More precise figures for the altitudes of benchmarks are given in the Geological Survey's bulletins on spirit leveling. The geodetic coordinates of triangulation and transit-traverse stations are also published in bulletins.

Lettering and the works of man are shown in black. Boundaries, such as those of a State, county, city, land grant, township, or reservation, are shown by continuous or broken lines of different kinds and weights. Public roads suitable for motor travel the greater part of the year are shown by solid double lines; poor public roads and private roads by dashed double lines; trails by dashed single lines. Additional public road classification if available is shown by red overprint.

Each quadrangle is designated by the name of a city, town, or prominent natural feature within it, and on the margins of the map are printed the names of adjoining quadrangles of which maps have been published. More than 4,100 quadrangles in the United States have been surveyed, and maps of them similar to the one on the other side of this sheet have been published.

Geologic maps of some of the areas shown on the topographic maps have been published in the form of folios. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped, and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. Two hundred twenty-five folios have been published.

Index maps of each State and of Alaska and Hawaii showing the areas covered by topographic maps and geologic folios published by the United States Geological Survey may be obtained free. Copies of the standard topographic maps may be obtained for 10 cents each; some special maps are sold at different prices. A discount of 40 percent is allowed on an order amounting to $5 or more at the retail price. The discount is allowed on an order for maps alone, either of one kind or in any assortment, or for maps together with geologic folios. The geologic folios are sold for 25 cents or more each, the price depending on the size of the folio. A circular describing the folios will be sent on request.

Applications for maps or folios should be accompanied by cash, draft, or money order (not postage stamps) and should be addressed to

THE DIRECTOR,
United States Geological Survey,
Washington, D. C.

November 1937.

STANDARD SYMBOLS

CULTURE
(printed in black)

City or village
Roads and buildings
Ruins
Cliff dwelling
Good Public road
Poor Public or private road
Trail
Railroads
Electric railroad
Tunnel
Power-transmission line
Wharves
Breakwater and jetties
Bridge
Drawbridges
Ferry *(point upstream)*
Ford
Dam
Dam with lock
Canal lock *(point upstream)*
U.S. township and section lines and recovered corners
State line
County line
Civil Township or district line
Reservation line
Land grant line
City, village, or borough line
Small park or cemetery line
Triangulation point or transit traverse station
U.S. mineral monument
Boundary monument
Bench mark *(supplementary bench mark shown by cross and black figures without lettering)*
BM × 1232
Cemeteries
CEM
Church, School *(distinguished on recent maps)*
Coke ovens
Tanks and oil reservoirs
Oil and gas wells
Mine or quarry
Prospect
Shaft
Mine tunnel
Mine tunnel *(showing direction)*
Lighthouse or beacon
Coast Guard station
LSS
CGS.

RELIEF
(printed in brown)

Elevation above mean sea level *(in black on recent maps)*
5463
Contours *(Contours showing depth of water printed in blue)*
Depression contours
Levee
Wash
Cliffs *(or shown by contours)*
Mine dumps
Tailings or mining debris
Sand and sand dunes

WATER
(printed in blue)

Streams
Falls and rapids
Intermittent streams and ditches
Canals or ditches
Aqueducts or waterpipes
Aqueduct tunnels
Lake or pond
Unsurveyed stream and abandoned canal
Intermittent lake
Glacier *(Or shown by contours printed in blue)*
Spring, Well
Marsh
Submerged marsh

WOODS
(when shown, printed in green)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
HERMAN A. MAC DONALD, COMMISSIONER

MASSACHUSETTS
MT. TOBY QUADRANGLE

GREENFIELD 6.7 MI.
DEERFIELD 3.2 MI.
GREENFIELD 7.6 MI.
EAST DEERFIELD 5 MI.
NORTHFIELD 14.7 MI.
MILLERS FALLS (BRIDGE) 6.1 MI.
TURNERS FALLS 6 MI.
MONTAGUE 2.5 MI.
ADAMS 35 MI.
CONWAY 4.8 MI.
(Shelburne Falls)
(Greenfield)
(Millers Falls)
72°37'30"
42°30'
72°30'
300000 FEET
540000 FEET
27'30"
25'
2230000 YARDS
1035000 YARDS
35'
32'30"
320000 FEET
510000 FEET
42°22'30"
72°30'

DEERFIELD
SUNDERLAND
LEVERETT
WHATELY
HATFIELD
HADLEY
AMHERST
MT TOBY STATE FOREST
MT SUGARLOAF STATE RESERVATION
Pocumtuck Range
North Sugarloaf Mtn
South Sugarloaf Mtn
Mt Toby
Ox Hill
Roaring Mtn
Ingraham Hill
Ryans Hill
Joshua Hill
Bull Hill
Rulpit Hill
Leverett Pond
Cranberry Pond
Chapel Pond
Great Swamp
Greene Swamp
Mt Warner
Three Corners Sch
South Deerfield
Sunderland
East Whately P O
Whately Sta
North Hatfield
Bradstreet
Russellville
North Hadley
Mainville
North Amherst
Leverett
Leverett Sta
Factory Hollow
Cushman
Fire Tower MT TOBY
State Fish Hatchery
Sunderland Bridge BM 142
Pine Nook Cem
Brookside Cem
Riverside Cem
East Whately Cem
Wildwood Cemetery
Massachusetts State College
Old Railroad Grade
Hillside Road
Pine Nook Road
Mountain Road
Maine Road
Plain Road
Boston and Maine Railroad
Connecticut River
Mill River
Sugarloaf Brook
Bloody Brook
Dry Brook
Mohawk Trail
Hungarian Ave
Plum Tree Road
Egypt Road
Straits Road
Bradstreet Road
Knightly Road
Bull Hill Road
Juggler Meadow Road
Jackson Hill Road
Long Plain Road
Central Vermont
Boston and Maine
Franklin Co
Hampshire Co
Lake Warner
Mill River
Cushman Brook
Franklin Swamp
North Hadley Falls
Great Pond
Lyon Bridge Brook
Mill Brook
Shattuck Brook
Meadow Brook
Least Pleasant
North Pleasant
Main St
Maple St
North Hadley St
King St
Meadow St
Long Plain
Central St
Vermont St
Pleasant St
Mt Toby Brook
Roaring Brook
Graham Brook
Cranberry Brook
Chapel Brook
Green Brook
Factory Hollow Pond
Levrett Pond
Great Pond
Lake Warner
Mill Pond
Amherst Cem
Wildwood Cemetery
Pine Nook Cem
Riverside Cem
Brookside Cem
East Whately Cem
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Ch
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Wildwood Cemetery
Pine Nook Cem
Riverside Cem
Brookside Cem
East Whately Cem
Sch
Ch
Tr
Fire Tower MT TOBY
State Fish Hatchery
Sunderland Bridge BM 142

HAYDENVILLE 7.5 MI.
WHATELY 0.8 MI.
(Williamsburg)
SPRINGFIELD 24 MI.
NORTHAMPTON 6.1 MI.
(Easthampton)
NORTHAMPTON 5.6 MI.
HADLEY 2.3 MI.
SOUTH HADLEY 10 MI.
(Mt.Holyoke)
SOUTH HADLEY 9.4 MI.
HOLYOKE 13.1 MI.
(Belchertown)
(Shutesbury)
EAST LEVERETT 1.3 MI.
COOLEYVILLE (JUNC. U. S. NO. 202) 7.7 MI.
EAST LEVERETT 1.3 MI.
COOLEYVILLE (JUNC. U. S. NO. 202) 7.7 MI.
WEST PELHAM (JUNC. U. S. NO. 202) 5.4 MI.
PELHAM (JUNC. U. S. NO. 202) 5.4 MI.

Topography by A.J. Ogle, B.P. Taylor, C.D. Mitchell, and J.G. Graninger
Surveyed in 1935

Scale 1/31680
1 Mile
2500 Yards
6000 7000 Feet
1 Kilometer
Contour interval 10 feet
Datum is mean sea level

APPROXIMATE MEAN DECLINATION, 1938
MAGNETIC NORTH
TRUE NORTH

Polyconic projection. 1927 North American datum
5000 yard grid based on U.S. zone system A
10000 foot grid based on Massachusetts (Mainland) rectangular coordinate system

ROUTES USUALLY TRAVELED
HARD IMPERVIOUS SURFACES
OTHER SURFACE IMPROVEMENTS
1944
U. S. ROUTE
STATE ROUTE

MT. TOBY, MASS.
Edition of 1941
reprinted 1945
with corrections
N4222.5-W7230/7.5

INDEX

COUNTIES and (County Seats)

Esso *Happy Motoring in* Esso

Pennsylvania

1952

HOW TO READ THIS MAP

NUMBERED ROADS		OTHER ROADS
	Dual Highways & Parkways	
	1st Class (Hard Surfaced)	
	2nd Class (Gravel or Equivalent)	
	3rd Class (Graded or Unimproved)	

Overpass or Underpass; no access to crossroad

City Streets

(Red and Blue roads are equally good)

Broken lines indicate roads likely to be under construction.

