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GUIDELINES AND CRITERIA FOR THE DESIGN OF FACILITIES FOR COMPULSORY EDUCATION IN RURAL ICELAND

by

Maggi Jóhann Jónsson

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Architecture
(Architecture)
in The University of Michigan
1974

Doctoral Committee:

Professor C. Theodore Larson, Chairman
Professor Frederick W. Bertolaet
Associate Professor Kingsbury Marzolf
Professor William Muschenheim

To my wife, Sigríður Soffía.

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CHAPTER I

THE PROBLEM

BACKGROUND

Statement of Present Situation

Iceland, an island of 103,000 square kilometers, is heavily mountainous, and only the periphery of the country is inhabited. Its population, around 210,000, is spread along the coastline with the highest concentration, about 112,000, in the area of Reykjavík the capital. See figure 1. With the exception of Akureyri, a town of about 11,000, the remaining population lives on farms and in small seaside villages and is occupied with fishing, light industry and farming. The countryside around the island is farmed with a rather low density spread over large areas. A network of gravel roads, electric powerlines and telephones reaches almost every farm. A government run radio and television network is also in operation.

Political History

The first settlers came to Iceland in 874, mainly from Norway. From 930 to 1264 Iceland was a republic. However, the rule of the king of Norway was recognized by treaty in

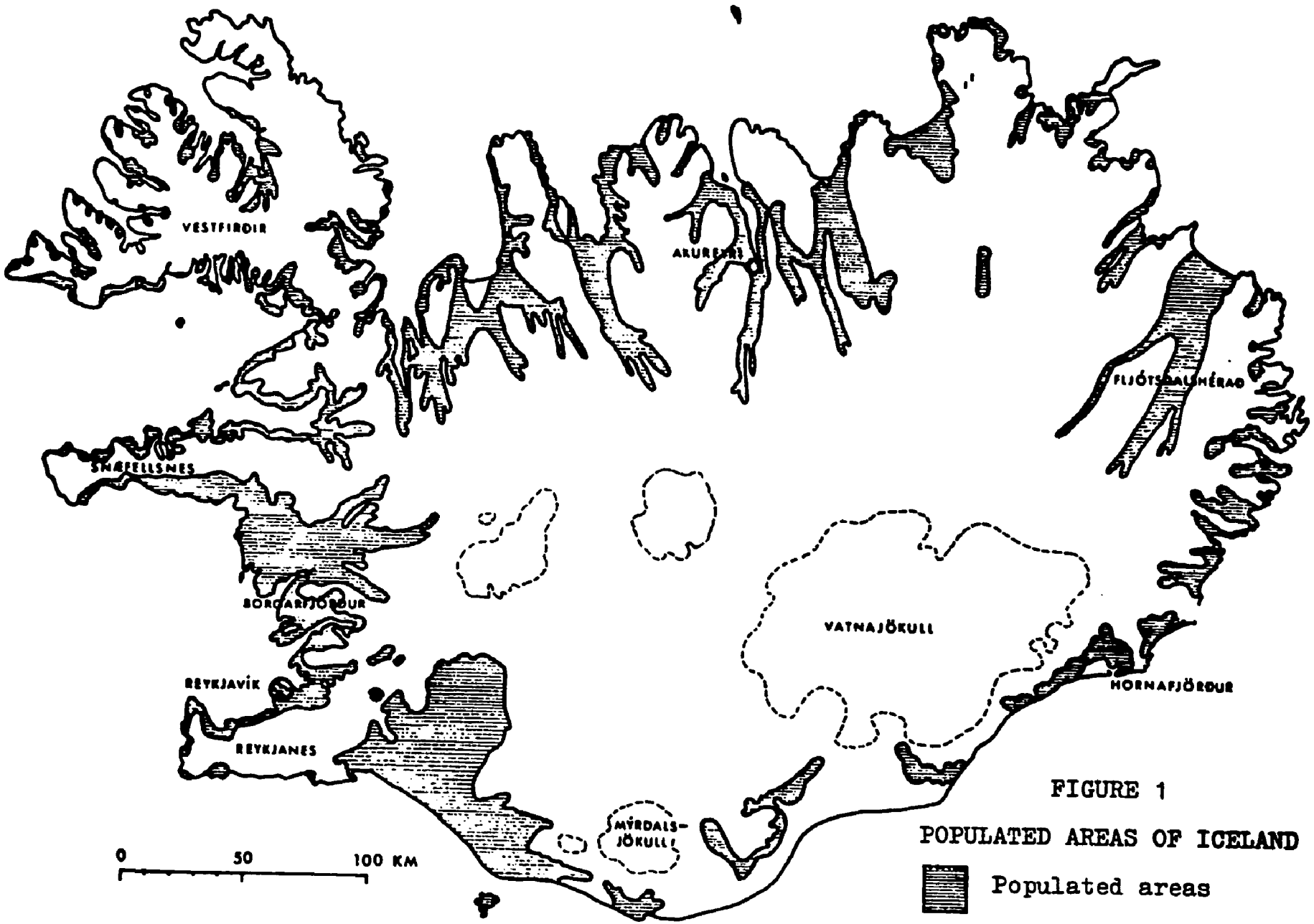


FIGURE 1

POPULATED AREAS OF ICELAND

Populated areas

1263. Both Iceland and Norway came under the rule of the Danish king in the year 1381. In 1814, when Norway was separated from Denmark, Iceland remained under Danish rule. On 1 December, 1918, Iceland was recognized as a sovereign state in union with the crown of Denmark. On 17 June, 1944, Iceland was proclaimed an independent republic. Iceland is a founder member of the United Nations and joined NATO in 1949.

The parliament, or the national legislature, named Alþing, is composed of 60 members elected by the people every fourth year. The cabinet of the president, consisting of seven members, is the executive authority.

There are at present five political parties in Iceland: Sjálfstæðisflokkur (Independence Party) 36.2% ; Alþýðuflokkur (Social Democratic Party) 10.5% ; Framsóknarflokkur (Progress Party) 25.3% ; Alþýðubandalag (Socialist Party) 17.2%:; and Samtök frjálslyndra og vinstri manna (Union of Liberals and Left Wingers) 9.0%, this last party first participating in the 1971 election.[1] The last 12 years, or three election periods, Sjálfstæðisflokkur and Alþýðuflokkur have had the majority in the Alþing and formed the government. However, as of June 1971 Framsóknarflokkur, Alþýðubandalag and Samtök frjálslyndra og vinstri manna have the majority in the Alþing and form the government.

The government formed by Sjálfstæðisflokkur and Alþýðuflokkur was considered conservative by comparison with the

---

[1] These are the 1971 percentages.

present center-left coalition. As regards educational policy there are only insignificant differences to be noticed between these governments. The proposal for revised educational jurisdiction initiated by the former government and debated in the 91st legislature 1970-1971 was with relatively minor revisions resubmitted by the present government to the 93rd legislature 1972-1973.

Religion

The Norwegian settlers in Iceland, largely vikings, brought with them their pagan faith of Ásatrú. In the year 1000 the legislature, Alþing, of the republic took up Christianity as the national religion. The last Catholic bishop, Jón Arason, was executed in 1550. At present over 97% of the nation belong to the Evangelical Lutheran Church, the national church of the country.

Some religious groups operate small private schools in Iceland. These, however, are few and have only a minor influence on the educational system.

Government and Education

Education in general is under the jurisdiction of the Ministry of Education. The Minister of Education is one of seven members of the cabinet of the President of the Republic and is usually also a member of the national legislature.

Responsible for implementing programs relating to schools and education in general, taking care that educational laws and regulations are obeyed, and collecting

school operation reports, is the State Superintendent of Education, who comes under the jurisdiction of the Minister of Education. For this purpose supervisors and specialists cooperate with local school boards and principals, give guidance on instructional methods, and evaluate instructional courses, school facilities and other matters related to education. In 1968 a partial reorganization of the state education administration took place in Iceland according to which the State Superintendent's Office became a department in the Ministry of Education.

The Ministry of Education has an Educational Research Department, that prepares proposals and plans for curricula, management of examinations, textbooks, teaching materials and other related matters for elementary and secondary schools. The Minister remains responsible for the final decisions. Educational Boards of three to five members are locally elected for the school districts with the exception of the chairman, who is appointed by the Minister of Education. School financing, facilities and development is the joint responsibility of the Financial and Planning Department and the Building Department of the Ministry of Education. These departments, in collaboration with the local authorities, submit to the Minister plans and proposals for schools and facilities.

In the 1973 revision of educational legislation referred to later, some changes have been made in the administrative structure. The central administration remains under the Ministry of Education, which is responsible for policy,

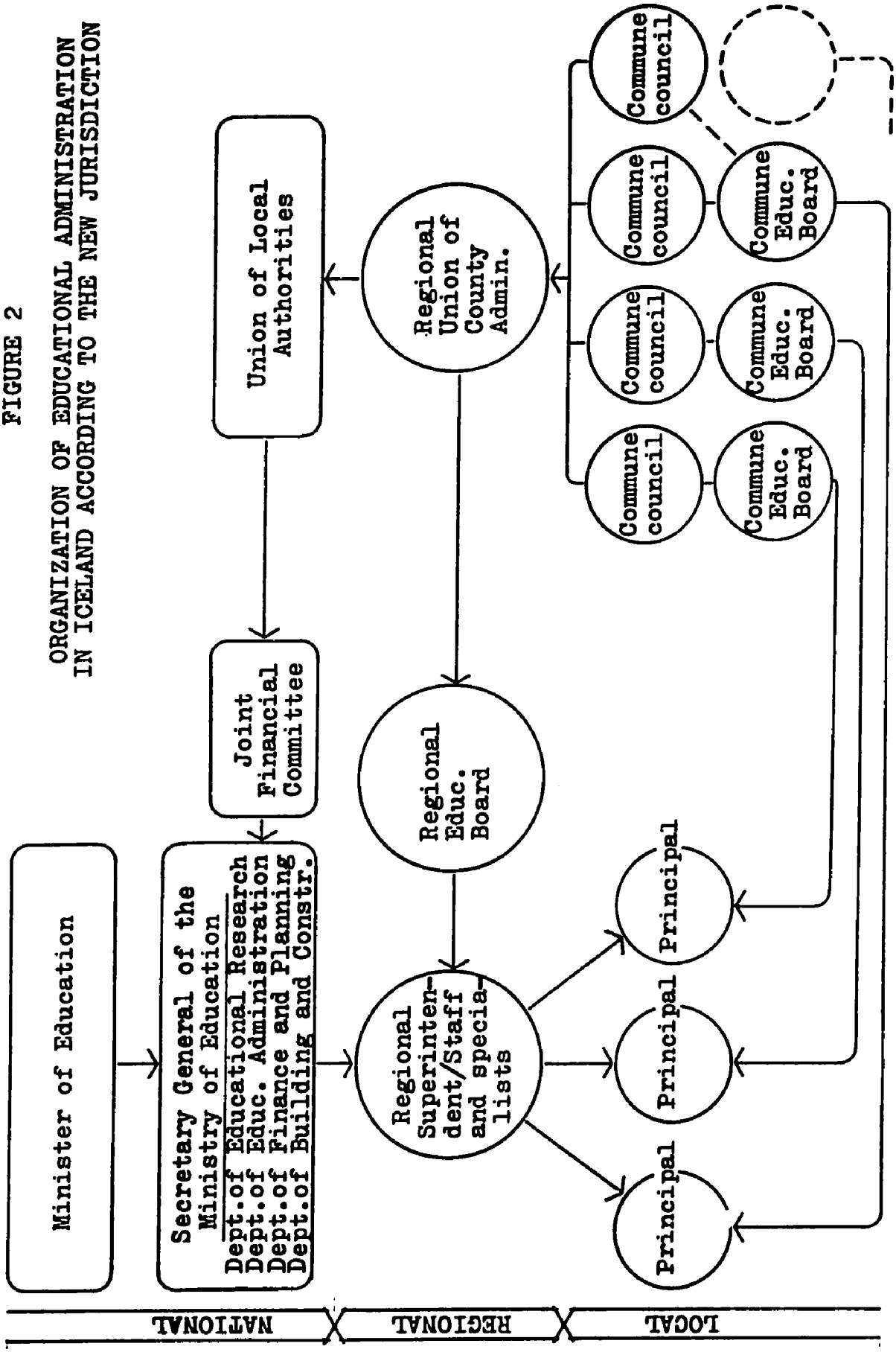
organization and control at all levels. An advisory council of ten members, appointed by the Ministry, advises the Ministry on methodological, technical and other educational matters for the compulsory school.

Another major change is the decentralization of the State Superintendent's responsibility to supervise the implementation of the law, and its regulation, into the eight regional superintendents' offices. The regional superintendents, appointed by the Ministry of Education on the recommendation of a five or seven member locally elected regional educational board, are to represent the Ministry of Education as well as the local communities. In their role as connecting links between the Ministry of Education and the local authorities they act as managers for the regional educational boards. The regional superintendents direct and supervise educational matters within their respective regions and are responsible for furnishing the Ministry of Education with annual financial plans.

Each school district has a publicly elected school board of three, five, or more members varying according to the number and size of communities included. The school boards are responsible for attendance of all children of school age in their district at a compulsory school, and for the provision of adequate facilities. The commune (municipal) council and the school boards in collaboration with the regional superintendents furnish the Ministry of Education with proposals for improvements and new constructions of school facilities. See Figure 2.

FIGURE 2

ORGANIZATION OF EDUCATIONAL ADMINISTRATION
IN ICELAND ACCORDING TO THE NEW JURISDICTION



Most schools in Iceland are public schools, and attendance is compulsory between the ages of seven and fifteen. They are all coeducational and tuition is free. Of the total student body, one percent or less receive elementary education in private schools, run with or without financial aid from the state. Some private specialized schools, such as musical conservatories, art schools, and commercial schools, receive state subsidies. All subsidized private schools are subject to supervision by the Ministry of Education. Some individual schools in specialized fields are under the jurisdiction of related ministries; agricultural schools, for example, come under the Ministry of Agriculture.