Approximate Mileages: Cumulative / Intermediate

U.S. Route Numbers — Principal Public Recreation Areas (See list on other side)

State Route Numbers — State Lines

Airline stops — County Lines (Names in light blue)

Military Airports — Elevations in feet

Other Airports — Foot Trails

Seaplane Landings

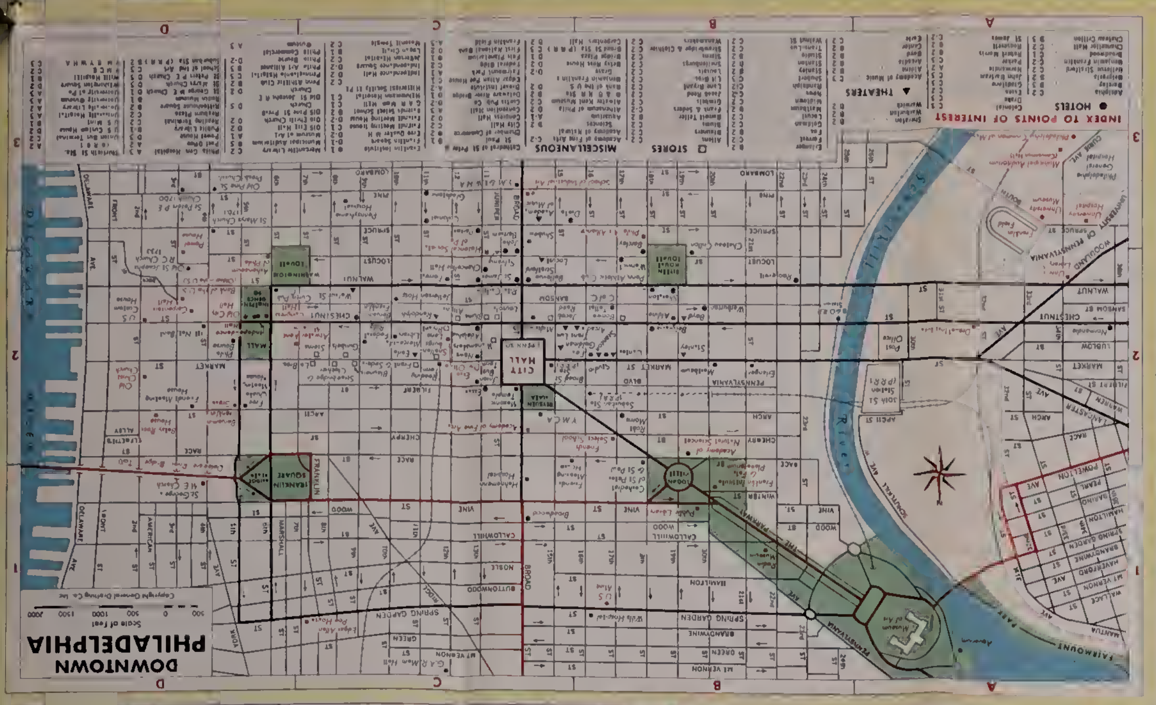
Entire area of this map is in the Eastern Standard Time Zone

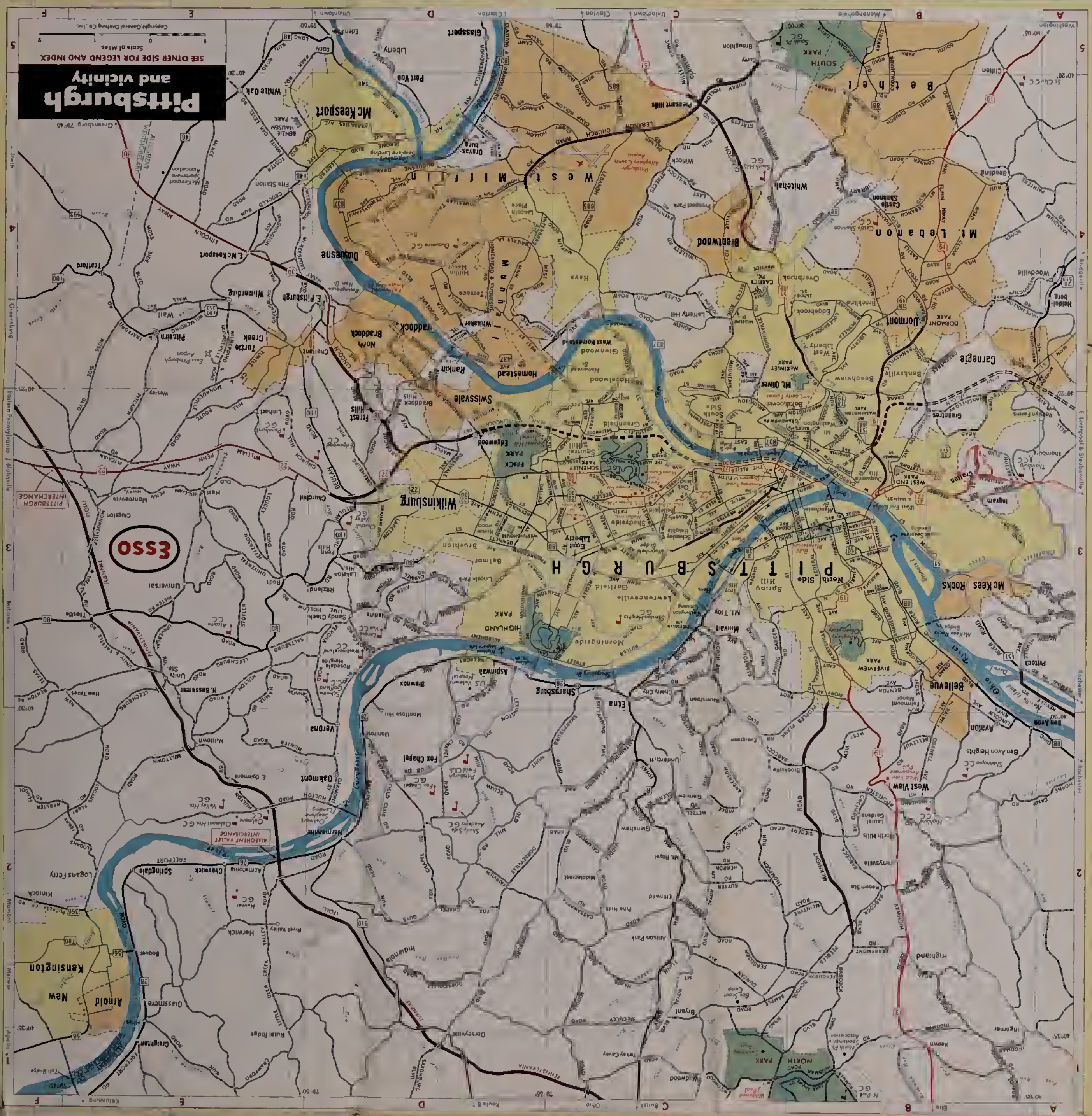
Approximate populations of cities and towns (latest available data): Over 25,000; 10,000 to 25,000; 5,000 to 10,000; 2,500 to 5,000; 1,000 to 2,500; 500 to 1,000; Under 500

SCALE OF MILES

One inch equals about 9½ miles

ESSO STANDARD OIL COMPANY





PICTORIAL GUIDE INFORMATION

ADDITIONAL information about many of the illustrated attractions is given below. Visiting hours, admissions and other facts were correct at time of publication, but are subject to change. Unless otherwise indicated, admissions are free. Inquire at local Esso Dealers for the locations of particular places.

A chart above lists recreational facilities in state parks and forests.

AIRPLANES (E-3), near Lock Haven. Construction of airplanes shown visitors to Piper Aircraft factory on conducted tours, 8-5 Monday-Friday.

ANIMAL FARM (G-3), near Stroudsburg. Deer, mountain goats, llamas and kangaroos at the Pocono Wild Animal Farm, 8-7 daily, May-November, 60c.

BALANCED ROCK (D-4), near Markleysburg. Huge stone hangs precariously over gorge cut by Trough Creek. Nearby is Trough Creek State Forest Picnic Area (see chart above).

BOONE HOMESTEAD (G-4), near Baumstown. Restored stone house on site of pioneer's birthplace. Period furnishings. 10-4:30 daily.

BUCHANAN CABIN (D-5), Chambersburg. Our 15th President spent his boyhood in this cabin (at present, the interior is closed) when it stood near Mercersburg. It was later moved to Chambersburg. James Buchanan Memorial Park, near Mercersburg, marks the site of Buchanan's birthplace.

BUHL FARM (A-2), Sharon. Beautifully landscaped public recreation area, privately endowed, offers swimming and other sports. Open daily.

CARILLON (D-5), Mercersburg. Concerts on Mercersburg Academy carillon are given at 3 p.m. Sunday, 10-15 p.m. Saturday, September-June and 9 p.m. Tuesday and Thursday, July-August.

CATHEDRAL OF LEARNING (A-4), Pittsburgh. 42-story modern Gothic tower on the campus of the University of Pittsburgh, accommodates more than 12,000 students.

CLOISTER (G-4), Ephrata. Buildings, dating from 1741, were home of monastic Seventh-day Baptists and are now being restored to their original appearance. 9-5 daily, 25c.

DELAWARE WATER GAP (H-3). Huge gorge, cut by the Delaware River, divides the Kittatinny Range of the Blue Mountains. U.S. 611 parallels the Delaware through the Gap.

DRAKE WELL MEMORIAL (B-2), near Titusville. Replica of Colonel Drake's oil well and museum exhibits trace history of oil industry and demonstrate operation of world's first drilled oil well (1859). 9:30-12 and 1-5 daily.

FOOD PACKING (A-4), Pittsburgh. Processing and packing of foods shown in 1½-hour tours of the H. J. Heinz plant, Progress Street, North Side. 8:30-10:30, 1-2:30 Monday-Friday.

FORT AUGUSTA (F-3), Sunbury. Original powder magazine, an outdoor, one-sixth-size scale model of the fort and a museum mark the site of this frontier outpost. 9-5 daily except Thursday.

FORT NECESSITY (B-5), near Uniontown. Museum and reproduction of stockade on site of George Washington's first battle, July 3, 1754. 8-5:30 daily. General Braddock's grave is 1 mile west of the fort on the National Road (U.S. 40).