The University of Iceland comes under the overall jurisdiction of the Minister of Education, but has internal self-government. The Rector of the University is the chief officer, and the University Council is its governing body.

Educational Financing

The public schools, elementary and secondary, are financed jointly by the government and the municipalities; facilities investment and maintenance 50%, and teacher salaries 100%, by the government; facilities investment and maintenance 50%, and utilities 100%, by the municipalities. The gymnasiums and the University are maintained entirely by the government. Individual schools in specialized fields are financed by the government and/or by related organizations in

these fields.

In 1956 2.5% of the Gross National Product was spent on education. The figure for 1966 was 3.5%. For the years 1971 and 1972 5.0% of the GNP was spent on education, and the same proportion is planned for the year 1973. This amounts to 3,750 millions out of the estimated GNP of 75,000 million Icelandic krónur. Additionally, about 1.0% of the GNP has been spent annually on cultural activities and research during the last decade.

Educational Development

Education in Iceland has always been held in high esteem, and in spite of the difficulties involved, it has been achieved by a relatively large proportion of the population.[1] As has been stated, the educational system is paid for by the government and municipalities, and it has been the policy that each individual, regardless of where he lives, should have access to all the education available. Primary education has been offered in schools in the villages, but in the countryside schools have been set up temporarily in the largest farms, with a teacher and ten or fewer children of different ages in one class. Secondary education has been provided in the larger villages and in a few relatively large schools with dormitories, serving larger areas. The

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[1] A rescript from the king of Denmark, dated in the year 1790, requires that reading instruction should begin before the age of five; delay until the age of seven entailed a fine.

gymnasiums[1] have been located only in the larger cities and towns, Reykjavík, Akureyri and Ísafjörður, and a small one in the countryside at Laugarvatn. The University of Iceland in Reykjavík, has provided education for clergy, lawyers, doctors, economists, and for Bachelors and Masters of Arts in most of the humanities. Thus the University has fulfilled the need for higher education, except in most of the technological and natural science areas, for which people have had to seek their education abroad.

All public-operated or subsidized schools in Iceland form one school system. That is to say, the pupil can move from one school, or district, to another throughout the country without an entrance examination. At the same time an effort is made to maintain a certain level of instruction so that each student, whether he plans further studies or not, receives certain basic tuition relevant to his interests and abilities.

The Icelandic school system falls into the following stages (see Figure 3 and 4):

Primary schools: Six years' schooling for ages seven to thirteen.

Secondary schools: These range from two years in the less populated districts to four years in the larger towns. The curricula of these secondary schools comprise two main types: the academic and the vocational.

Gymnasiums, vocational and special schools: The

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[1] Senior high school and first part of college.

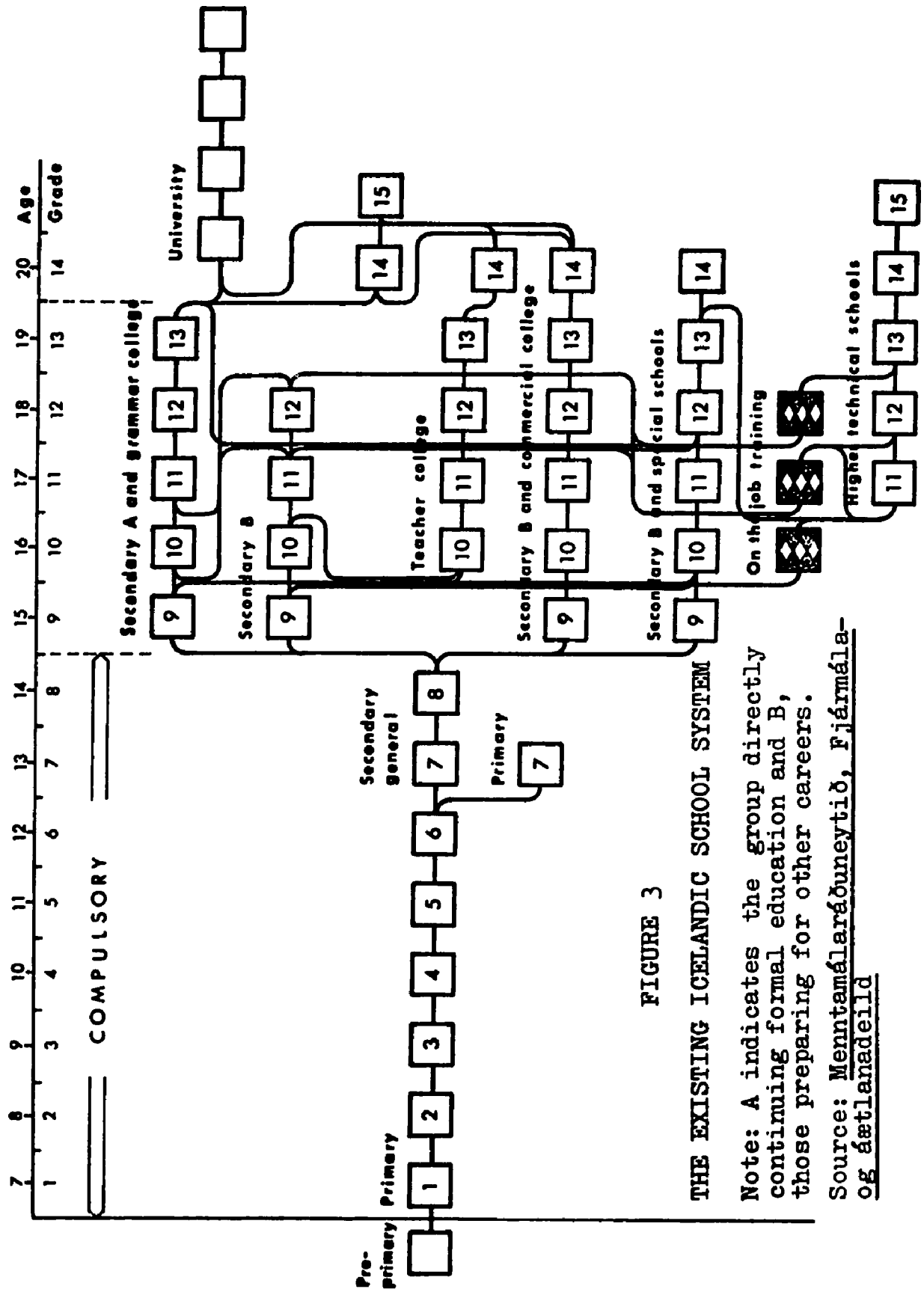


FIGURE 3

THE EXISTING ICELANDIC SCHOOL SYSTEM

Note: A indicates the group directly continuing formal education and B, those preparing for other careers.

Source: Menntamálaráðuneytið, Fjármála- og áætlanadeild

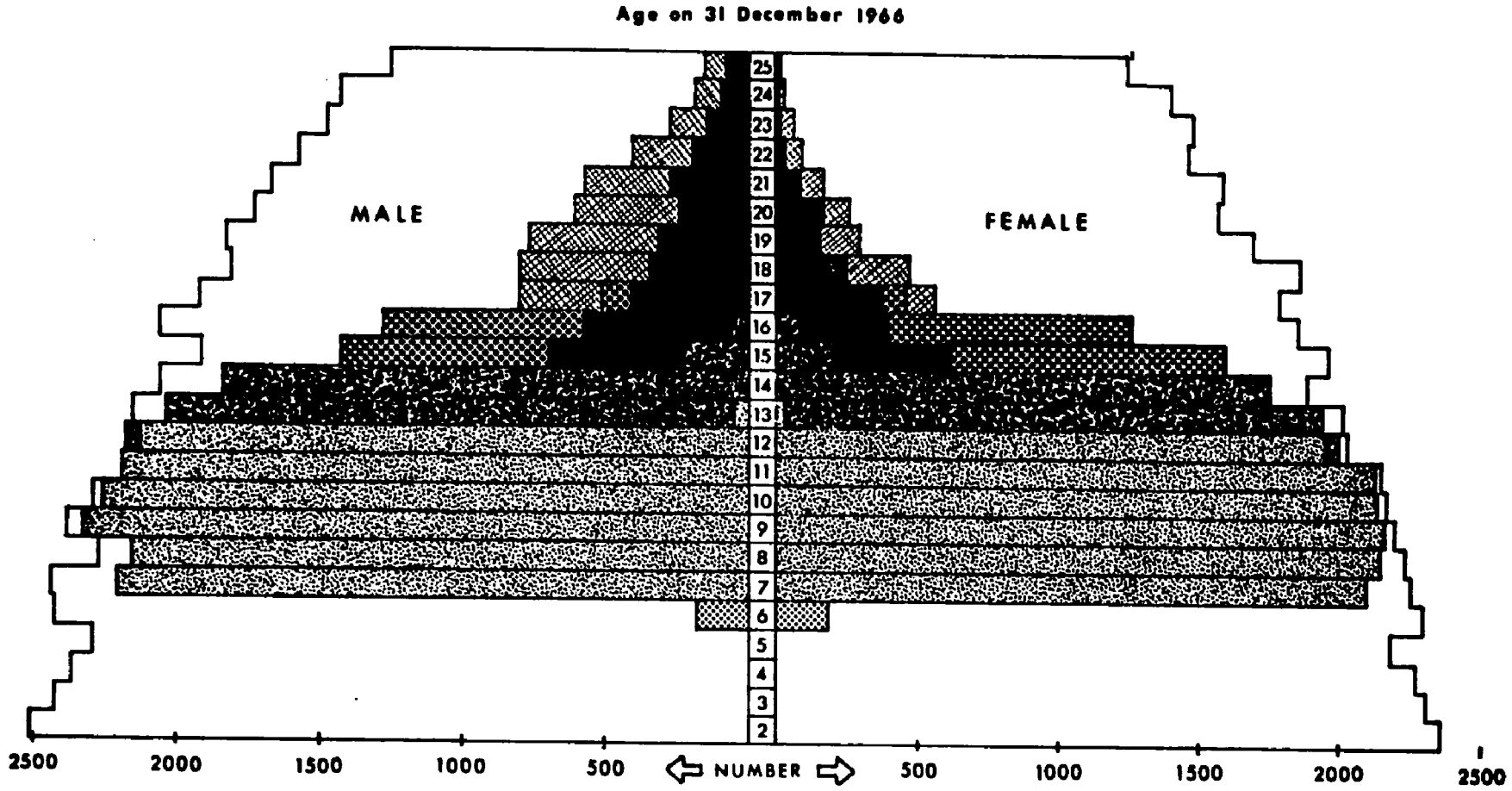


FIGURE 4

AGE-PYRAMID FOR THE SCHOOL-AGE POPULATION, SHOWING SCHOOL ENROLLMENT 1966-67 ACCORDING TO THE MAIN EXISTING SCHOOL-TYPES

Source: Menntamálaráðuneytið, Fjármála- og áætlanadeild

gymnasiums' (grammar colleges) curriculum involves four years after the third year of secondary school and requires good grades from the academic option. After the first year the instruction divides into three lines: mathematics and physics, natural sciences, and languages. Additional lines in social sciences, and modern and classical languages are offered in some schools. After the examination known as stúdentspróf, admission to the University is automatic. The Commercial College of Iceland and the Teachers' College of Iceland also train for the stúdentspróf, with the right to automatic admission to the University.

All children are required by law of 1946 to attend school between the age of seven to fifteen. Permission to start school at the age of eight, however, and to terminate compulsory schooling at the age of fourteen, can and has been granted to school districts. Local authorities can also be granted permission to extend compulsory schooling up to the age of sixteen. In the cities, some 18,400 children receive education in 37 primary schools, in which the proportion of pupils to teachers is around 24:1; outside the cities 9,200 pupils are in 142 schools, averaging 16 pupils to a teacher (as of 1970).

During the last decade, especially the latter half, a considerable development has taken place in most areas of the Icelandic educational system. The Educational Research Department of the Ministry of Education has prepared a comprehensive program for the revision of the elementary and secondary curriculum, and for the development of revised

and new texts and teaching materials. Vocational and special schools are in rapid development and the University of Iceland is expanding at an accelerating rate, with the provision of teaching in new fields like engineering, biology and social sciences.

The following solutions to the problem of education in the rural areas have been applied during recent decades. The first is the replacement of the temporary schools on the farms by permanent primary schools. Depending on location, the child is transported to and from school daily, or is boarded. For secondary education the countryside makes use of the village schools, but this requires the child to live in the village, a necessity which is costly and has been rather unpopular. Another more favored solution is to build schools with dormitories in the countryside. Because of low population density in the rural areas these schools serve large districts and have been combined with the primary schools.

Boarding-type rural schools, including even those built in the most recent years, have been designed as informal experiments by contracted architects. No comprehensive guidelines or functional analysis of the educational program requirements have been available. It has become increasingly apparent to the Icelandic government that there is a need for such guidelines. Meanwhile the only regulation applied has been with regard to a limit on maximum floor area paid for by the government.

Factors Accounting for Change

Recent decades have seen large changes in Iceland as

in most other rapidly developing countries. Advanced technological methods and mechanization in fishing and farming as well as in light industry and the development of services have caused a great demand for technically trained and educated people. But the present educational system as a whole lacks some of the necessary flexibility to incorporate effectively the technical education and specialized training needed to meet these changing demands. As a result the Icelandic government has undertaken an intensive study and revision of the entire educational system. These studies are expected to produce changes in programs and curricula, making greater demands and necessitating greater complexity in buildings and equipment.

The Icelandic government's effort to reconstruct the educational system in Iceland has now reached the point of revising the educational legislation. At the same time the curricula for the compulsory school, i.e. for ages from seven to sixteen, has been revised or is under revision.

In the 91st national legislature 1970-1971, a proposal for the revision of educational legislation was debated, but not passed. In revised form this bill was resubmitted late in 1972 and debated by the 93rd legislature. With some minor revisions the bill has been resubmitted in October 1973 to the 94th legislature and is presently under debate.

The major changes initiated in this bill provide for compulsory schooling in a single unified institution named grunnskóli (basic school), nine years (grades) of continuous schooling from age seven to sixteen. Following this there

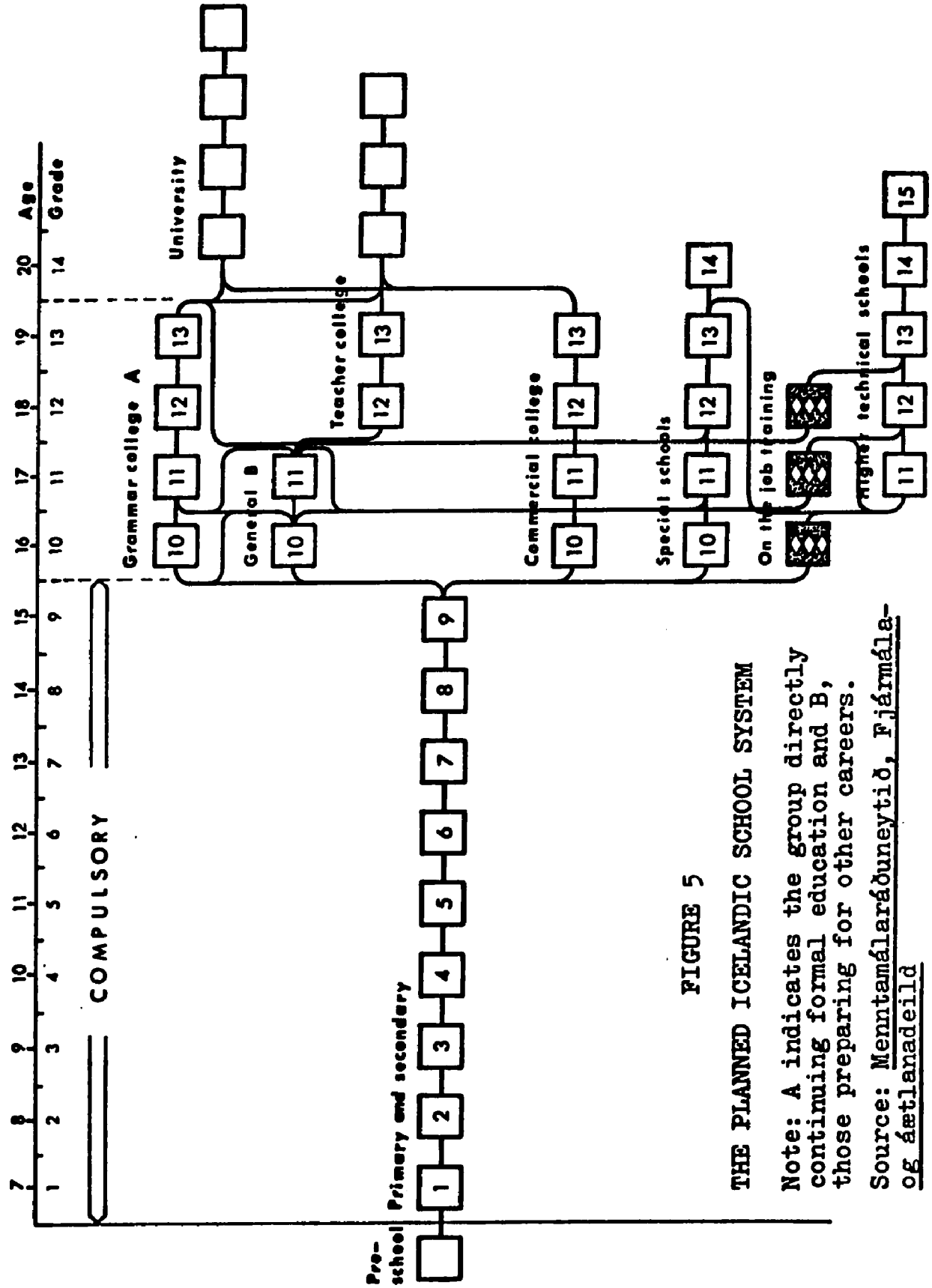


FIGURE 5

THE PLANNED ICELANDIC SCHOOL SYSTEM

Note: A indicates the group directly continuing formal education and B, those preparing for other careers.

Source: Menntamálaráðuneytið, Fjármála- og æðtlanadeild

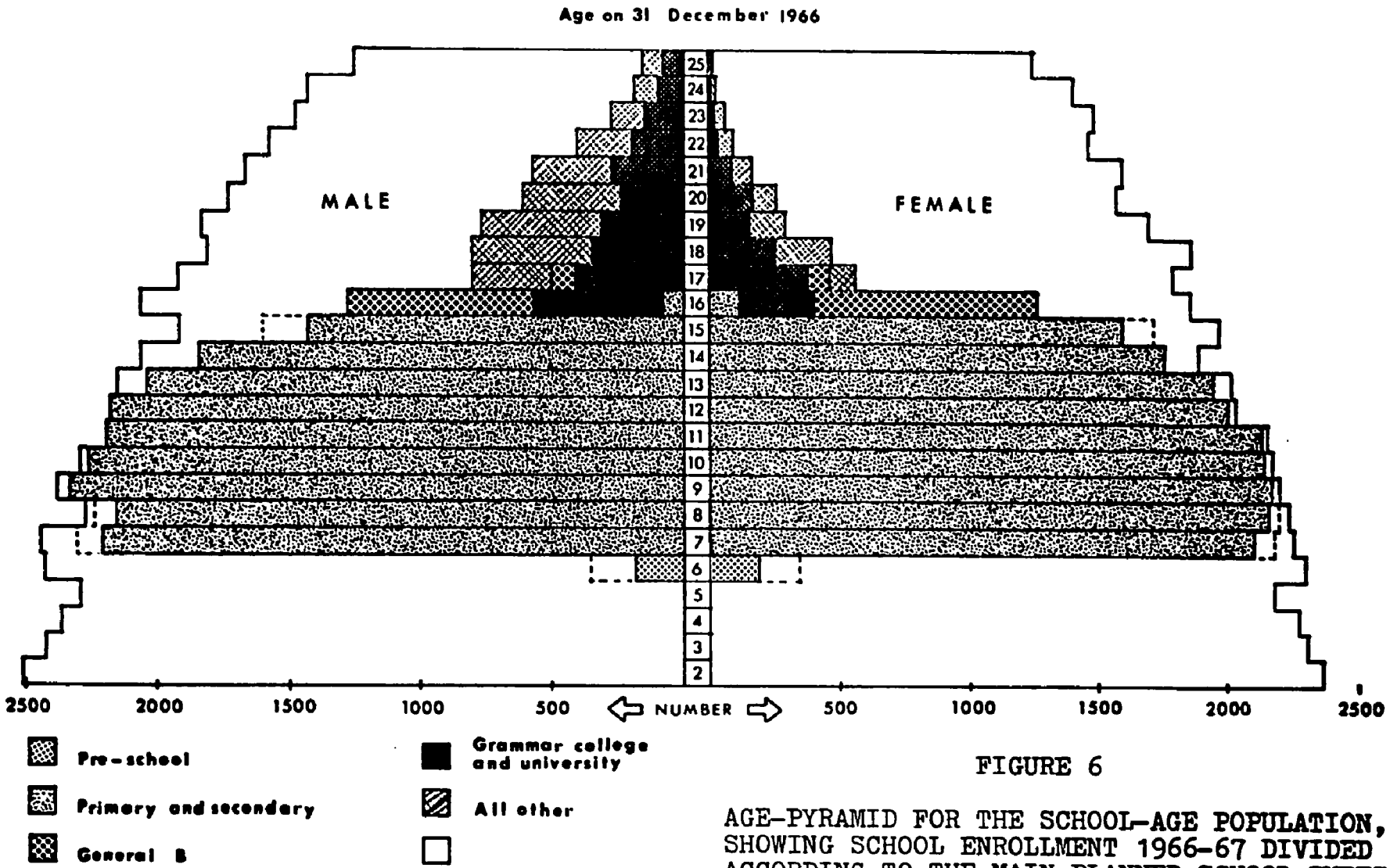


FIGURE 6

AGE-PYRAMID FOR THE SCHOOL-AGE POPULATION, SHOWING SCHOOL ENROLLMENT 1966-67 DIVIDED ACCORDING TO THE MAIN PLANNED SCHOOL-TYPES

Source: Menntamálaráðuneytið, Fjármála- og áætlanadeild

will be four, or eventually three, years of gymnasium, vocational and special school attendance. See Figure 5 and 6.

The major academic objective implicit in the compulsory school laws is a system of basic education available to all youth, including those preparing for vocational or other careers.

The social aim is to assist families in bringing up capable and openminded members of a continuously developing society, fully aware of Icelandic history and culture.

Furthermore, the revision suggests a longer annual school attendance, increased weekly school hours in grades one through six, and an expanded curriculum.

The government's policy commits it to provide this basic education equally all over the country. Advanced education, gymnasium and/or technical and specialized education will be provided in the major cities and areas of greater density of population only.

Another major policy change initiated by the revised educational legislation is, as mentioned above decentralization of responsibility for the implementation of the law and regulations, into the eight regional superintendents' offices.

In recent years the following factors have developed and are intensifying the need to consider new concepts of school facilities: 1) policy development with regard to curriculum and educational legislation; 2) changes in school population; 3) more effective use of transportation and communication; and 4) the need to preserve the national character while undergoing rapid development and an

accelerating rate of change.

STATEMENT OF THE PROBLEM

It is evident that the existing educational facilities in the rural areas, such as described earlier in this paper, will not adequately meet the changing requirements of educational programs to be introduced in the next decade. There is no doubt that new criteria must be introduced in order to achieve the new educational goals and priorities. One of the chief elements in the establishment of these criteria is a more effective use of the resources at present being spent on educational facilities in Iceland.

The initial task to be tackled in this study is the determination of the kind of schools, or facilities, which will be the best solution to the problem of providing the rural population with access to the revised curriculum, besides fitting these facilities into the new overall educational system being developed by the government.

The basic question is - how can this new compulsory educational program be carried out in the rural areas, fulfilling the requirements of longer school time and new methods of instruction that usually demand expensive equipment and complex facilities ? Following in importance is a second question - what tools in terms of educational facilities are the most appropriate for this task ?

This study therefore attempts to determine guidelines for the design of such educational facilities, focussing on the kinds of facilities, their performance requirements and

conceptual solutions.

NEEDS FOR THE STUDY

No comprehensive survey of school building needs in rural Iceland has ever been made. Similarly, no functional analysis of the educational program requirements for the performance of facilities is available. It is assumed that the new, revised curriculum and the revised school policy for the compulsory stage, as mentioned earlier, will bring about a considerable change in the appropriate physical facility requirements.

A rapidly developing road transport system and increased technology in communication have opened new perspectives which need to be explored.

In the past decade more than one fourth of the rural population has not enjoyed full access to education according to government policy because of the lack of physical facilities. It is therefore necessary, in order to fulfill these commitments, that in the near future a considerable number of new facilities be provided. It is assumed that this will be done.

In order successfully to implement the national educational policy, a clear determination of school building needs together with an investigation of available alternative solutions is necessary.

The determination of the kinds of facilities, their performance requirements and their conceptual solutions, is of primary importance for the architect, to enable him to

cope successfully with the design.

It is of utmost importance that this investigation be carried out at the present time in view of the studies now going on in Iceland under the direction of the Ministry of Education. This situation provides an opportunity for coordinating the redevelopment of the educational system with the development of the appropriate architectural tools to be used for its realization.

The specific objective of this study, as mentioned above, is to furnish recommendations for the future development of educational facilities in rural Iceland. But it is hoped that it will also contribute something to a general understanding of the ways in which scientific knowledge can be used as an aid to architecture, without letting such procedure become the architectural goal - it is, then, an effort to apply rather than to accumulate knowledge. Today the supply of cumulative knowledge greatly exceeds its application in the field of architecture and any further effort at application will be beneficial.

SCOPE OF THE STUDY

Because of restricted time and resources available this study has been limited to the kinds of facilities their performance requirements and conceptual solutions. The study does not include the technological aspects of the school buildings.

As stated above, the greatest need in this area at the present time is for a study of the architectural program

requirements and the appropriate conceptual solutions. It is from these factors that the highest benefits are to be gained.

As stated, the government's policy commits it to provide basic education equally all over the country. The program of advanced education, gymnasiums and/or technical and specialized schools, will be provided only in the major cities and areas of higher density of population, and these are not included in this study.

The objectives of this study are to utilize the present resources and available knowledge to establish conceptual solutions for the design of educational facilities in rural Iceland. It will also be a goal to develop these recommendations in conceptual rather than quantitative forms wherever possible.

It is recognized that the setting of goals and priorities for education is inappropriate in this study. With a knowledge of the educational goals, however, one can determine the necessary architectural requirements for the facilities in which these educational goals are to be achieved. This determination can not be freed completely from value judgements, priorities and standards, although the main environmental qualities will remain to be determined in the architectural design. Keeping in mind the nature of schools, and that there are few institutions in our present society in which the occupants stay as long and under such compulsion as in public schools, we will need to consider the question of environmental factors no less than the

factors of utilitarian performance.