FOSTER MEMORIAL (B-4), Pittsburgh. Memorial to Stephen Foster, composer of America's best-loved folk songs. He was born in Pittsburgh in 1826. 9-5 Monday-Saturday.

FRICK BIRTHPLACE (B-5), Scottdale. Early American furnishings and historical murals in the steelmaster's early home. 2-5 Saturday and Sunday, May-October.

FRIENDSHIP HILL (A-5), New Geneva. Home of Albert Gallatin, Secretary of the Treasury 1801-1813. Exhibits include many original furnishings and historical documents. 10-6 daily, May-November, 75c.

GAME PRESERVE (G-3), Schnecksville. Bison, elk and other wild game at the Trexler-Lehigh Game Preserve. Noon-7 Sun., holidays (except Winter). 50c.

GETTYSBURG NATIONAL MILITARY PARK (E-5). Gettysburg. Monuments, markers and artillery line the 26 miles of roadway that wind through this park. Panoramas of the famous battleground visible from observation towers. Cyclorama painting of battlefield. Site of Lincoln's Gettysburg Address marked by Soldiers' National Monument. Park open daily, guides for hire.

HAND-CUT GLASSWARE (H-2), White Mills. A collection of crystal and the fine art of cutting glass may be seen at the Dorflinger Glass Works 9-5 weekdays.

HANOVER SHOE FARMS (F-5), Hanover. Famous trotter stables stretch along Route 194 between Hanover and Littlestown. Stables open 8-5 daily.

HERSHEY PARK (F-4), Hershey. Amusement area includes zoo, miniature railway, golfing, swimming. Extensive rose gardens; museum of Indian and Pennsylvania Dutch relics. Open daily. Chocolate factory open 8:15-10:30, 12-3:15 Monday-Friday.

HISTORICAL MUSEUM (H-4), Doylestown. Fully rigged shops in Bucks County Historical Society Museum illustrate use of pioneers' tools. Thousands of items on display. 9-5 weekdays all year, 1-5 Sun.

HORSESHOE CURVE (C-4), near Altoona. U-shaped railroad tracks, 2,375 feet from end to end, arch across the Alleghenies.

ICE MINE (D-1), near Coudersport. Unusual rocky shaft in which ice forms in the Summer and disappears in the Winter. 7-8 daily, June-August. 30c.

INCLINED PLANE (C-4), Johnstown. Carries passengers (10c) and cars (25c) 500 feet up 71 per cent grade. Excellent view of the city. Frequent trips daily.

INDEPENDENCE HALL (H-5), Philadelphia. Liberty Bell, table used by signers of the Declaration of Independence and other furnishings on display in this hall of freedom. Old City Hall and Congress Hall, meeting place of Congress from 1790 to 1800, flank the building. Buildings open 9-5 daily.

LANDIS VALLEY MUSEUM (F-4), near Lancaster. More than 250,000 items—glassware, books, clocks, guns, farm tools, furniture—reflect the culture of the region since 1710. 10-4 daily.

LIMESTONE CAVERNS (C-5 and E-3). More than 100 known caves throughout Pennsylvania. Many, commercially developed and equipped with handrails, lights and guide service are located on the road map on the other side. Usually open daily. Admission ranges from 75c to $1.20.

LONGWOOD GARDENS (G-5), near Kennett Square. Extensive gardens, three-acre conservatory and spectacular fountains on estate of P. S. duPont. 11-5 daily. Free weekdays, Sunday 60c. Organ recitals are featured Sundays from 3 to 5. Gardens are the scene of the American Legion Pageant in June.

NATIONAL ROAD (A-5). U.S. 40 follows the route of the historic trail that carried pioneers westward. An early tollhouse is still standing at Addison.

OLD ECONOMY (A-3), Ambridge. 35-room Great House, music hall, granary and other refurbished buildings contain relics and crafts of the once flourishing Harmonists. 10-4 daily.

PENNSBURY MANOR (H-5), near Tullytown. Reconstruction of William Penn's Summer home includes the manor house, brewhouse, smokehouse, stables, gardens and orchards. 10-4:30 daily.

PENNSYLVANIA TURNPIKE (D-5). Superhighway 327 miles long, stretches from near Valley Forge to the Ohio border. Seven tunnels stab through mountains. Toll approximately 1c per mile. See map of Turnpike above.

PERRY MONUMENT (B-1), Erie. Obelisk honors Comm. Oliver Hazard Perry, victor in the Battle of Lake Erie. The reconstructed hull of Perry's Niagara is located at the foot of State Street.

PLANETARIUM (B-4), Pittsburgh. The story of the heavens is dramatized in daily afternoon and evening shows at Pittsburgh's Buhl Planetarium (admission 50c) and at the Fels Planetarium in Philadelphia (admission 60c).

ROADSIDE AMERICA (F-4), near Hamburg. Indoor display of miniature farms, villages and cities covers more than 4,000 square feet. 10-9 daily, April-December, 12-6 daily, January-March. 75c.

SPRING CREEK (D-3), Bellefonte. Trout fishing in this "fishermen's paradise," a state preserve, daily during Summer. Fishing license required.

TINY TOWN (C-4), Indiana. Miniature city contains 48 buildings, traffic and street lights and other familiar city sights. 9-9 weekdays, 1-9 Sunday.

TIOGA POINT MUSEUM (F-1), Athens. Indian implements and historical relics. 3-5 Friday and Saturday; also 7-9 p.m. Saturday. 25c.

VALLEY FORGE STATE PARK (G-4). Site of Colonial encampment during the bitter Winter of 1777-78. Washington's headquarters, museum, Memorial Chapel and replicas of army huts. The park is particularly beautiful during the Spring when thousands of dogwood blossoms appear on the countless trees throughout the preserve. 9-5 daily, all year.

WAYNE BLOCKHOUSE (A-1), Erie. Replica of blockhouse in which Revolutionary General "Mad" Anthony Wayne died in 1796. Open daily in Summer.

WHEATLAND (F-5), Lancaster. President Buchanan lived here before and after his term in the White House (1857-61). 9-4:30 weekdays, 1-5 Sunday (closed Sunday during Winter). 50c.

WOLF PARK (C-1), near Kane. A pack of large, fierce lobo wolves and several rare Arctic wolves roam the fenced-in enclave until dark daily. 30c.

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LOOK AT THE PAST
for faith in America's future!

In these days when our democratic way of life is on trial, when hard-won liberties are challenged, it is reassuring and inspiring to look at the past.

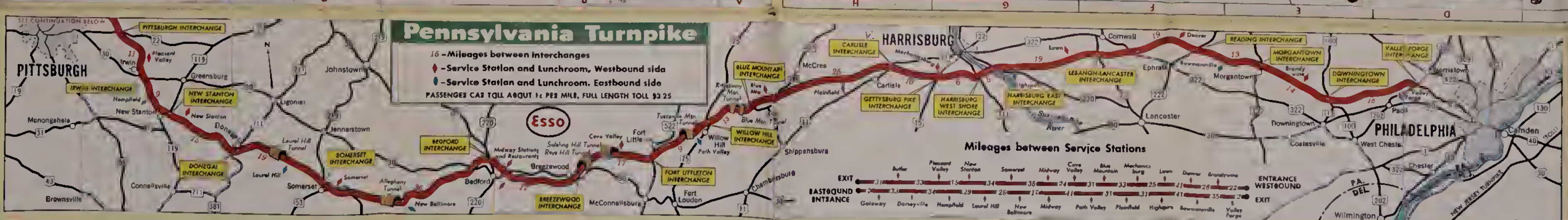
There we will discover how our forefathers wrested a continent from a wilderness; how they established a nation on a new concept of human rights and the dignity of man; how they defended this nation in the face of discouraging odds; how they brought to the nation the fruits of religious freedom, education and invention.

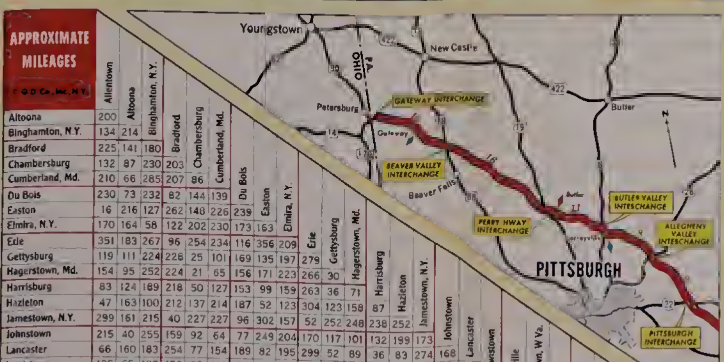
Abraham Lincoln's Gettysburg address expressed probably the greatest tribute ever paid to American ideals and their defenders. The scene at Gettysburg is illustrated on the front cover of this map. Now a national military park, Gettysburg Battlefield (see Pictorial Guide) has many mementos of the conflict on July 1-3, 1863, in which 23,000 Union and 20,000 Confederate troops were casualties.

The oil industry is justly proud of its contribution to American progress and American defense. The first oil well was drilled 93 years ago; since that time more than 900,000 successful wells have brought to the surface the petroleum that runs our cars and trucks, heats our homes and factories, and powers our planes, railroads, ships and machinery.

ESSO STANDARD OIL COMPANY

Your Progress and Oil Progress Go Hand in Hand





APPROXIMATE MILEAGES

Features of this Esso Map

ON THIS SIDE . . .

City maps of Philadelphia and Vicinity and Pittsburgh and Vicinity showing through routes and principal streets.

Sightseers' maps of downtown Philadelphia and Pittsburgh with indexes to hotels, theaters, stores and other attractions.

Map of Pennsylvania Turnpike.

Pictorial map and information for sightseers.

Chart of Public Recreation Areas.

Mileage Chart.

ON OTHER SIDE . . .

"How to Read This Map" — clearly explains map symbols.

Complete index of every Pennsylvania city and town shown on map.

Speed Limits Chart.

DRIVE CAREFULLY...
THE LIFE YOU SAVE MAY BE YOUR OWN!

PUBLIC RECREATION AREAS

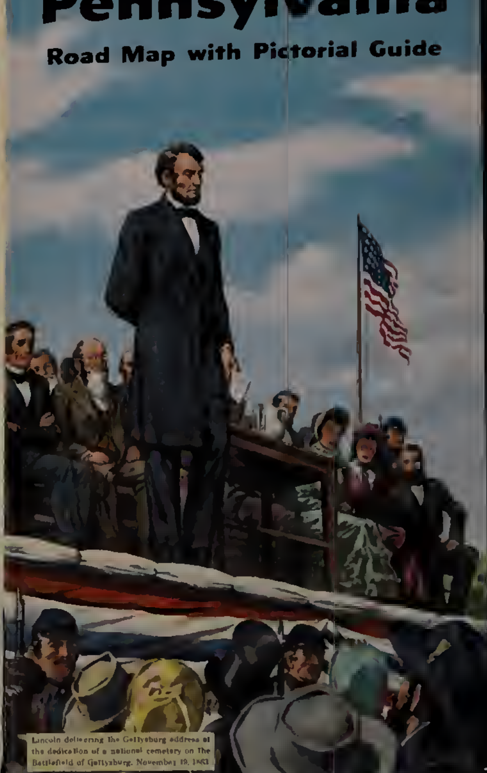
Index numbers refer to the road map on the other side. For details on state parks and forests, write to Department of Forests and Waters, Harrisburg. Data on the Allegheny National Forest may be obtained from Forest Supervisor, Allegheny National Forest, Warren, Pa.

ALLEGHENY NATIONAL FOREST	Index
Allegheny	E-3
Complanter	E-3
Hearts Content	D-3
Kelly Pines	E-4
Kennedy Springs	F-3
Loleta	E-5
Morrison Run	D-3
Sandstone Springs	D-3
Twin Lakes	E-4
STATE PARKS	
Black Moshannon	G-7
Blue Knob	F-10
Caledonia	J-12
Chapman Dam	E-3
Clear Creek	E-5
Colton Point	H-3
Cook Forest	D-5
Cowans Gap	G-12
Crooked Creek	D-8
French Creek	N-10
George W Childs	P-6
Greenwood Furnace	H-8
Halfway	J-7
Hickory Run	N-7
Hills Creek	J-3
Kettle Creek	G-5
Keystone	D-10
Kooser	D-11
Laurel Hill	D-12
Leonard Harrison	H-4
Ole Bull	H-4
Parker Dam	F-6
Pine Grove Furnace	J-12
Poe Valley	J-8
Pymatuning	A-4
Raccoon Creek	A-9
Ralph Stover	O-9
Ricketts Glen	L-5
Shawnee	F-11

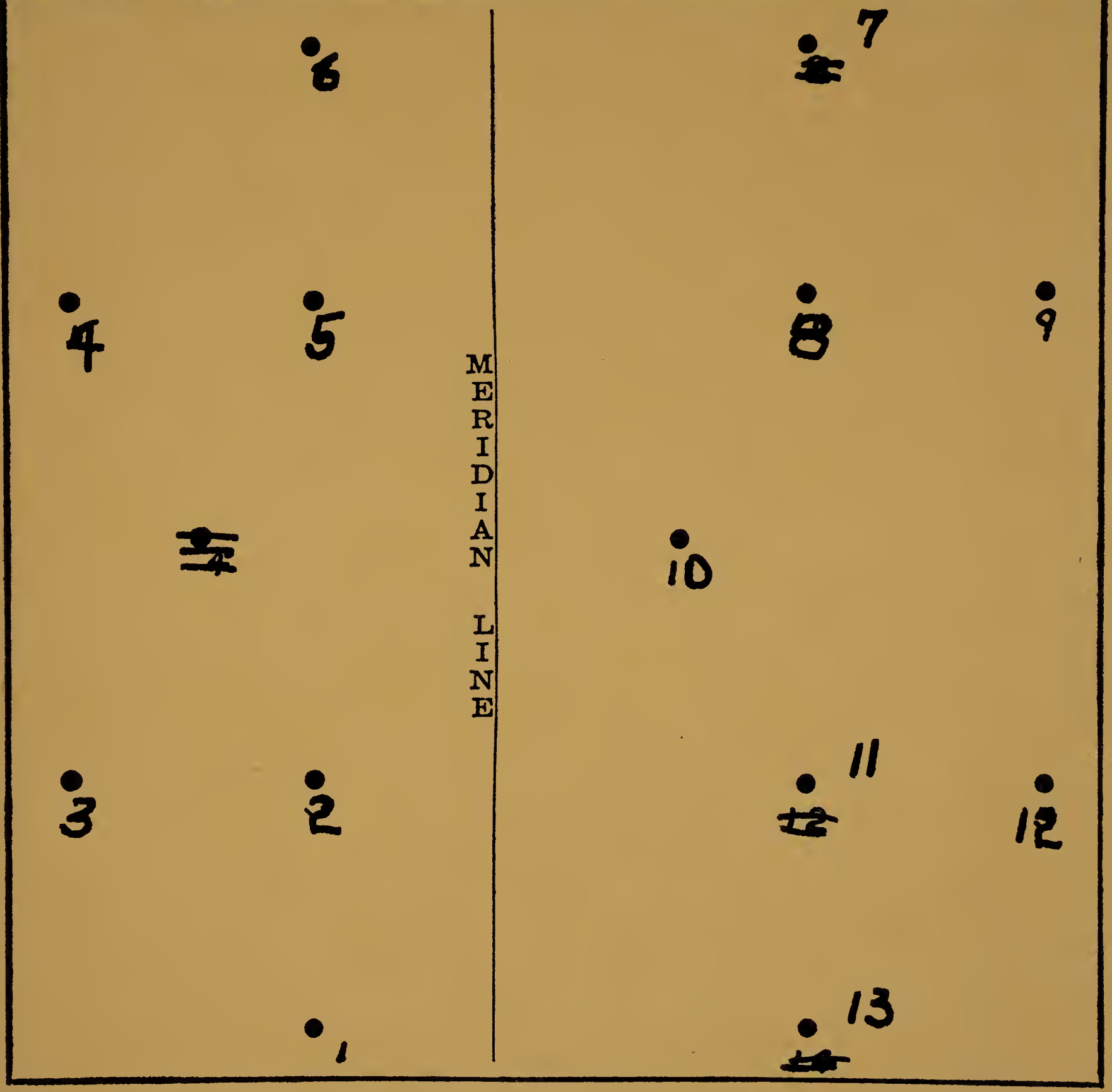
STATE PARKS (Cont'd)	Index
Sizerville	G-4
Tobyhanna	N-6
Whipple Dam	H-8
Worlds End	L-4
NATURAL OR HISTORICAL MONUMENTS & PARKS	
Alan Seeger	H-8
Bear Meadows	H-8
Bruce Lake	O-5
Buchanan's Birthplace	G-12
Bushy Run Battlefield	C-10
Detweiler Run	H-8
Fort Necessity	C-12
Hemlocks	H-10
Joyce Kilmer	J-7
Mount Davis	D-13
Mount Logan	J-6
Mount Riansares	J-7
Presque Isle	B-1
Snyder-Middleswarth	J-8
Valley Forge	N-11
Washington Crossing	P-10
Wayside Memorial	G-4
STATE FOREST PICNIC AREAS	
Asaph Run	J-3
Bear Gap	J-8
Bear Valley	H-12
Big Spring	H-10
Blankley	F-12
Bradley Wales	J-4
Cherry Springs	H-4
Colerain	G-9
Colonel Denning	J-10
County Line	H-10
Dry Run	K-5
Dyer Farm	H-4
Eastville Gap	J-7
Elliott, S. B.	F-6
Fahneystock	H-4

STATE FOREST PICNIC AREAS (Cont'd)	Index
Fowlers Hollow	H-10
Hogeland Branch	K-4
Jerry Springs	G-12
Jesse Hall	H-5
Kansas Valley	H-10
Laurel Run	H-8
Laurel Summit	D-11
Licking Creek Valley	H-10
Linn Run	D-11
Little Cherry Springs	J-5
Little Pine	J-6
Long Run	J-6
McCall Dam	J-7
McClure	J-8
Mine Hole	H-4
Minnichs Spring	K-9
Mont Alto	H-13
Morris	J-4
Negro Mountain	D-13
Old Forge	J-13
Old Locust	H-8
Old Town Tower	F-7
Owego	O-5
Patterson	H-3
Pecks Pond	O-5
Penn-Roosevelt	H-8
Pine Hill	G-8
Poe Paddy	J-8
Promised Land	O-5
Prouty Place	G-4
Ravensburg	J-6
Reeds Gap	J-8
Rowland	K-9
Sand Bridge	J-7
Sideling Hill	G-12
Snow Hill	O-6
Stony Fork	J-4
Trough Creek	G-10
Tuscarora Tower	G-12
Upper Pine Bottom	J-5
Voneida	J-7

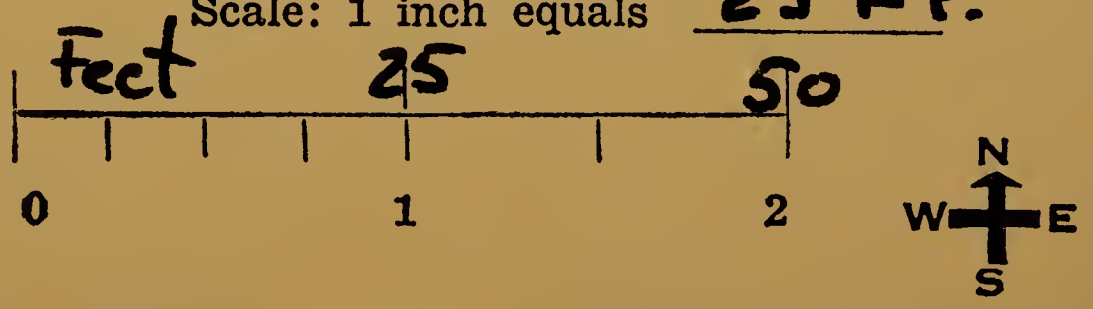
Esso
Pennsylvania
Road Map with Pictorial Guide



Lincoln delivering the Gettysburg address at the dedication of a national cemetery on the Battlefield of Gettysburg, November 19, 1863



Scale: 1 inch equals 25 Ft.