FRAMEWORK OF ANALYSIS

A common viewpoint today is that technological methods are the best tools available to solve most problems, including problems in the field of architecture. It is known, however, that at present we do not have extensive scientific knowledge and technology available for determining the design solution. Human value judgement necessarily enters into a great many design decisions, and this approach seems to have led to the most successful results.

In the architectural design process, the method with the highest potential for producing an optimum environment and at present available is creative thinking, trained insight or intuition. Nevertheless, many scientific methods and sources of information are available for determining the performance requirements of facilities and for organizing those requirements into a comprehensive and useful form. Use of these methods and sources through comprehensive programming is one of the ways most likely to insure the satisfactory performance of a facility, and can be considered the aid most useful for the designer.

The planning for and of educational facilities and services is here approached as a design problem. The search is for a solution that satisfies most adequately most of the requirements determined by utilitarian performance and by

value judgement.[1]

In order to plan for and to design the educational facilities and services, certain predictions must be made of user needs and requirements. Gathering and analysis of data required for developing such predictions has been undertaken.

Another major consideration has been the investigation and comparison of techniques and methods used to solve parallel problems in isolated rural areas in the United States, Scandinavia, and other parts of the world with more developed educational systems. Because of differences in desired performance and economic systems, and in the priorities to be served, very few foreign developments and inventions have direct application for the Icelandic schools. Nevertheless, an investigation of these schools in other countries created a point of reference which is useful for a solution of the Icelandic problem.

The determinants for rural school facilities, which are the subject for consideration in this study, can be divided into two groups: the first, those not considered as subject to change, and the second, those whose change can be the subject for recommendations within the scope of this study.

Basic Facts and Underlying Assumptions

The first group of determinants - i.e. those not considered to be subject to change - can in turn be divided

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[1] In fact the latter requirement is not subject to scientific analysis since there are no satisfactory measurement criteria in existence.

into three categories: 1) factors not considered to be subject to change within the viewed spectrum; 2) factors whose change can be predicted, or partly predicted; and 3) factors which are not predictable and whose character is assumed for the purposes of the study.

Within these three categories the following factors have been given primary consideration:

1. Geographical condition.
2. Population.
3. Educational policy.

Main Variables

The second group of determinants - i.e. those whose change is suggested as a part of a solution within the scope of this study - are here called variables. Although development of these factors can be assumed to follow a path and are therefore to some extent predictable, they are nevertheless considered potential means to support the solutions suggested by the study.

These factors are:

A. Artificial boundaries.
B. Transportation.
C. Communication.
D. Curriculum implementation.

Analysis

The analysis and correlation of the above mentioned factors as regards the establishment of needs and performance

requirements relating to location, kind and student capacity of the facilities, constitutes the first step of the research and is reported in the following chapter under the title "Planning for the Facilities".

Viewing the problem in a wider spectrum as set forth in Development Index[1] revealed the necessity of extending the time scale of the study beyond the period for which quantitative predictions are accurate.

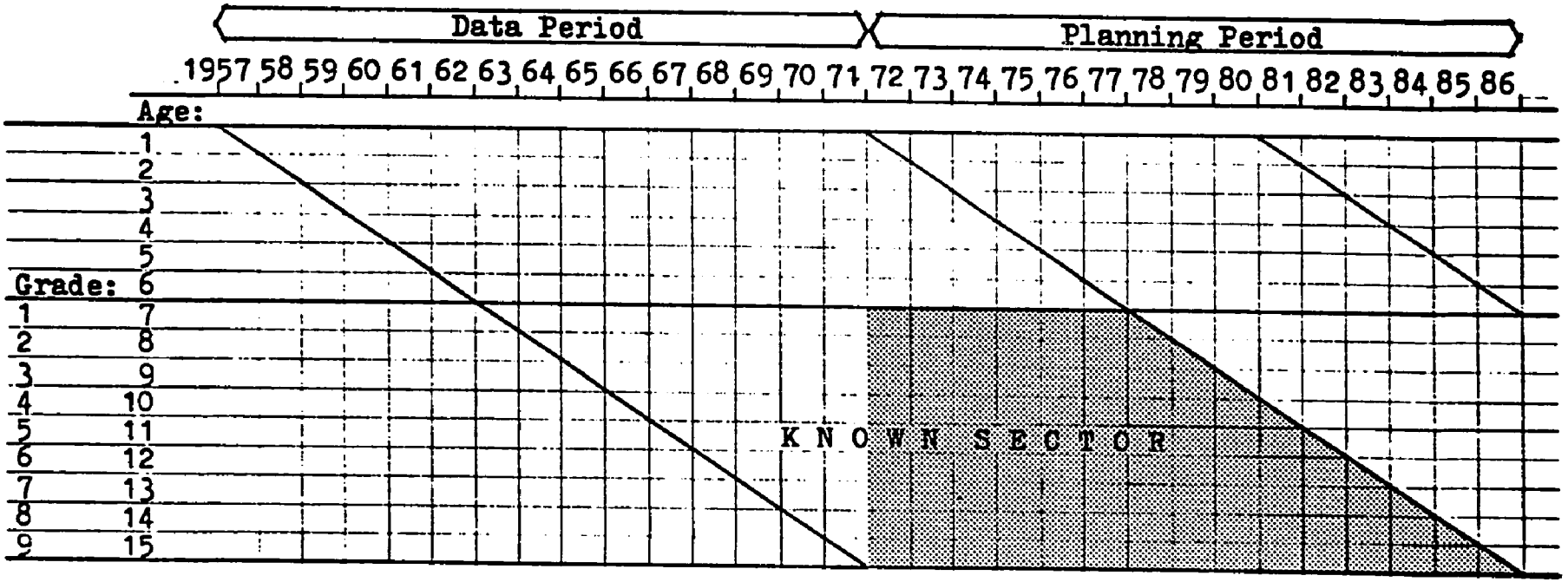
The dynamic character of the educational services is such that long-term planning is difficult. However, the number of school-aged children for the next seven years is known. So also is half of the school population during the subsequent nine-year period (see Figure 7). This leaves migration the only undetermined factor for school-aged population during these periods. In view of the relatively stable settlement location in Iceland, the period of fifteen years, from 1972 to 1986, is selected as a planning period. The planning for this period is in terms of a prediction of the main determinants based on the past fifteen-year period from 1957 to 1971. By projecting the planned trends into the future through another period of fifteen years from 1987 to 2001 and by evaluating the plans in the light of these forecasts, evaluation of those plans is conducted. This evaluation brings into focus the direction of the planning period on the assumption that development will continue in

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[1] K. Lönberg-Holm and C. Theodore Larson, Development Index (University of Michigan, 1953).

FIGURE 7

YEAR OF BIRTH AS RELATED TO SCHOOL AGE IN THE DATA AND PLANNING PERIOD



the same direction. See Figure 8.

In chapter III, under the title "Planning of the Facilities", the facts, assumptions and variables are interrelated in order to establish the desirable building performance criteria. On this basis conceptual solutions and design concepts are formulated.

The final step is the actual design itself.

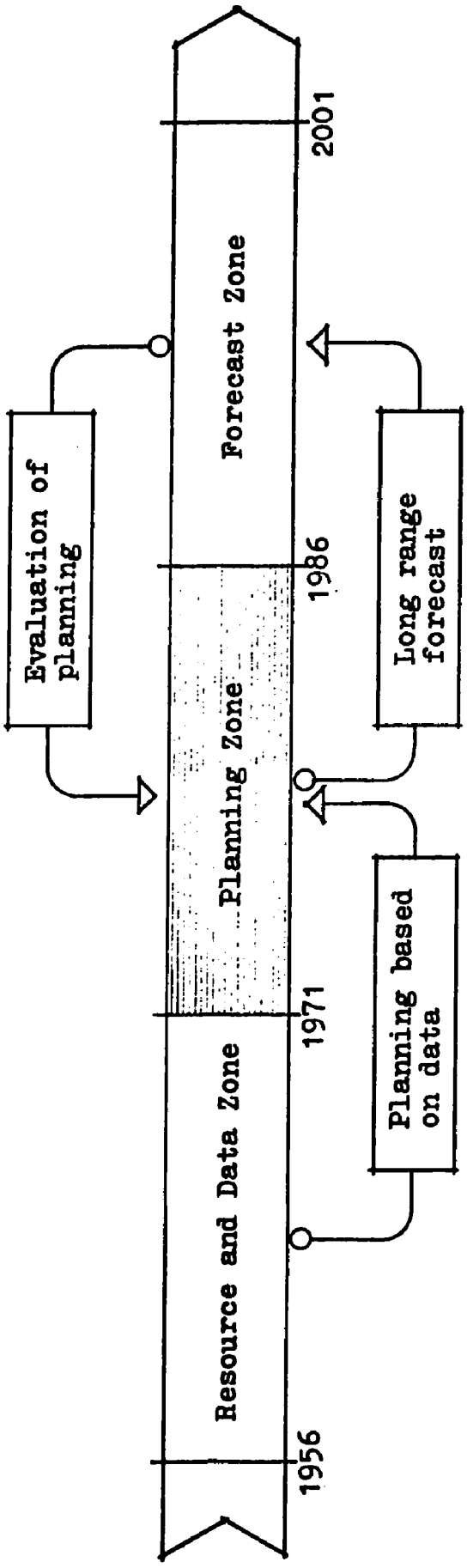


FIGURE 8

PLANNING AND FORECASTS RELATED TO TIME

CHAPTER II

PLANNING FOR THE FACILITIES

INTRODUCTION

In order to analyze the performance requirements for rural school facilities a broader question must first be answered: what kinds of facilities are the most appropriate to provide Iceland's rural population with access to education according to the government's policy commitment ?

This chapter deals with this question and seeks to come to a positive conclusion.

Two main tasks have been undertaken: First, an investigation of the present governmental policies, opinions, and planning, and of the measures taken for their implementation; and second, an analysis, verification and supplementation of such measures, according to the conclusions drawn in this study from the analysis of the underlying data.

In the following analysis these two main tasks have been conducted concurrently in order to achieve clarification and to prevent repetition.

All the data and facts from the current governmental studies were made available by the Ministry of Education as

source material for the research undertaken here (see page 15). References are given throughout the analysis to these governmental sources and suggestions.

ALTERNATIVE SOLUTIONS

In the investigation of school facilities in differing rural areas around the world, the focus has been on sparsely populated areas with seasonal transportation difficulties. The research has involved a study of available literature, interviews with specialists, and the acquisition of information by mail. The conclusions arrived at merely confirm that solutions to the problems of a scattered population are relatively few, and most are already widely known and applied.

Transporting the child to and from school every day is the most favored solution, and used wherever possible. Where transportation by bus or other means is very difficult, or impossible, boarding in different forms is used. The situation in the U.S.S.R., where residential schools are used for social reasons, regardless of density and transportation, is an exception.

In the United States several measures are applied to enhance the small schools' capacity to offer high quality programs. As examples may be cited the use of electronic devices, including television in different forms, audio-visual equipment, correspondance courses, in-service training for teachers, etc. There are also mobile units like specially equipped buses and trains, which may be circulated from one

locality to another and thus serve as supplements to numerous facilities over a large area.

The literature reviewed has included social and economic educational planning, educational facilities (notably the reports published by Educational Facilities Laboratories, Inc.), communication techniques (particularly new developments), and environmental behavioral research related to educational facilities. This research will be referred to as appropriate in the following chapters.

Study of this literature revealed several solutions now in use which constitute physical arrangements for the educational services. These methods, as used in Iceland, include daily transport to and from school, full time boarding schools, and boarding schools shared in alteration.[1] Among the less frequent alternatives not currently being applied in Iceland are the alteration of school attendance with home work assisted by modern communication techniques such as television; and the use of mobile school units to supplement regular facilities.

The Icelandic solutions to be considered should comprise the following possibilities:

1. Daily transportation to and from school.
2. Full-time boarding schools.
3. Boarding schools to be shared in alteration.
4. Alternating school attendance and home work with the assistance of communication techniques.

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[1] Two distinct groups of children attend the school for alternating two-week periods.

5. Complete audiovideodidactic home study plan.
6. Mobile school units to supplement regular facilities.

In establishing priorities among these alternatives, it becomes clear that there are only two comprehensive solutions, i.e., daily transportation to and from school on the one hand, and full time boarding schools on the other. The other alternatives, with the exception of a complete audiovideo-didactic plan (which is not available at present), are a mixture of the two comprehensive solutions.

As regards the first two alternatives, strong arguments support the daily transportation to and from school wherever possible. Only two of these arguments need be mentioned: 1) the unfavorable social impact on the rural family of youngsters' being absent from home for up to nine months in a year, from the age of seven to sixteen; 2) the substantially higher cost in both the capital investment in the residence buildings and in the expenses of their operation.

The Ministry of Education has estimated for the year 1973 the following approximate expenses: Transporting the child 13,000 kr.; operating a residence, excluding the food price, which is paid by the parents, 24,000 kr. The initial cost, or investment per student in residence is 960,000 kr.

A preparatory study for this work undertaken in 1971, which focussed on the future development of transportation in Iceland, indicated a considerable and accelerating increase in the road transport system in the near future. The substance of this previous investigation will not be

presented here - for the purposes of this present study, it is assumed that a significant development and improvement will be made on the road system during the next decade. It is further assumed that these improvements will permit daily transportation of school children to a greater extent than is possible at present. In making this rather basic assumption it is recognized that opinions about the daily transportation of school children differ among governmental and local agencies as well as the general public. Nevertheless, statement giving preference to the policy of daily transportation wherever possible was added to the compulsory education bill of 1971 in its revision late in 1972.

The third comprehensive alternative, i.e. a complete audiovidiodidactic home study plan, is, as mentioned above, not available at the present time. Moreover, despite rapid developments in the technology of two-way vidio telecommunication which can be expected to make the requisite educational machinery universally available at moderate prices within a few years, an audiovideodidactic system as a comprehensive alternative for the planning period of 1971-1986 appears unattainable because of the lack of appropriate programming and methodological skills.

This approach, however, has already shown such powerful potentialities, as pointed out by Larson,[1] that there is

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[1] C. Theodore Larson and K. Lönberg-Holm "Role of Mass Media of Information and Communication", Plan Europe 2000: The Future is Tomorrow, 17 Prospective Studies, published under the auspices of the European Cultural Foundation (The Hague: Martinus Nijhoff, 1972).

good reason to regard it as an important supplementary alternative during the planning period. Advances in this technology may radically alter the entire image of education in Iceland during the forecast period 1987-2001. As its first application will be in the acquisition, organization, and storing of knowledge, it does not necessarily involve obsolescence of the concept of school facilities. A shift in the patterns of their use would more likely be the result, especially in regard to school residences. Whatever course the development may take, the impact of such a system on education in the future is likely to be revolutionary. The effects of such development on the facility itself will be discussed in chapter III.

Mobile school units are considered only as a possible supporting device to supplement various school facilities. A mobile unit, or a large truck equipped with features too expensive to be purchased by an individual facility, which could be circulated among many facilities, would be feasible and conceivably economical. Its possible introduction does not invalidate conclusions reached in this study as to the location of school facilities.

DATA AND THEIR ANALYSIS

To establish the location and kind of facilities, from which information the capacity requirements were formulated, the following data were considered relevant and have been analyzed.

In this analysis the original parameters set forth and

the variables categorized above appear in various combinations (see page 24 and 25). Attention has been focussed on the significant characteristics of the following factors which have application in the final facility designs:

1. Curriculum organization.
   a. Age grouping, the compulsory stage.
   b. Major aims implied by the programs.
   c. Required, or recommended school time.
2. Population.
   a. Settlement pattern and concentration in different areas.
   b. Population growth.
   c. Projection for school-age population. The number of school-age children over a 15-year period in rural and urban areas.
   d. Migration pattern.
3. Geography.
   a. Natural boundaries.
   b. Artificial boundaries.
   c. Weather.
4. Transportation.
   a. Road patterns and distances.
   b. Road conditions.
5. Present school facilities.
   a. Location and capacity.
   b. Expected useful lifetime.

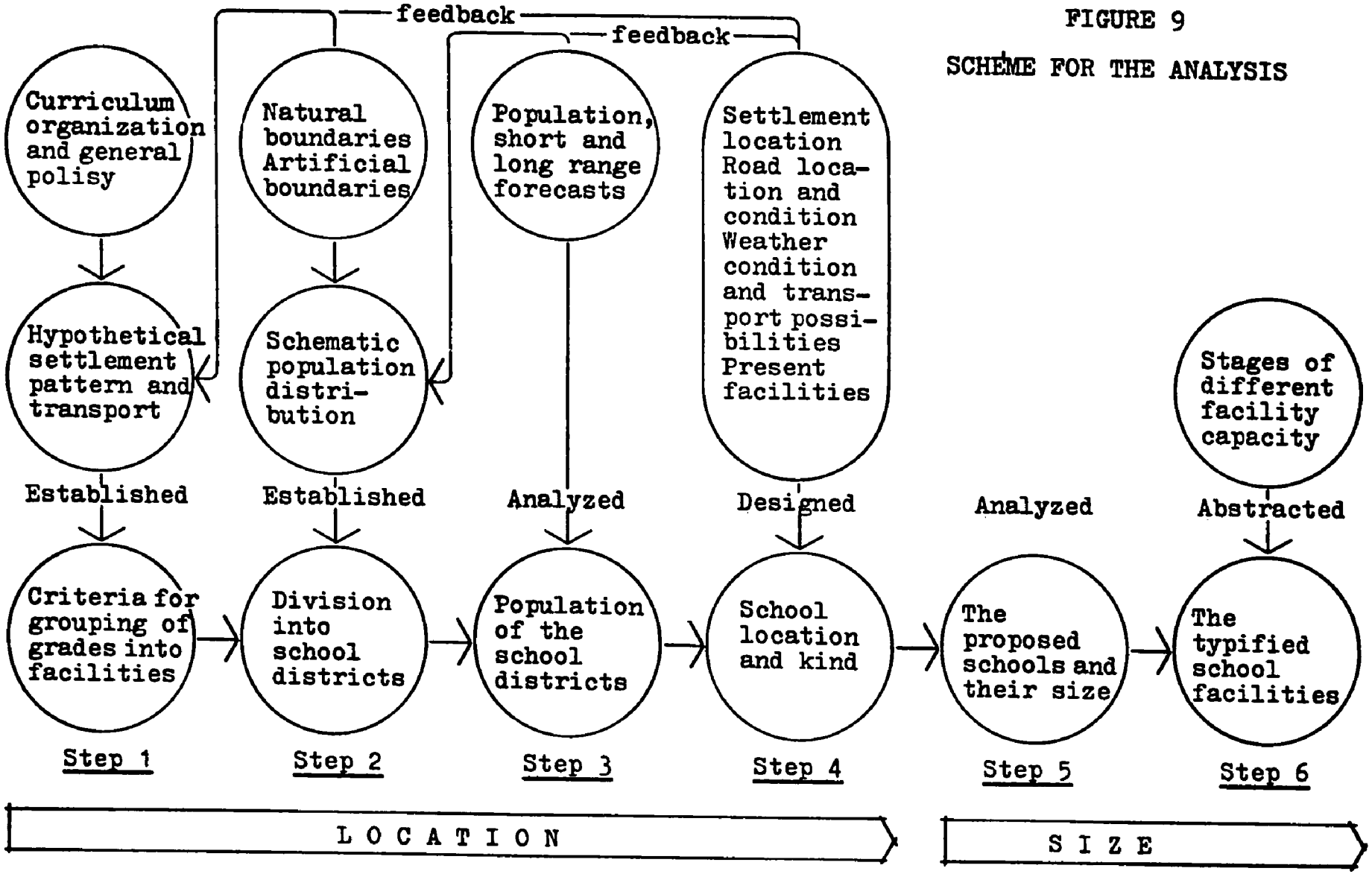
In the analysis of data the following sequential steps have been taken (see Figure 9).

Step 1. Based on the curriculum organization and a hypothetical scheme for settlement pattern, the criteria for a grouping of grades into facilities were established.

Step 2. Based on natural boundaries, artificial

FIGURE 9

SCHEME FOR THE ANALYSIS



boundaries, schematic population distribution, and in light of Step 1, a division into school districts was established.

Step 3. Based on population forecasts for the planning and for the forecast periods, and in light of Step 2, the population structure of the school districts was analyzed.

Step 4. Based on settlement location, road location and condition, weather conditions, transport possibilities, present facilities, and in light of Steps 1, 2 and 3, the school location criteria, including the kinds of schools and transport routes, were established.

Step 5. Based on the information established in Steps 1 to 4, and on the student population, the student structure of each proposed facility was analyzed.

Step 6. Typified school facilities were distinguished according to relevant criteria governing their individual capacity requirements.

Since most of the above described data and variables are cross-related, constant reference backwards and forwards was required throughout the entire analysis.

Criteria for the Grouping of Grades

Curriculum Organization and General Policy. As earlier mentioned, the key document to the facts underlying this study was the bill known as grunnskólafrumvarp, "Proposals for Compulsory Education Legislation". This bill presented to the 91st legislature in 1971, and debated in revised form by the 93rd legislature is since October 1973 in its 2nd revision being debated by the 94th legislature.

Paragraph three of the proposed law for the compulsory school states:

> Grunnskóli er níu ára skóli, þar sem fram fer barna- og unglingafræðsla.
> Hann getur verið ein stofnun eða skipt í einingar, tvær eða fleiri eftir því sem menntamálaráðuneytið ákveður að fengnum tillögum hlutaðeigandi fræðsluráðs.
>
> The compulsory school is a nine-year school in which primary and secondary education takes place.
> This school can be one institution, or be divided into units, two or more, as the Ministry of Education decides, according to suggestions received from the individual district Educational Boards.
>
> (Translation M.J.)

In notes attached to the bill which was presented to the legislature the following alternatives for division of grades into institutions are suggested: 6+3, 7+2, 3+6, 3+3+3, 4+3+2.

In terms of curriculum the most obvious points of change occur between grade 3 and grade 4, when science and foreign languages are introduced, and between grade 7 and grade 8 since elective courses intended to provide some alternative lines of study are offered in grades 8 and 9 (see Table 1).

Paragraph 48 of the aforementioned proposed law states:

> Í fámennum skóla, þar sem nemendur 1.-6. bekkjar eru á mismunandi aldri saman í deild, skulu ekki vera fleiri en þrír aldursflokkar saman í bekkjardeild; þó skal heimilt að hafa 1.-4. bekk saman í deild. Hámarksfjöldi nemenda í bekkjardeild skal að jafnaði vera þessi:
> a) 12, ef aldursflokkar eru fjórir;
> b) 17, ef aldursflokkar eru þrír;
> c) 22, ef aldursflokkar eru tveir.
> Fræðslustjóri getur, þegar sérstaklega stendur á aukið nemendafjöldann um allt að fjóra nemendur í bekkjardeild, gegn aukningu kennslumagns með fjölgun tíma eða skiptitímum. ....
>
> In small schools grades 1-6, where pupils of different ages are together in classes, no more than 3 age groups

TABLE 1

DISTRIBUTION OF SCHOOL HOURS AMONG SUBJECTS AND WEEKLY SCHOOLTIME

Subject Matters	Number of Weekly 40-minute School Sessions								
Grades	1	2	3	4	5	6	7	8	9
Icelandic (incl. reading)	7	7	7	6			5	5	5
Writing	3	3	3	2	1				
Mathematics	4	4	4	5	5	5	5	5	5
Social studies	3	3	2						
Religion			2	2	2	2	1		
Social studies (incl.hist.&geog.)			2	3	3	3	3	3	)4
Geography							2	2	)
Biology				3	2½	2½	2	2	)
Physics and chemistry					1½	1½	2	2	)3
Danish				3	4	3	3	3	)
English						3	3	3	)4
Music (incl.vocal lessons)	2	2	2	2	2	1	1		1
Art (handcraft, sewing, drawing)	2	3	3	4	4	5	4	4	3
Home economics							1	1	1
Physical education	1	2	2	2	3	3	3	3	3
Electives							2-3	4-6	7-10
Total sessions a week	22	24	27	32	34	35	37-8	37-9	36-9

Note : Permitted fluctuation of one session a week. The ratio of interval period to teaching session being 15 minutes to 100 minutes.

Source: Grunnskólafrumvarp, paragraph 45, and Andri Ísaksson, Oct. 1973.

shall be in one class. It is permitted, however, that grades 1-4 be in one class. Maximum number in classes shall in general be:
a) 12, if grades are four;
b) 17, if grades are three;
c) 22, if grades are two.
The district superintendents can, in particular cases, increase the number by up to 4, provided that there is increased teaching time or partly divided classes. .....
(Translation M.J.)

Paragraph 49:

Í 7.-9. bekk grunnskóla skulu deildir eigi vera færri en aldursflokkar þeir, sem skólann sækja.
Til þess að 8.-9. bekk grunnskóla verði haldið uppi í skólahverfi, má meðalfjöldi nemenda í deild ekki vera minni en 15, nema að fenginni heimild menntamálaráðuneytisins.

In grades 7-9 of the compulsory school, classes shall be no fewer than the age groups represented in the school.
In order to offer grades 8 and 9 in a school district, the average number of students in a class shall be no less than 15, except by permission of the Ministry of Education.
(Translation M.J.)

As has been stated earlier, the daily transportation of the child to and from school, wherever possible, has been assumed and accepted as a criterion for the purpose of this study; this is in accordance with recent policies of the Ministry of Education as stated in the 1973 bill (see page 15 and page 36). In the notes attached to the bill, paragraph 4, there is a discussion of the difficulties relating to the first two grades in areas where residential schools exist and where daily bus transport is impossible. The solutions suggested are small school units for those grades operated as branches from the main schools, and utilizing community houses or the like within each community.

According to the 1973 bill, the regular school year is

nine months, from 1 September to 31 May

Exceptions can be granted to districts in connection with seasonal employment and transportation difficulties. This permission can, however, be granted for a minimum of 7 months in grades 1-3, 7½ months in grades 4-6, and 8 1/4 months in grades 7-8.

The bill plans for a 6-day schoolweek but on the request of the districts' educational board the Ministry of Education can grant permission for a 5-day week on condition that the daily and monthly school-time be adjusted so as not to affect the total annual school-time (see Table 1).

Interviews with the governmental specialists of the Ministry of Education, and the planning suggestions and policies made to different local districts planning for new facilities in the last year or two suggest the following size-limiting requirements: 1) two lines, or programs, offered for grades 8 and 9, 2) schools offering grades 6-9 and also, wherever possible, grade 5, are to have on their staff at least 4 or 5 teachers to allow for specialization, 3) age group teaching for grades 6 and 7 and also, if possible, grade 5.

<u>The following criteria have been abstracted from the curriculum and governmental policies</u>:

1. Nine years' compulsory schooling as a continuous unit divided into two or more facilities.
2. Grouping of grades and division into facilities according to the following requirements:
   a. Two lines or programs offered for grades 8 and 9

b. Schools with at least 4 or 5 teachers for grades 6 through 9, and, where possible, grade 5.
c. Age-grouped classes for grades 6 and 7, and also, if possible, grade 5.