Practice Map

OHIO INDEX

Population 6,907,612 (1940 Census)
Area 41,222 sq. miles
Capital Columbus

COUNTIES '88

1940 Populations

CITIES & TOWNS

*Includes population of entire township

OHIO INDEX
CITIES & TOWNS CONTINUED

ROAD MAP OF OHIO

U. S. INTERSTATE AND PRINCIPAL STATE HIGHWAYS SHOWN IN RED.
Paved and Improved Roads also recommended and usually less congested.

Super Highways—4 lanes or over (State and U. S. highways)
Paved Roads—first class all weather
Improved Roads—second class
U. S. Interstate Highways (Abbreviations in shields indicate: ALT—Alternate, BYP—Bypass, B—Business Route)
Toll inquiry may save time.
Graded Roads
Dirt Roads
Connecting Roads (No road surfacing shown)
State Highways
Rivers and Streams
Airports
State & U. S. Fish Hatcheries
State Parks
Points of Interest
Ferries and Boatlines
National Parks, Monuments and Cemeteries
Mileage shown between towns and junctions
Accumulated mileage shown between stars
State Capitals
County Seats

Speed Laws—50 m.p.h. (prima facie limit)

State Capital—Columbus

Time Zone Boundary between Central and Eastern Standard Time.
In some localities time is advanced one hour by local option.

One inch equals approximately 13.8 miles.

Scale: 0 5 10 15 20 25 30 miles

POPULATION OF CITIES AND TOWNS
0–250 251–1000 1,001–5,000 5,001–10,000 10,000–25,000 25,000–50,000 50,000–100,000 100,000 and over

MAPS OF ADJOINING STATES ARE AVAILABLE AT AMOCO STATIONS FROM MAINE TO FLORIDA.

UNITED STATES MILEAGE CHART	Akron, Ohio	Atlanta, Ga.	Baltimore, Md.	Birmingham, Ala.	Bismarck, N. Dak.	Boston, Mass.	Buffalo, N. Y.	Cheyenne, Wyo.	Chicago, Ill.	Cincinnati, Ohio	Cleveland, Ohio	Columbus, Ohio	Dallas, Texas	Denver, Colo.	Des Moines, Iowa	Detroit, Mich.	Dubuque, Iowa	Evansville, Ind.	Ft. Wayne, Ind.	Harrisburg, Pa.	Helena, Mont.	Houston, Texas	Indianapolis, Ind.	Jackson, Miss.	Jacksonville, Fla.	Jefferson City, Mo.	Kansas City, Mo.	Lansing, Mich.	Little Rock, Ark.
Atlanta, Ga.	692		694	167	1549	1107	901	1475	713	475	710	569	839	1446	899	731	832	422	630	749	2220	842	548	420	325	680	805	760	562
Birmingham, Ala.	723	167	807		1517	1217	933	1384	675	506	741	600	672	1362	860	762	793	384	622	826	2072	677	521	253	439	606	729	752	395
Bismarck, N. Dak.	1228	1549	1559	1517		1869	1412	622	871	1165	1221	1188	1225	725	683	1141	708	1148	1035	1537	684	1484	1055	1484	1874	956	806	1080	1214
Boise, Idaho	2142	2265	2460	2176	1101	2792	2323	790	1772	1995	2123	2058	1680	871	1433	2051	1624	1872	1924	2420	587	1925	1880	2098	2653	1597	1447	1991	1859
Boston, Mass.	672	1107	413	1217	1869		460	1981	998	877	848	772	1849	2035	1340	716	1178	1111	851	391	2512	1892	949	1470	1219	1319	1438	800	1505
Buffalo, N. Y.	215	901	366	933	1412	460		1512	541	436	191	332	1409	1566	871	255	722	664	394	290	2055	1525	492	1159	1149	862	981	340	1075
Cheyenne, Wyo.	1331	1475	1649	1384	622	1981	1512		982	1203	1331	1266	907	103	640	1259	832	1090	1132	1628	735	1151	1090	1332	1823	820	670	1199	1067
Chicago, Ill.	357	713	688	675	871	998	541	982		294	350	317	971	1028	342	269	181	291	164	666	1514	1111	184	780	1038	392	506	209	660
Cincinnati, Ohio	235	475	506	506	1165	877	436	1203	294		245	110	981	1179	580	258	475	234	155	486	1808	1090	110	703	800	476	599	277	639
Cleveland, Ohio	34	710	353	741	1221	648	191	1331	350	245		141	1218	1370	691	168	531	473	203	331	1864	1333	301	953	1023	671	790	223	884
Dallas, Texas	1219	839	1441	672	1225	1849	1409	907	971	981	1218	1092		804	716	1192	918	766	1032	1460	1644	244	917	419	1036	579	510	1163	344
Denver, Colo.	1364	1446	1636	1362	725	2035	1566	103	1028	1179	1370	1237	804		685	1313	875	1068	1186	1623	838	1048	1062	1226	1801	791	641	1253	1040
Detroit, Mich.	178	731	509	762	1141	716	255	1259	269	258	168	190	1192	1313	616		451	477	160	487	1784	1308	277	942	1056	639	752	84	858
Glacier Nat'l. Park	1925	2246	2256	2212	697	2566	2109	875	1568	1862	1918	1885	1784	978	1426	1838	1413	1881	1732	2234	188	2028	1752	2228	2571	1633	1483	1777	1895
Grand Canyon	2061	1879	2334	1712	1395	2706	2258	847	1744	1862	2061	1941	1063	790	1448	2020	1682	1686	1881	2314	890	1307	1766	1482	2100	1386	1238	1963	1344
Houston, Texas	1328	842	1484	677	1484	1892	1525	1151	1111	1090	1333	1198	244	1048	960	1308	1130	870	1148	1503	1889		1033	422	932	813	754	1299	450
Indianapolis, Ind.	295	548	576	521	1055	949	492	1090	184	110	301	175	917	1062	470	277	365	172	115	556	1698	1033		667	873	370	491	245	583
Kansas City, Mo.	791	805	1065	729	806	1438	981	670	506	599	790	664	510	641	206	752	395	427	604	1045	1343	754	491	681	1130	150		694	411
Los Angeles, Calif.	2445	2289	2726	2122	1733	3099	2642	1191	2128	2294	2451	2325	1450	1194	1828	2425	2033	2119	2265	2706	1234	1570	2150	1869	2487	1819	1621	2400	1710
Memphis, Tenn.	728	423	958	256	1279	1366	933	1128	547	500	741	610	483	1106	631	729	616	282	569	977	1816	589	454	213	695	350	473	699	139
Miami, Fla.	1376	674	1155	786	2223	1568	1498	2172	1387	1149	1372	1243	1374	2150	1573	1405	1506	1096	1304	1232	2902	1244	1222	956	349	1382	1489	1440	1181
Minneapolis-St. Paul, Minn.	776	1097	1107	1058	452	1417	960	823	418	713	769	736	972	887	256	689	256	693	583	1085	1095	1216	603	1084	1422	518	462	628	837
Nashville, Tenn.	524	257	737	220	1292	1147	733	1218	457	301	542	401	704	1189	642	557	575	166	404	756	1959	810	303	403	581	423	548	534	360
New Orleans, La.	1066	523	1173	364	1653	1583	1275	1413	957	843	1084	943	506	1310	1020	1099	1026	692	960	1192	2151	366	845	196	574	760	850	1090	438
New York, N. Y.	478	885	191	995	1706	222	370	1798	835	655	500	550	1632	1791	1166	628	1016	889	671	168	2349	1675	725	1248	997	1096	1214	711	1285
Oklahoma City, Okla.	1094	912	1368	745	1009	1741	1284	726	846	898	1093	967	214	623	576	1067	765	730	907	1348	1454	458	792	602	1193	454	370	1038	356
Omaha, Nebr.	830	1014	1148	937	607	1480	1011	500	482	700	830	765	682	546	140	758	330	635	631	1127	1188	926	590	890	1349	359	209	698	620
Philadelphia, Pa.	401	797	103	910	1629	310	364	1717	758	578	423	473	1544	1744	1091	579	939	812	594	101	2272	1587	648	1163	909	1018	1142	634	1200
Pittsburgh, Pa.	108	750	223	780	1336	592	221	1426	465	290	130	185	1277	1422	800	286	646	525	301	201	1979	1381	360	1011	926	730	856	341	924
Portland, Oreg.	2575	2731	2906	2642	1388	3216	2759	1256	2218	2461	2568	2524	2146	1337	1899	2488	2090	2338	2390	2884	704	2381	2346	2564	3063	2063	1913	2427	2325
Raleigh, N. Car.	565	418	306	585	1702	719	673	1769	831	554	586	521	1243	1750	1148	709	1012	713	674	383	2345	1267	664	840	501	982	1107	764	928
Richmond, Va.	429	560	148	706	1656	561	515	1737	785	522	450	479	1340	1744	1116	603	966	718	616	225	2299	1383	628	959	658	996	1121	662	996
St. Louis, Mo.	536	550	816	511	1015	1189	732	925	296	346	541	315	677	896	347	515	311	172	355	796	1598	815	240	518	875	130	255	485	363
Salt Lake City, Utah	1805	1947	2123	1856	1019	2455	1986	472	1454	1672	1805	1740	1289	518	1112	1733	1306	1571	1606	2102	496	1525	1562	1708	2272	1295	1127	1673	1546
San Francisco, Calif.	2563	2604	2881	2437	1657	3213	2744	1230	2212	2430	2563	2498	1791	1276	1870	2491	2064	2329	2364	2860	1140	1969	2320	2210	2828	2053	1885	2431	2066
Santa Fe, N. Mex.	1641	1459	1934	1292	1094	2295	1838	472	1324	1462	1647	1521	643	369	1029	1616	1257	1269	1467	1902	1119	887	1346	1062	1680	969	818	1559	908
Seattle, Wash.	2485	[illegible]	2816	2719	1298	3126	2669	1333	2128	2422	2478	2445	2220	1414	1946	2398	1973	2423	2292	2794	614	2464	2312	2639	3156	2140	1990	2337	2402
Tampa, Fla.	1164	471	1006	557	2020	1419	1349	1941	1184	946	1175	1040	1120	1919	1370	1202	1303	893	1101	1083	2690	1008	1019	684	200	1163	1286	1228	952
Washington, D. C.	336	656	38	769	1564	451	376	1658	693	502	362	398	1403	1635	1032	518	874	737	529	115	2207	1446	573	1022	768	944	1070	580	1059
Yellowstone National Park	1723	1915	2054	1824	565	2364	1907	467	1366	1640	1716	1683	1352	648	1064	1636	1185	1520	1530	2032	182	1596	1530	1771	2240	1260	1110	1575	1507