The following criteria, approximating the leading governmental opinions and policies, have been set up and applied:

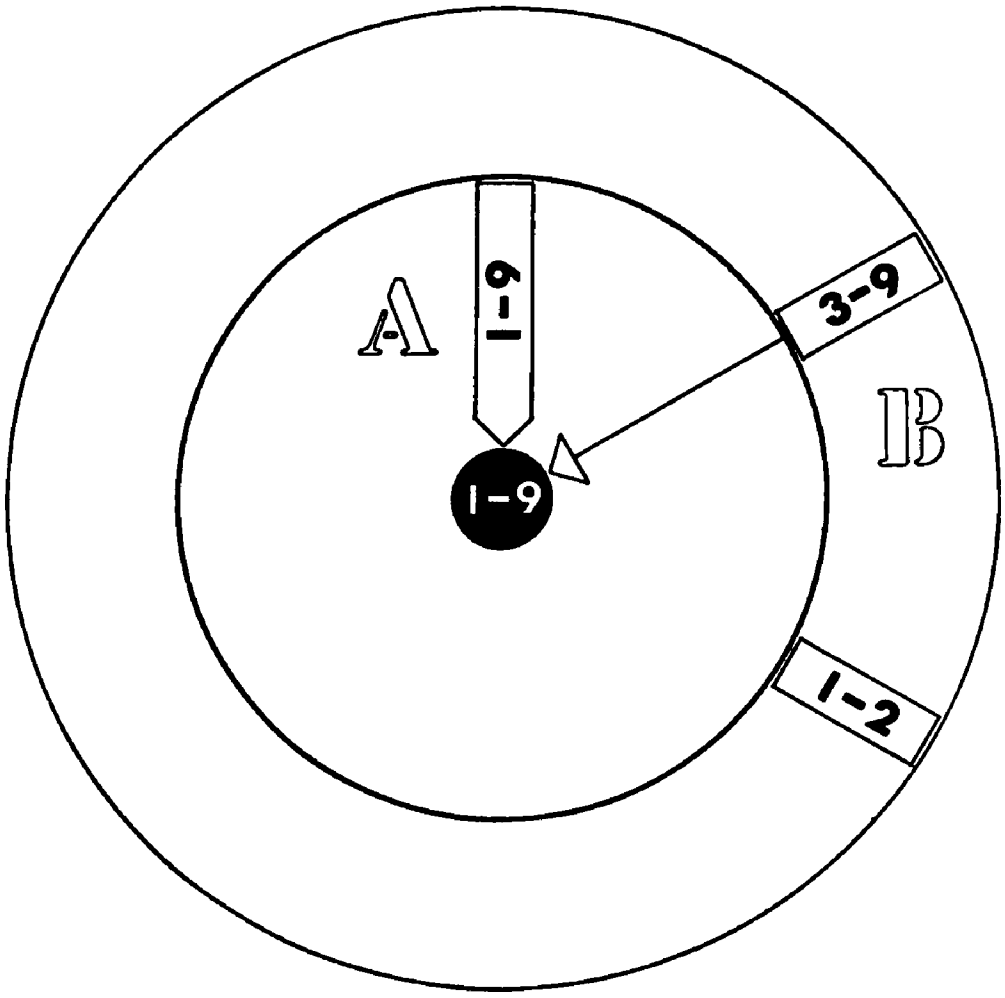
1. Transporting the child daily to and from school, used wherever possible in preference to school residence.
2. A maximum transportation distance of 25-30 km, equivalent to 45 minute driving time each way.
3. A maximum walking distance of 1.5 km to school or bus.
4. A five day school week in rural areas.
5. Residential living not demanded of first and second grade. If first and second grade children are out of reach from small one-class school units (10-15 pupils) a home study program is to be developed.
6. Grades in residence, especially third to fifth, to be transported home during weekends, wherever possible. See Figure 10.

Hypothetical Scheme for Settlement Pattern and Transport. From the factors of natural boundaries, settlement location, road location and condition, weather condition and transportation possibilities, presented under the subsequent headings of this chapter, a hypothetical scheme for settlement pattern and road transport was created (see Figures 11, 12 and 13).

Based on the above data, policies and arguments, the

FIGURE 10

CRITERIA FOR USE OF DALY TRANSPORT AND SCHOOL RESIDENCES



A — Area from which transportation of grades 1 to 9, 5 days a week, is possible. i.e. the area of adequate roads, distance less than 25-28 km or less than 45 minute transportation time.

B — Area from which transportation according to the criteria set forth in A is not possible. Pupils beyond grade 2 from this area live in residences but are generally transported to home during weekends. Pupils of grade 1 and 2 in this area use home study programs, or other educational means.

FIGURE 11

HYPOTHETICAL SETTLEMENT PATTERN AND TRANSPORT, ONE SCHOOL OFFERING ALL GRADES

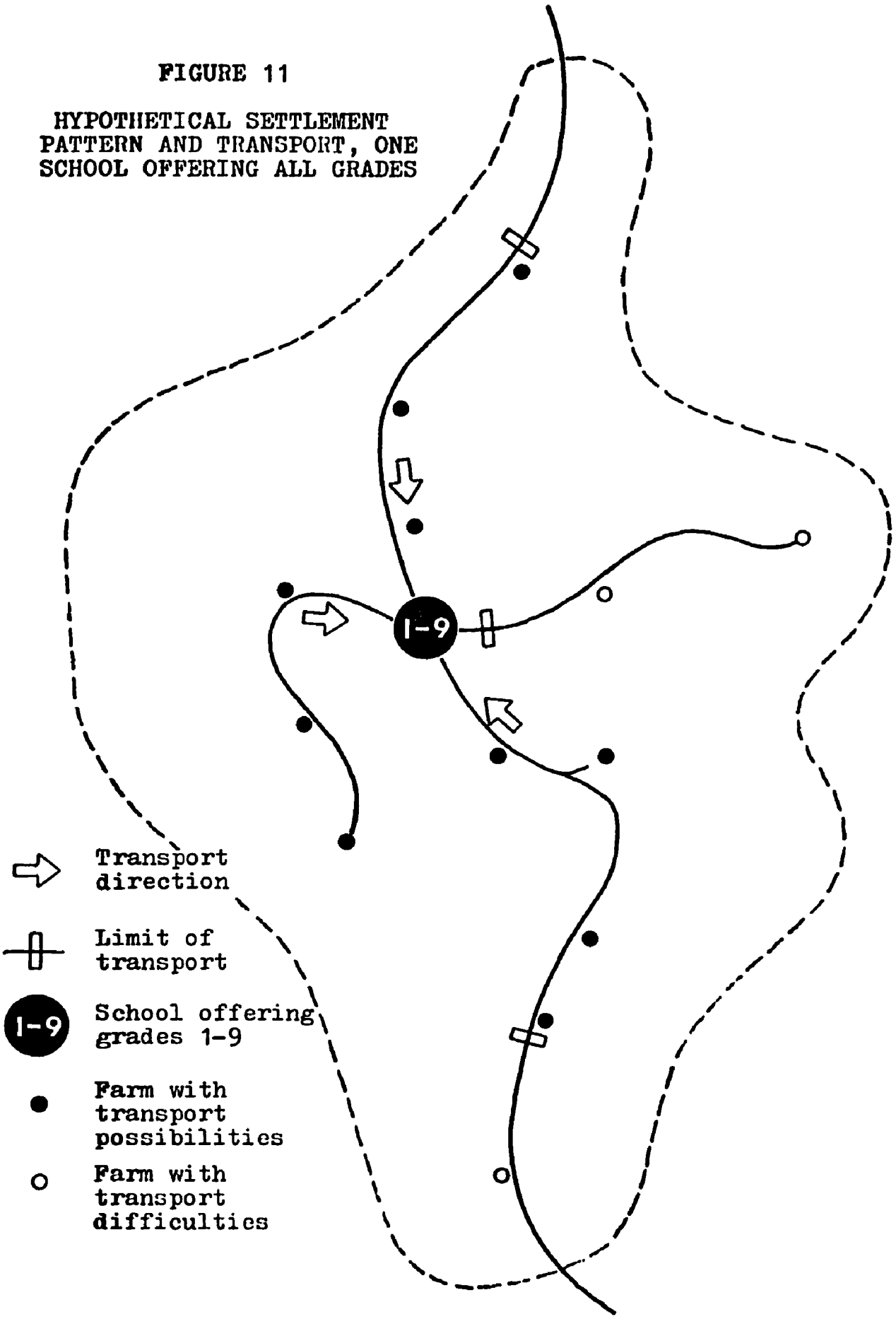


FIGURE 12

HYPOTHETICAL SETTLEMENT PATTERN AND TRANSPORT, HIERARCHY OF GRADES OFFERED

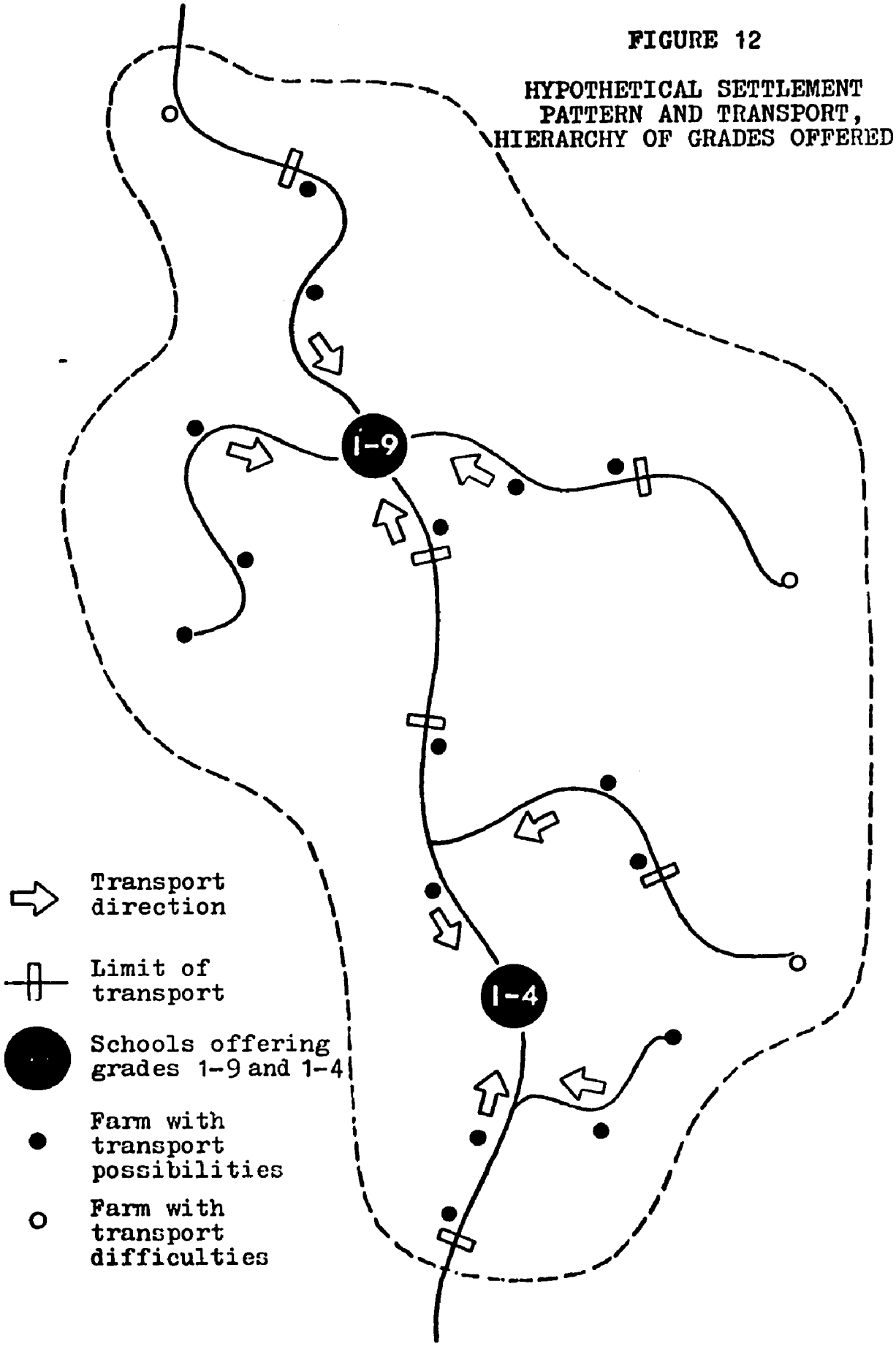
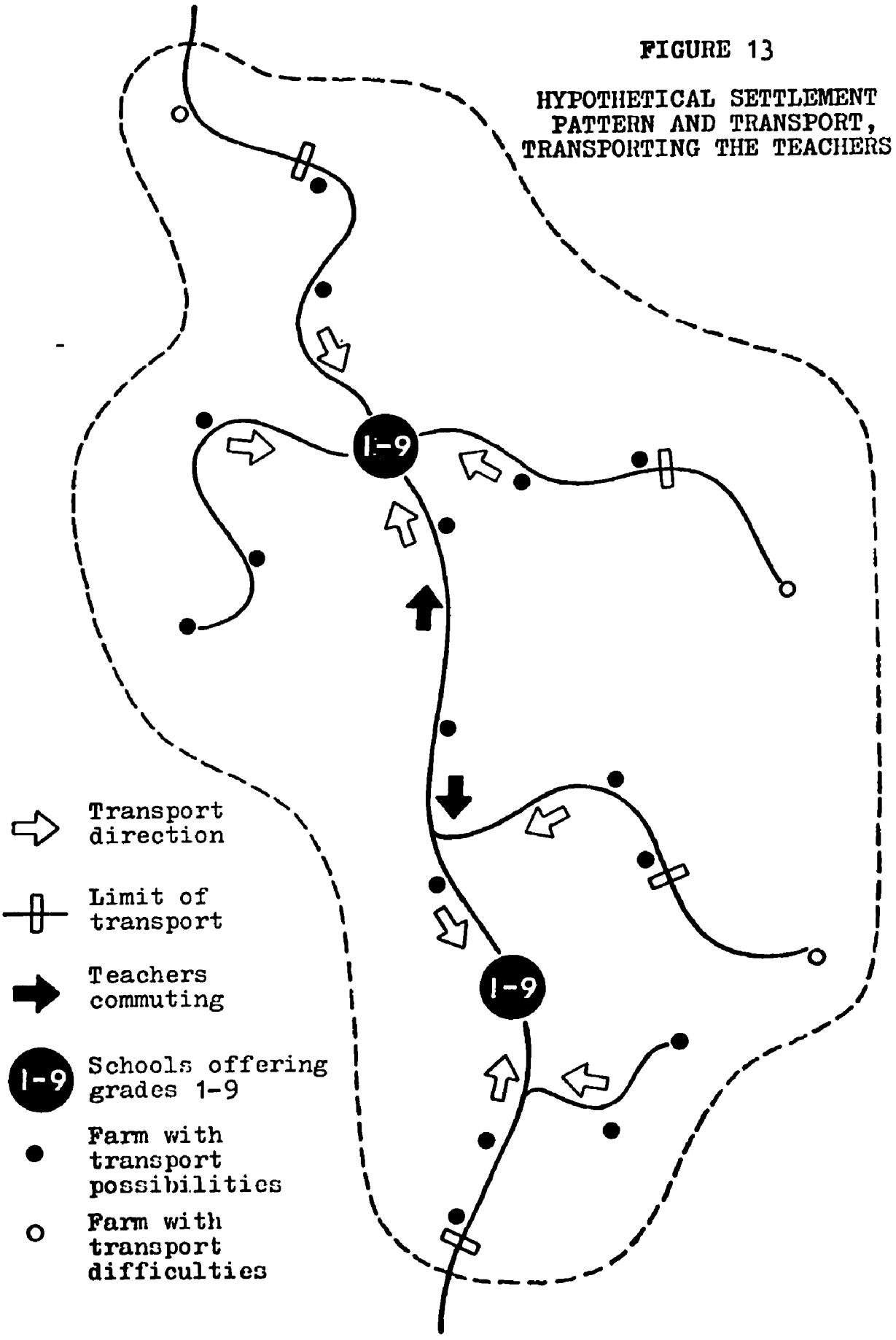