UNITED STATES MILEAGE CHART	Los Angeles, Calif.	Louisville, Ky.	Madison, Wis.	Memphis, Tenn.	Milwaukee, Wis.	Montreal, Que.	Mpls.-St. Paul, Minn.	Nashville, Tenn.	New Orleans, La.	New York, N. Y.	Omaha, Nebr.	Peoria, Ill.	Philadelphia, Pa.	Phoenix, Ariz.	Pierre, S. Dak.	Pittsburgh, Pa.	Portland, Oreg.	Raleigh, N. Car.	St. Louis, Mo.	Salt Lake City, Utah	San Francisco, Calif.	Seattle, Wash.	Spokane, Wash.	Springfield, Ill.	Springfield, Mo.	Tampa, Fla.	Toledo, Ohio	Topeka, Kans.	Tulsa, Okla.	Washington, D. C.	Wichita, Kans.
Atlanta, Ga.	2289	442	825	423	801	1097	1263	257	523	885	1014	656	797	1896	1418	750	2731	418	550	1947	2604	2808	2552	603	720	471	676	877	852	656	1038
Birmingham, Ala.	2122	408	820	256	763	1058	1319	220	364	995	937	617	910	1729	1346	780	2642	585	511	1856	2437	2719	2397	563	553	557	707	801	685	769	849
Bismarck, N. Dak.	1733	1168	728	1279	795	452	1528	1292	1653	1706	607	881	1629	1664	221	1336	1388	1702	1015	1019	1657	1298	1008	944	982	2020	1105	775	1014	1564	836
Boise, Idaho	990	1968	1719	1920	1796	1645	2657	1995	2187	2585	1290	1666	2520	1067	1232	2227	465	2580	1702	376	767	543	398	1721	1623	2797	2034	1422	1626	2460	1385
Boston, Mass.	3099	983	1141	1366	1086	1417	328	1147	1583	222	1480	1109	310	2744	1791	592	3216	719	1189	2455	3213	3126	2836	1141	1424	1419	761	1510	1621	451	1665
Buffalo, N. Y.	2642	547	684	933	629	960	388	733	1275	370	1011	652	364	2292	1334	221	2759	673	732	1986	2744	2669	2379	689	967	1349	306	1053	1164	376	1208
Cheyenne, Wyo.	1191	1190	929	1128	1008	823	1846	1218	1413	1798	500	877	1717	941	484	1426	1256	1769	925	472	1230	1333	1059	929	831	1941	1223	620	804	1658	620
Chicago, Ill.	2128	297	143	547	88	418	857	457	957	835	482	158	758	1792	793	465	2218	831	296	1454	2212	2128	1838	194	529	1184	234	578	726	693	733
Cincinnati, Ohio	2294	111	437	500	382	713	824	301	843	655	700	324	578	1900	1087	290	2461	555	346	1672	2430	2422	2132	302	581	946	201	871	778	602	826
Cleveland, Ohio	2451	356	493	741	438	769	579	542	1084	500	830	458	423	2099	1143	130	2568	586	541	1805	2563	2478	2188	483	776	1175	113	862	973	362	1017
Dallas, Texas	1450	872	1015	483	1056	972	1779	704	506	1632	682	850	1544	1057	1009	1277	2146	1243	677	1289	1791	2220	1969	777	442	1120	1137	514	283	1403	387
Denver, Colo.	1194	1161	971	1106	1048	887	1900	1189	1310	1791	546	931	1744	838	587	1422	1337	1750	896	518	1276	1414	1162	870	809	1919	1277	564	701	1635	517
Detroit, Mich.	2425	367	411	729	358	689	587	557	1099	628	758	405	579	2058	1063	286	2488	709	515	1733	2491	2398	2108	440	750	1202	57	828	947	518	982
Glacier Nat'l. Park	1422	1865	1426	1956	1492	1149	2196	1989	2291	2403	1304	1582	2326	1404	918	2033	668	2471	1738	684	1224	578	288	1641	1659	2717	1802	1462	1648	2261	1489
Grand Canyon	510	1782	1734	1463	1811	1666	2607	1684	1569	2484	1351	1620	2403	243	1250	2117	1236	2269	1496	394	839	1313	1141	1550	1283	2226	1976	1193	1087	2331	1011
Houston, Texas	1570	978	1181	589	1194	1216	1918	810	366	1675	926	991	1587	1177	1253	1381	2381	1267	815	1525	1969	2464	2213	918	677	1008	1278	758	527	1446	631
Indianapolis, Ind.	2150	113	327	454	272	603	862	303	845	725	590	214	648	1814	977	360	2346	664	240	1562	2320	2312	2022	192	475	1019	220	561	672	573	716
Kansas City, Mo.	1621	520	492	473	559	462	1342	548	850	1214	209	355	1142	1286	617	856	1913	1107	255	1127	1885	1990	1668	312	176	2386	713	71	250	1070	227
Los Angeles, Calif.		2215	2130	1846	2191	2017	3047	2067	1937	2875	1702	2078	2874	392	1601	2588	1015	2710	1901	739	401	1201	1253	2012	1666	2614	2424	1565	1467	2802	1394
Memphis, Tenn.	1846	389	630		628	871	1316	221	410	1146	682	465	1062	1511	1090	789	2386	789	306	1600	2197	2431	2141	392	297	813	685	545	429	920	579
Miami, Fla.	2856	1116	1536	1042	1475	1771	1726	930	887	1346	1698	1330	1258	2462	2136	1275	3428	850	1224	2644	3190	3505	3234	1277	1339	269	1355	1561	1471	1118	1621
Minneapolis-St. Paul, Minn.	2017	716	276	871	344		1179	840	1281	1254	379	430	1177	1773	404	884	1799	1250	567	1290	2048	1709	1419	495	602	1568	658	522	712	1112	693
Nashville, Tenn.	2067	187	602	221	545	840	1121		542	925	757	399	840	1732	1165	591	2461	568	295	1675	2419	2506	2216	345	472	727	502	620	850	699	776
New Orleans, La.	1937	732	1050	410	1037	1281	1673	542		1361	1059	875	1276	1544	1469	1133	2653	953	715	1788	2297	2727	2476	802	674	650	1075	922	712	1135	862
New York, N. Y.	2875	766	978	1146	923	1254	380	925	1361		1296	920	88	2522	1628	370	3053	497	965	2272	3030	2963	2673	917	1200	1197	810	1286	1397	229	1441
Oklahoma City, Okla.	1348	817	861	489	931	832	1654	710	689	1517	489	725	1440	1013	787	1152	1962	1287	558	1139	1691	2037	1779	652	317	1302	1019	344	120	1373	173
Omaha, Nebr.	1702	703	426	682	503	379	1345	757	1059	1296		376	1216	1389	404	925	1256	1254	464	972	1730	1803	1513	422	385	1495	722	168	399	1157	316
Philadelphia, Pa.	2874	683	901	1062	846	1177	473	840	1276	88	1216	840		2441	1551	293	2976	409	888	2191	2949	2886	2596	840	1123	1109	524	1209	1320	141	1364
Pittsburgh, Pa.	2588	401	608	789	553	884	597	591	1133	370	925	549	293	2155	1258		2683	465	600	1900	2658	2593	2303	552	835	1126	231	921	1032	232	1076
Portland, Oreg.	1015	2434	2075	2386	2142	1799	2916	2461	2653	3053	1756	2132	2976	1405	1542	2683		3046	2168	842	698	186	380	2187	2089	3205	2484	1888	2043	2925	1851
Raleigh, N. Car.	2710	586	974	789	919	1250	877	568	953	497	1254	878	409	2307	1650	465	3046		852	2243	3001	3006	2716	868	1049	701	661	1180	1229	268	1337
Richmond, Va.	2777	593	928	857	873	1204	719	636	1072	339	1216	842	251	2382	1593	324	3007	158	866	2211	2977	2917	2627	838	1101	858	564	1194	1304	110	1336
St. Louis, Mo.	1901	266	365	306	375	567	1102	295	715	965	464	175	888	1554	857	600	2168	852		1382	2140	2213	1923	102	234	1021	468	327	438	814	482
Salt Lake City, Utah	739	1667	1398	1600	1475	1290	2320	1675	1788	2272	972	1348	2191	720	874	1900	842	2243	1382		758	919	747	1401	1303	2413	1697	1087	1215	2132	1018
San Francisco, Calif.	401	2425	2156	2197	2233	2048	3078	2419	2297	3030	1730	2106	2949	792	1632	2658	698	3001	2140	758		884	936	2159	2033	2948	2455	1845	1810	2890	1753
Santa Fe, N. Mex.	857	1365	1315	1036	1433	1313	2203	1257	1149	2071	926	[illegible]	2003	522	970	[illegible]	[illegible]	1852	1077	623	[illegible]	[illegible]	[illegible]	1175	870	1767	1574	762	667	1931	592
Seattle, Wash.	1201	2425	1985	2431	2052	1709	2826	2506	2727	2963	1803	2142	2886	1595	1452	2593	186	3006	2213	919	884		290	2233	2166	3286	2394	1965	2115	2835	1928
Tampa, Fla.	2614	911	1296	813	1272	1568	1577	727	650	1197	1495	1127	1109	2220	1924	1126	3205	701	1021	2413	2948	3286	3022	1074	1110		1147	1358	1242	968	1392
Washington, D. C.	2802	613	836	920	781	1112	609	699	1135	229	1157	781	141	2369	1498	232	2925	268	814	2132	2890	2835	2545	766	1050	968	470	1142	1253		1289
Yellowstone National Park	1074	1616	1252	1568	1319	976	2093	1658	1858	2201	940	1316	2124	1056	662	1831	890	2218	1365	336	977	776	486	1362	1271	2381	1600	1087	1260	2059	1065

4626

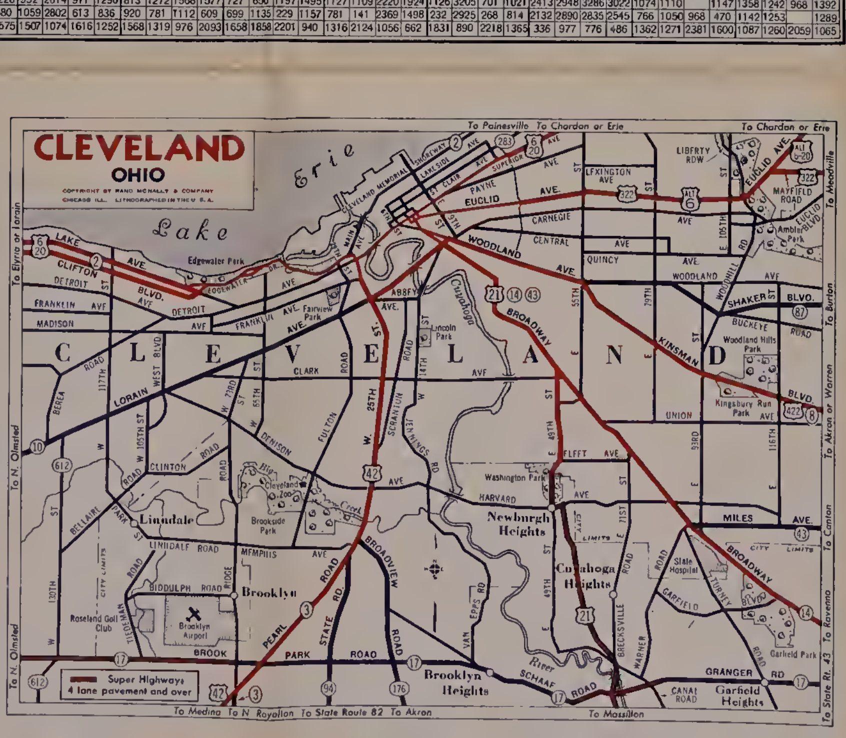
The safe way to go is to obey traffic laws. Remember the prime purpose of traffic regulations is to keep you out of trouble. Below are important state traffic laws for your guidance. If you are in doubt about local regulations or any other important local traffic information, just stop at an Amoco Station. The Amoco man will be glad to assist you.

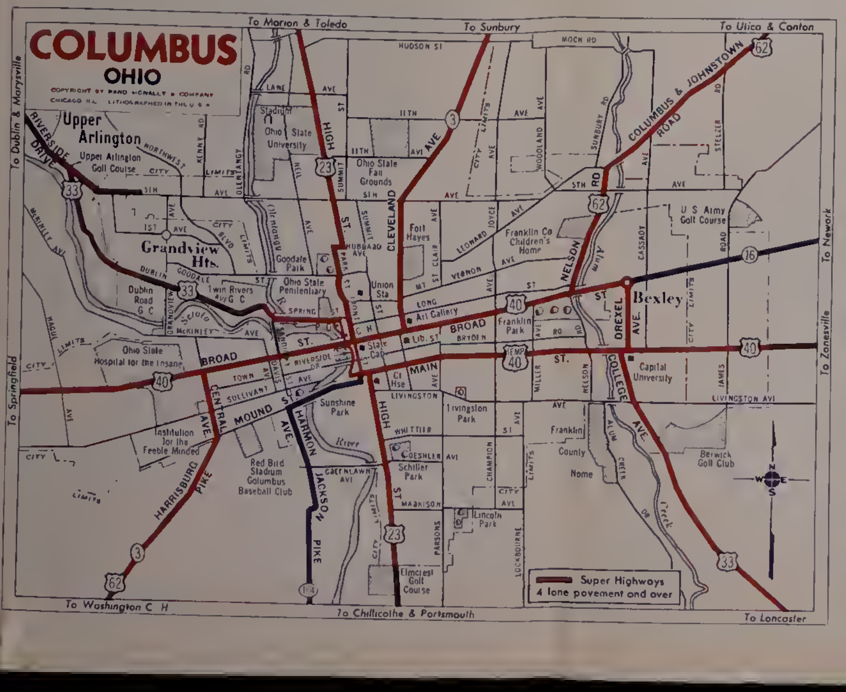
IMPORTANT STATE TRAFFIC LAWS

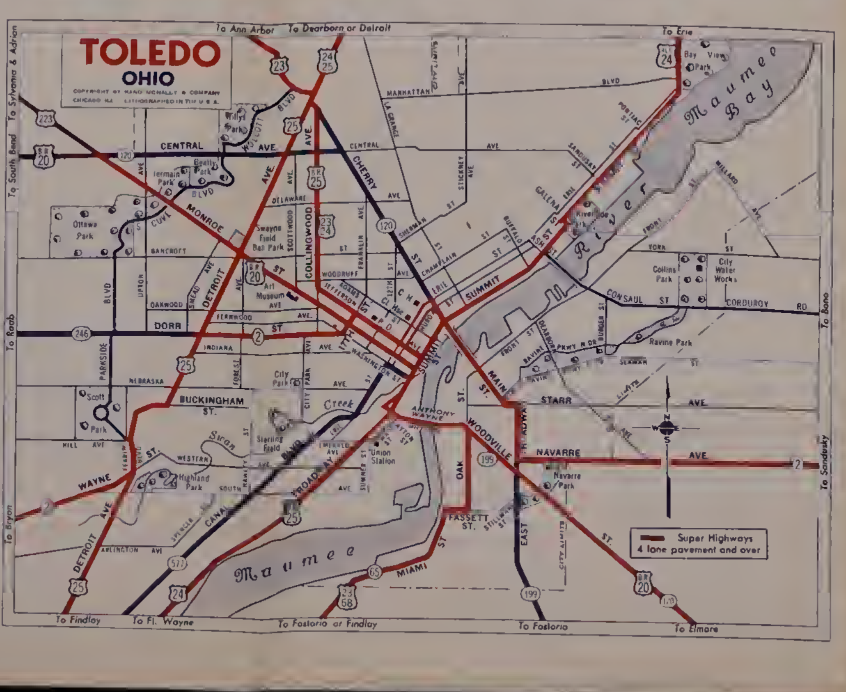
Because of frequent changes in Laws and Regulations, make local inquiry for latest information.	Speed Limits m. p. h. Business	Residential	Country	Non-Residents Must Register Car Within This Time (days)	Hand Signals Required for Turn or Stop	Minimum Age	Responsibility Proof Required after Accident	State Gasoline Tax per gallon (A)
Alabama	20	25	R. & P.	30	Yes	16	No	.06
Arizona	20	25	50-45 N	10	Yes	16	Yes	.05
Arkansas	20	25	55	30	Yes	16	Yes	.06½
California	25	25	55*	R	Yes	16	No	.03
Colorado	25	30	60*	R	Yes	16	Yes	.04
Connecticut	L. O.	L. O.	40*	R	Yes	16	Yes	.03
Delaware	25	35	50▲	R	Yes	16	Yes	.04
District of Columbia	25	25	30	R	Yes	16	No	.03
Florida	25	25	60-50 N	R	Yes	16	No	.07
Georgia	L. O.	L. O.	55*	30	Yes	15	No	.06
Idaho	15	20	50	60	Yes	14	Yes	.06
Illinois	20	25	R. & P.	R	Yes	15	Yes	.03
Indiana	20	30	R. & P.	60	Yes	18	Yes	.04
Iowa	20	25	R. & P.	R	Yes	15	Yes	.04
Kansas	20	30	R. & P.	30	Yes	16	Yes	.03
Kentucky	20	25	R. & P.	R	Yes	18	No	.05
Louisiana	25	25	R. & P.	R	Yes	14	Yes	.07
Maine	25	25	45	R	No	15	Yes	.04
Maryland	25	35	50▲	90	Yes	16	No	.04
Massachusetts	20	20	30*	R	Yes	16	Yes	.03
Michigan	25	25	R. & P.	90	Yes	14	Yes	.03
Minnesota	30	30	60-50 N	R	Yes	15	Yes	.04
Mississippi	15	25	55*	25	Yes	16	Yes	.06
Missouri	L. O.	L. O.	R. & P.	R	Yes	16	No	.02
Montana	20	25	50*	60	Yes	15	Yes	.05
Nebraska	20	25	60-50 N	R	Yes	16	Yes	.05
Nevada	L. O.	L. O.	R. & P.	5	Yes	17	No	.04
New Hampshire	20	25	35*	6 mo.	No	16	Yes	.04
New Jersey	15	20	40	R	Yes	17	Yes	.03
New Mexico	20	25	45*	90	Yes	14	No	.05
New York	L. O.	L. O.	50	R	Yes	17	Yes	.04
North Carolina	20	25	50	R	Yes	15	No	.06
North Dakota	25	25	50*	30	Yes	14	Yes	.04
Ohio	25	25	50*	R	Yes	14	No	.04
Oklahoma	L. O.	L. O.	R. & P.	60	Yes	16	No	.07½
Oregon	20	25	55*	R	Yes	16	Yes	.05
Pennsylvania	L. O.	L. O.	50	R	Yes	16	Yes	.04
Rhode Island	20	25	35*	R	No	16	No	.03
South Carolina	25	35	55*	R	Yes	14	No	.06
South Dakota	15	30	60-50 N	R	Yes	15	No	.04
Tennessee	30	30	50*	30	Yes	16	No	.07
Texas	L. O.	L. O.	60-50 N	120	Yes	16	No	.04
Utah	25	25	60-50 N	R	Yes	16	Yes	.04
Vermont	L. O.	L. O.	50	R	Yes	16	Yes	.04
Virginia	15	25	50	R	Yes	14	Yes	.05
Washington	25	25	50*	R	Yes	16	No	.05
West Virginia	20	25	45	90	Yes	16	Yes	.05
Wisconsin	25	25	R. & P.	R	No	16	Yes	.04
Wyoming	20	30	60*	90	Yes	15	No	.04