FIGURE 13

HYPOTHETICAL SETTLEMENT PATTERN AND TRANSPORT, TRANSPORTING THE TEACHERS



following criteria for the grouping of grades into a system of facilities were established. The basic units are three: 1-4; 1-7; and 1-9 (see Figure 14). The 1-4 school is a feeder unit to the 1-7 and 1-9 school, and the 1-7 school is a feeder unit for the 1-9 school. A 1-5 and a 1-6 school unit serve as an alternative where the number of students in grades 5 and 6 is relatively low; this raises the alternative possibilities of offering the same grades, or boarding the child, in another location. An alternative unit consisting of grades 1-4 and 8-9 only, occurs where substantial residential facilities already exist in a relatively unfavorable location. The 1-9 school unit in the villages differs from the rural unit offering the same grades both in its student body structure, since it is in some locations little or not affected by students from the feeder units, and in that most children can walk to school. See Figure 15.

The criteria are applied to the whole country with the exception of Reykjavík and Akureyri. A qualification is that another division of grades into facilities may be more appropriate in the larger towns where more than one facility is required; this does not, however, affect the system, as those facilities have the same location for practical purposes.

Division into School Districts

Natural Boundaries. Iceland measures some 500 km from west to east and some 300 km from north to south. The country consists broadly of a plateau of volcanic rock with an

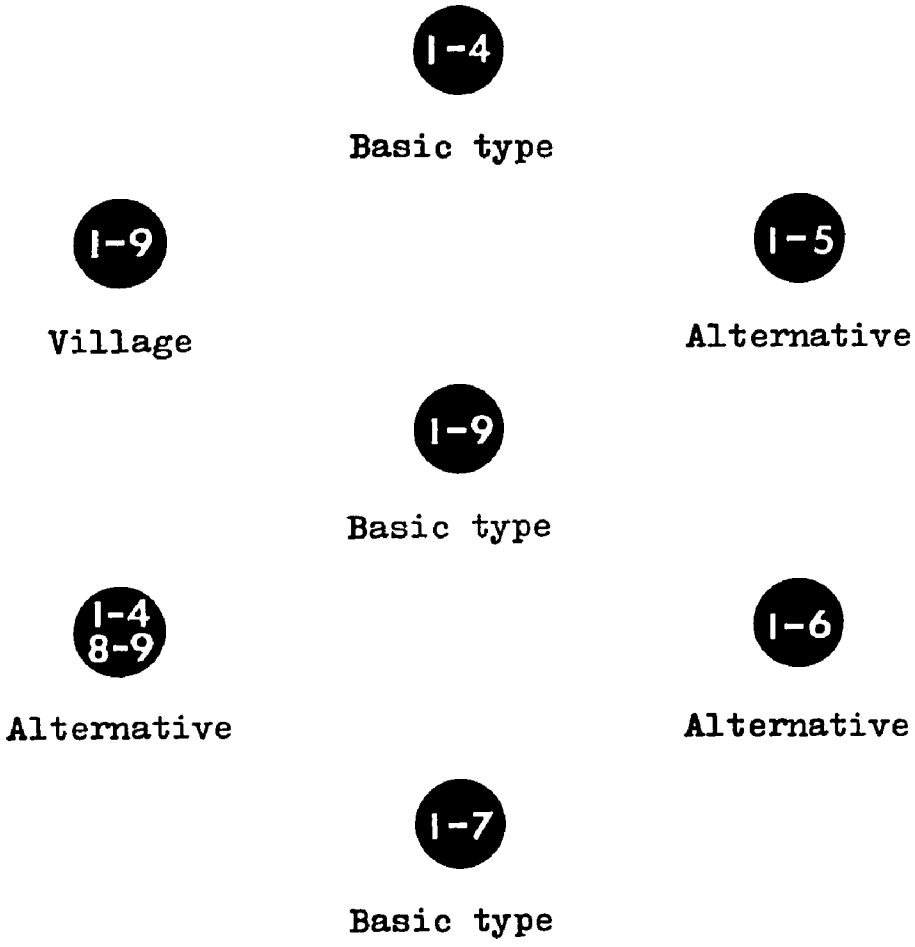


FIGURE 14

SUGGESTED TYPES OF RURAL SCHOOL UNITS

Note: Figures indicate grades offered.

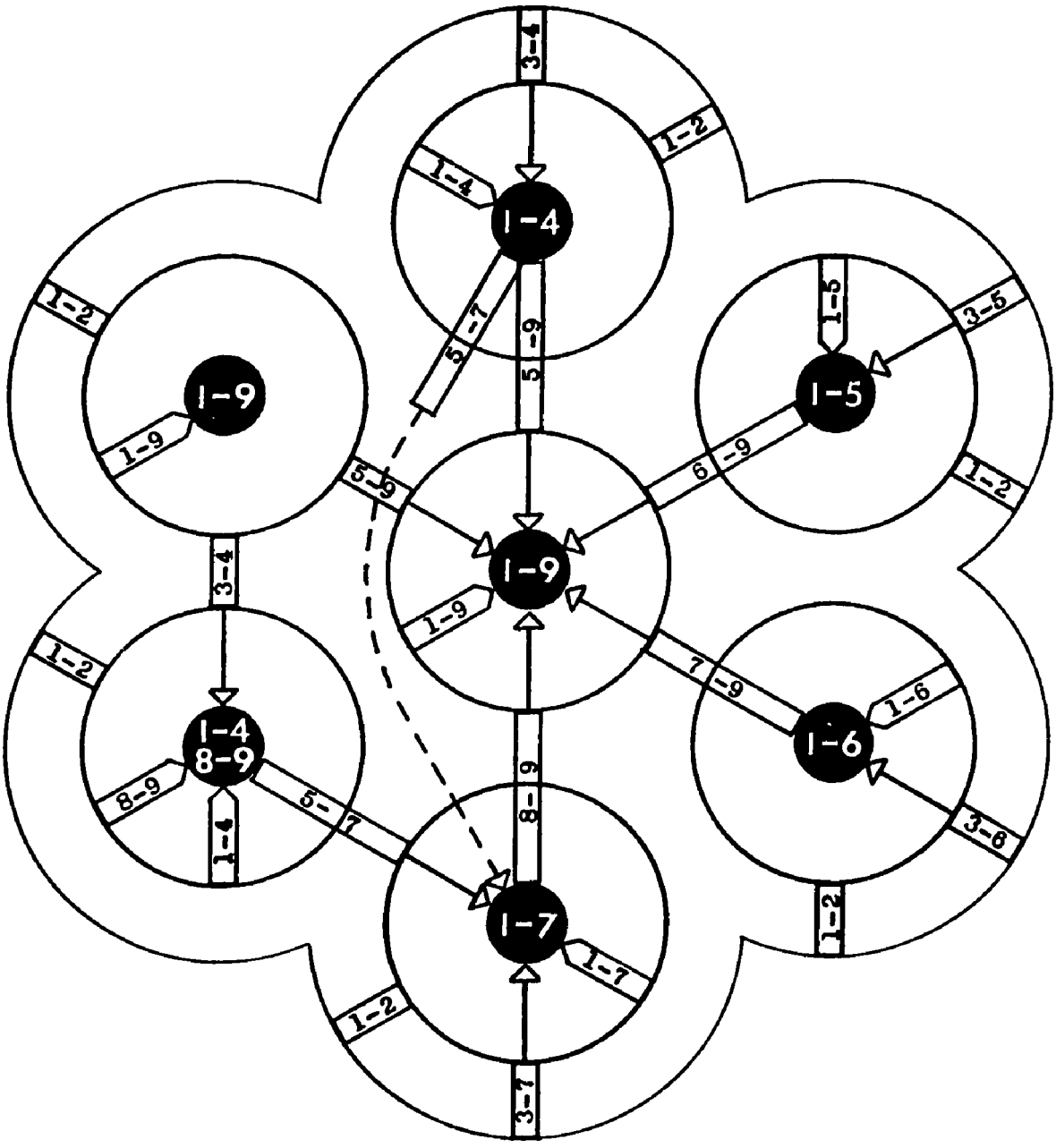


FIGURE 15

LOCATION OF GRADES IN SCHOOL UNITS AND RESIDENCES

Note: Figures in center indicate grades offered. Figures in arrows indicate grades commuting. Figures in boxes connected to arrows indicate grades in residences. Figures in boxes only indicate grades using home study programs.

average height of 600 m above sea level. About 17% of the country lie below 100 m.[1]

This small fraction of Iceland's land-area, the lowlands, the coastal strips in the fiords, and the valleys, is broadly speaking the arable part of the country, and contains virtually the entire population.

The largest continuous tract of lowland area extends from the Mýrdalsjökull on the south coast westwards to the eastern end of the Reykjanes peninsula. Another agricultural area extends from Borgarfjörður in the southwest to the southern side of the Snæfellsnes peninsula (see Figure 1).

Between these areas is the Reykjavík region, including the capital and more than half of the country's population.

From Mýrdalsjökull, east to Hornafjörður there extends a flat coastal strip formed by ice-fed torrents and rivers originating from the glaciers of Mýrdalsjökull and Vatnajökull.

The north-west peninsula and the east coast are indented with deep fiords, where the basalt plateaux meet the ocean. Almost vertical basalt walls rise from the sea to 600-800 m and there is only a narrow coastal shelf where the fishing villages and a few farms lie.

From the highlands in the center broad valleys descend towards the north coast. These valleys support agriculture and villages have risen at the coast. The Fljótsdalshérað region is also a prosperous agricultural area.

The high plateau of the center is covered with sand, lava and glaciers. These areas are devoid of vegetation

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[1] Björn Jóhannsson, The Soils of Iceland (Reykjavík 1960)

and entirely uninhabited. Rivers, fed by the glaciers and heavy rainfall, run towards the south and north.

Iceland's topography forces the country's land transport into a rigid pattern and forms strong natural boundaries. Available road locations are therefore severely limited. The lowlands and valley settlements are served by the primary road network. The fiord towns are connected with the network by less adequate roads; these are steep and winding, frequently climbing up to over 500 m, and in winter, subject to snowdrifts which render them impassable to most vehicles for long periods.

There are three basic types of natural boundary which affect the transportation and the school district division.

1. Mountain reaches dividing the lowlands, which connect only through mountain passes.
2. Major rivers, as obstacles to road systems.
3. Distribution and size of cultivable lowland areas.

Artificial Boundaries. The communes, hreppar, 211 in number, are the smallest units in the administrative structure of the country. Population statistics are collected on a communal basis.

The counties, sýslur, 23 in number, each including a number of communes, are the units next in size in the administrative structure. These are formed so that their boundaries are natural features such as high plateaux, mountains, rivers, etc. There are a few exceptions where minor rivers, or fiords, form the divisions. The county

division is very old historically, but socio-economically it is still quite up to date. This is not surprising and probably reflects the significance of topographical and other geographical conditions in the formation of socio-economic units. That the rapid technical development in communications during the recent decades has only begun to change the situation reflects the strength of the natural boundaries and geographical condition.

For descriptive and some administrative purposes Iceland is frequently divided into six main regions, landshlutar, each consisting of a number of counties which belong together geographically. See Figure 16.

Towns are considered as communes within counties. These have, however, a higher degree of autonomy than other communes. Other concentrations of population are separate communes or included for administrative purposes within communes, and are referred to, for the purpose of this study, as "villages".

The divisions created by the above described administrative units are not considered relevant as criteria for a division into school districts. The boundary lines, however, because of their geographically determined locations, are fully applicable. In a great majority of cases, the county division, because of its relatively stronger geographical nature, was found to be an appropriate location of school district division.