R. & P. Reasonable and Proper. Careful and prudent driving with due regard to weather, highway and traffic conditions. L. O. Local Ordinance. R. Reciprocal. A Reciprocal exemption means that the state allows the tourist the same number of days as the visitor's state. N. Night, (50-day, 45N-night). *Prima Facie. Speed beyond which the driver is presumed to be driving recklessly. ▲55* m.p.h. 4 Lane or Dual Highways. (A) Does not include Federal Tax of 1.5c per gallon. Non Resident Exemption column refers to the length of time a non-resident is exempt from paying fees or registering his automobile in another state.

646







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COMPASS AND MAPS

NEW SCHOOL SUBJECT IN SWEDEN

By a Correspondent

SINCE 1941 every primary school in Sweden has been obliged to teach a subject called "Orienteering." An ugly word—not, surprisingly, coined by an American university teacher—it derives from the Swedish for orientation. Up to 40,000 Swedish schoolboys and schoolgirls compete annually for an orienteering proficiency pin. And a text-book in Swedish on orienteering has sold over 150,000 copies and reached the realms of a best seller. In the autumn of 1950 the educational authorities of the Canadian province of Ontario made orienteering a compulsory subject in 7,500 of its schools, and universities and educational institutions in the United States are also including it now in their instructional programmes.

Taking a line on a given point during an exercise in the country.

Fundamentally it is the art of finding one's way with the help of a map and a compass. Actually it is a new sport with an educational and instructional basis, which has swept through all the Scandinavian countries like wildfire, spread into Holland, Belgium, Franee and Switzerland, and has now crossed the Atlantic to Canada and the United States. In Sweden alone it has 350,000 followers, and as many as 135,000 adults have taken part in contests in it at the same time.

It all began over 30 years ago on a fine Sunday morning when a group of young Swedish boys sat in a semi-circle at the feet of Major Ernst Killander in the woods outside Stockholm. They listened to him eagerly as he expounded the rules of a novel outdoor activity, which was to add a new word to the English language and give a new sport to the world. Killander, Swedish youth and Scout leader, had been worried at the increasing number of hours that his youthful charges were spending in watching sport instead of participating in it. How, he wondered, could he get them away from the turnstiles and into the sports field instead? Killander pondered this difficulty for a long time and then fell back on his military map training for the solution. He gave each of the boys sitting at his feet that Sunday morning a compass and a topographical map of the surrounding countryside. Indicating certain points he had marked on the map, he told them to find these as quickly as possible. A farmhouse came first, then a small lake and finally the fork of two streams. The boys had to reach these places in the shortest possible time guided only by the maps and the compasses. They could go on a bee-line, they could go straight over the hills or they could consult the map and find easier routes along roads, woodland paths or river beds.

The boys took to the game like fish to water and clamoured for more. Encouraged by success Major Killander developed his idea still further—and a new sport was born. Within a few years orienteering became a major sport in Sweden. Its attraction as an all-round, all-weather outdoor activity appealed to old and young of both sexes. For it required fitness, fleetness of foot, ability to surmount natural obstacles, and stamina, combined with skill in map-reading, quick judgment, rapid and accurate observation and a knowledge of nature. It needed no special equipment except a map and a compass, no special sports ground except that given by nature in the fields and the forests. It could be played on foot, on skis or skates, by bicycle, motor-cycle, car or canoe. It was the perfect pre-requisite for camping, hiking, scouting, mountaineering, hunting and fishing, and an ideal preliminary for civil defence exercises and military training. But its most interesting educational aspect was its value in showing a new way to inspire interest in such school subjects as geography, mathematics, drawing, report writing and nature study. It also had the additional quality of combining purposeful activity with the out-of-doors which forms an important part of the normal school curriculum in Sweden. Apart from organized games and physical exercises, an average of six days each term is set aside for outdoor excursions.

A lesson on the use of maps before going out on an "orienteering" expedition.

Preparation for instruction in orienteering begin in Sweden during the child's first year at school with simple outdoor games. Swedish children start school when they are seven years old. These simple games are played without any reference to map and compass. The object is to inculcate a sense of direction and to make the children, particularly those who live in the town, feel at home in open country or forest land.

When the children are nine and 10 years old, they get their first proper instruction in orienteering in their geography lessons. They start learning fundamental map symbols and begin to draw simple maps—of their own classroom, for example, or the school playground, or the area surrounding their home. They also take imaginary walks on the map, and practice is conducted outdoors by using a large-scale topographical map. While out-of-doors, the judging of distances by stepping them out is also taught, and competitive games are introduced. At 11 years, instruction in the classroom consists of the drawing of more difficult maps, learning the map-scale and taking imaginary walks along topographical maps, the pupils having to describe verbally or in writing the various objects that they see or encounter *en route*.

Outdoor exercises at this stage become more difficult. They learn to read the map while walking along a country road, to orient it in different directions, and to practise stationary orienteering, which is the ability to find various points on the landscape by comparing map with terrain. The teachers now take the children on their first cross-country walk, relying on the map to find their way. Distance judging is taught by other means than by stepping, using for instance a watch instead. While still in the 11-years-old stage an introduction is made to the compass. When the cardinal points have been well-mastered, the children learn to take map bearings, and to use the compass for walking in certain stipulated directions. Particular emphasis is laid on the fact that each mark or graduation on the compass means so many different directions or ways in which one can walk—a fact more easily understood by the average child than use of the term "degrees," which he might confuse unnecessarily with geometry.

During the next year of their school life the children devote their class-room work to finding indicated points on the map, and to the making of descriptions of more difficult imaginary walks. Under the supervision of the teacher they begin serious cross-country walks using for the first time both the map and the compass to guide them. In their final year at the primary school, which is when they are 13 years old, compass drill becomes much more earnest. They learn to use the compass accurately and speedily, with and without maps, to take bearings, and to correct for declination. They are also taught how to measure distances on the map. By now it is usually found that most children are ready for easy cross-country orienteering over distances of two or three miles.

The popularity of this new school subject with both girls and boys is unquestioned. That it has helped to propagate amongst schoolchildren a love of nature and a more practical approach to the lessons of geography, there is no doubt. The best Christmas present one can give any Swedish child of either sex is an orienteering compass.

After 10 years of experiment, Swedish educationists are convinced orienteering enthusiasts. According to them, its greatest contribution to the cause of teaching is that it has suddenly given the subject of map-reading a practical and recreative application. That it has stimulated interest in associated subjects, there is no doubt. Experience has shown that even the dullest child can master the principles of orienteering. The perpetual utilization of "play-way" methods of instruction and the constant introduction of competitive games—for which orienteering is ideally suitable and without which it should not be taught—has made it a most popular subject in the Swedish schoolchild's curriculum.

Supervised by their schoolmaster primary school children from Enskede, a suburb of Stockholm, are studying their maps while on an expedition near their school.

Tracing their projected route before going out. Children often work in teams of two.

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