For the purpose of this study the national pattern of school districts was therefore established

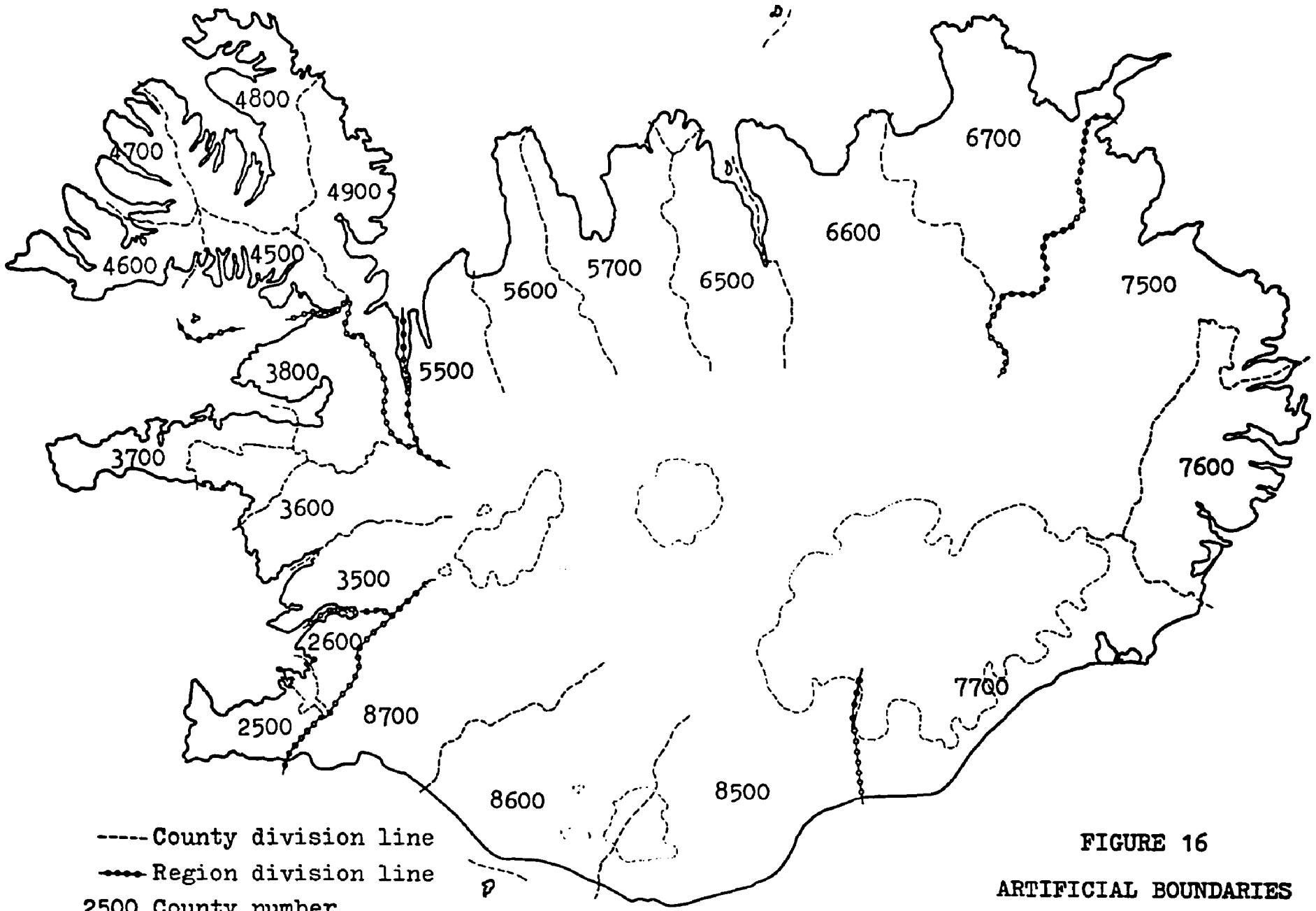


FIGURE 16

ARTIFICIAL BOUNDARIES

according to natural boundaries and geographical condition, ignoring the artificial boundaries of administrative structure.

Schematic Population Distribution. This distribution has been conceptualized from the factors of population and settlement location. For evaluation of school district division the following prerequisites were established, taking into account the factors of road location and transportation possibilities:

1. School districts having sufficient population to support one school offering grades 8 and 9, i.e. approximately 30 students in each year group.[1]
2. School district division lines so located, if possible, as not to require a student to enroll in another district in order to complete his compulsory education.

Accordingly, as shown in Figure 21, the country was divided into 34 school districts. Additional districts are Reykjavík and Akureyri which are not included in this study.

Population of the School Districts

Population. In Iceland the census has been taken every ten years since 1840; the population statistics are adjusted annually to indicate the situation on the first of December, and are available every year. In December 1972 the total population of Iceland was 210,775. The forecasted figure for 1973 is 214,200. An annual increase of approximately 1.5 per cent has been the average in Iceland during the last decade.

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[1] See page 41, paragraph 49 and page 42-43, 2 a. and 2 b.

TABLE 2.

ICELANDIC POPULATION 1940-1973

Year	Population in Thousands	Average Yearly % Growth
1940	121.6	1.1
1945	130.4	1.4
1950	144.3	1.7
1955	159.5	2.1
1960	177.3	2.1
1961	180.1	1.6
1962	183.5	1.9
1963	186.9	1.9
1964	190.2	1.8
1965	193.8	1.8
1966	196.9	1.6
1967	199.9	1.5
1968	202.2	1.2
1969	203.4	0.6
1970	204.6	0.6
1971	207.2	1.3
1972	210.8	1.7
1973[1]	214.2	1.6

Source: Hagstofa Íslands

Compared with the high growth rate of 2.1% annually for the 1950 decade, the trend now indicates a relatively smaller annual increase. The drop to 0.6% in 1969 and 1970 is, however, considered exceptional and partly due to out-migration. The increase expected by governmental specialists in the near future is 1.2-1.4% annually.

[1] Forecasted figures.

One of the most important factors affecting educational development is the geographical distribution of the population. The present distribution is characterized by the fact that approximately half of the population lives in the capital area. At the beginning of the century, fewer than 7,000 persons lived in Reykjavík; by 1940 the number was 38,000 and during the last 30 years the population of the Reykjavík area has grown by nearly 3.5% annually, due to a big migration. Except for the Reykjavík area, only Akureyri, the main town in north Iceland, with 11,182 inhabitants in 1972, has developed on a greater than local scale.

In estimating the school population for the planning period the most relevant data were the figures collected by the Statistical Bureau of Iceland, Hagstofa Íslands, for children resident in the communities and born during the period 1957-1971.

These data from the computer files of the national census were made available by the Ministry of Education. Since the children born before 1971 will constitute the majority of the school-aged population during the planning period these figures were the most useful (see Appendix A).

Migration can be expected to play some role, but as information on internal migration is not readily available this factor could not be analysed in depth. In interviews with various governmental advisors, it has consistently been asserted that the migration pattern is very vague and actually affected only by individual and unpredictable

undertakings. From discussions with Icelandic authorities it is evident that a decrease of the migration to the capital area is expected. Efforts towards this end are already being made, among them, for example, certain improvements in the road system, the extension of the rural electricity grid, and the provision of agricultural subsidies; subsidies are also offered for economic expansion in the towns and villages. Since positive effects of these policies can already be seen, future efforts towards maintaining agricultural activities at their present location are expected. These are supposed to include a transport policy aimed at providing the regions with more adequate connections with one another and with the two urban centers, Reykjavík and Akureyri, and not least in importance, an improvement in educational and other government services in rural areas is envisaged.

Recognizing that variations within the probable range of migration pattern would have only very small, if any, repercussions on the resulting school-aged population during the planning period, it is assumed that the agricultural population will remain unchanged in number during the period up to 1980-1986. The number was approximately 28,000 or 13% of the total population in 1972. Providing there is no change in this number, the percentage will drop to 11% in 1986.

In analyzing the birth figures for the rural areas it was observed that a substantial difference is found between communes within the same region in terms of children-per-farm and children-per-inhabitant ratio. The difference between

communes amounted to 100% or more. A closer look at this phenomenon indicated an uneven grouping of age in the communes. This was confirmed by pilot studies.

The phenomenon develops from a shifting occupancy of individual farms in each commune, whether by sale or by inheritance at the conclusion of the active life of the farmer. This shift is here referred to as the "generation shift". Its period in agricultural Iceland seems to lie between 36 and 40 years.[1]

It appears that the generation shift, instead of being evenly distributed over time, occurs within a decade in some communes. This gives rise to a fluctuation of the birthrate which occurs at this generation interval or in relation to it. Among the incidental effects is an uneven migration of young people from the rural areas, as there are no employment possibilities for at least the older children on the farm. No studies of this phenomenon have been available in Iceland.

This rhytmic fluctuation, although its effect on planning for the next 15 years is insignificant, requires careful consideration in any long-term forecasting.

In order to investigate the effects of the birthrate fluctuation on the long-term plan, two methods were compared and tested, which levelled out the fluctuation. One used the number of farmers and family units, the other the total

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[1] An estimate which has been confirmed by Icelandic sociologists.

population for each commune. Both methods showed approximately the same results. The method using the population figures showed, however, more sensitivity as a t-test analysis revealed a significant difference of birthrate per 100 inhabitants between the different groups (i.e. rural area, mixed rural and village, village and town). On the other hand, the difference computed using number of families was insignificant. With the aid of least square regression analysis the function for the average birthrate per 100 inhabitants was established for the four categories respectively.

In order to assess the population increase, figures for the expected total population in 1987, provided by the Economic Development Institute, Framkvæmdastofnun ríkisins, were used. As these figures refer to the country as a whole and no detailed estimates could be obtained, the distribution among communes was created according to the following assumptions: 1) the rural communes will remain unchanged in number, and 2) the villages and towns will grow at the national average. Despite that local fluctuations can be substantial due to migration, this estimate can with reference to larger areas be considered to be a maximum possible increase. On this basis a forecast of the number of children born annually in each of the communes in the years 1977-86 was completed (see Appendix B).

A comparison of the figures used for the planning period 1971-1986 with those used for the forecast period 1987-2001 shows an approximate deviation of 12% in the rural school districts.

A fluctuation of this order is not significant in the establishment of the facility capacity which is, in fact, flexible within this range.

School Location and Kind

A close look at the relationship of curriculum organization, and population to geographical conditions, transportation and communication networks has indicated that no useful construction applicable to the whole country can be made on the basis of averages. The wide variation of geographical character, the irregularity of the populated areas and the limitations set by the gravel road network prevent any such generalization. At this point the communication networks (telephone, radio, television, etc.) were not considered of significant importance in establishing the criteria for school location, kind and size.

In order to relate the factors of settlement location, road location and condition to the established criteria for grouping of grades into facilities, district division, and population, and to permit evaluation of alternative locations of school facilities accordingly, these factors were combined into a comprehensive model. This was accomplished by mapping the data relevant to settlement location, road location and condition and communal division. After this the established school district division was added. On the resulting maps the alternative types and locations of facilities were evaluated in the light of population, transportation and existing facilities. The alternative considered most appropriate was recorded on the maps (see Appendix C).

At this point the criteria for grouping of grades into facilities and school district division were re-evaluated.

Settlement Location. With the aid of the maps available

at the Icelandic Survey Department, Landmælingar Íslands,[1] and the farm register, jarðaskrá, prepared by the State Agricultural Development Office, Landnám ríkisins, it has been possible to locate all the farms in operation in 1971. From a variety of other sources, such as interviews with persons familiar with the different localities, it has been possible to complete the recording of all settlements in Iceland with a high degree of accuracy.

Road Location and Condition. With the population scattered along the periphery of the island it is natural that the principal roads of the system roughly follow the coastline. Today the Icelandic road network reaches to practically all inhabited places, its total length being around 12,000 km. The main coastal roadcircle will be completed in 1974 with a new 33 km road across the Skeiðarársandur area south of the Vatnajökull glacier. There seems to be little need for extending the network further, though a cross road over the interior on Sprengisandur has been discussed.

The road network in its present condition is far below the standard of most European countries, not to mention the U.S.A. Practically all roads are gravel having inadequate bearing courses and elevation, except for the newly constructed 37 km concrete highway from Hafnarfjörður to Keflavík, the 20 km of the west country road and 58 km of

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[1] The maps cover the entire country to scale 1:100,000.

the south country road to Selfoss, completed in 1972. As the density of motor traffic is sharply increasing,[1] main emphasis has been laid on upgrading the principal parts of the network to a higher standard, also in terms of snow clearance.

No comprehensive inventory of the present road network in Iceland is available. On the basis of the above mentioned maps, however, and others provided by the Icelandic Survey Department and with the aid of documents made available by the Public Roads Administration, Vegagerð ríkisins, the actual location of existing roads has been established.

The country roads were classified into three groups: 1) fully built roads, in adequate condition; 2) built roads which can be improved to adequate condition; roads which need rebuilding. This classification is based on the one, used by the Public Roads Administration and recorded with the assistance of its district engineers. A shortcoming is that some county roads on which less information is available had to be classified under group 3. State roads are defined as roads longer than 2 km and serving at least three farms.

Weather Condition and Transport Possibilities. The amount of precipitation is greatest in the south (see Figure 17). In the populated lowlands, precipitation ranges from 800 to 1,600 mm in the southern and western agricultural areas; in the valleys of north Iceland the annual precipi-

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[1] The number of vehicles increased from 11,000 in 1950 to 22,000 in 1960 and reached 47,000 in 1970. Tölfræðihandbók 1967 and Hagtíðindi (May 1971).

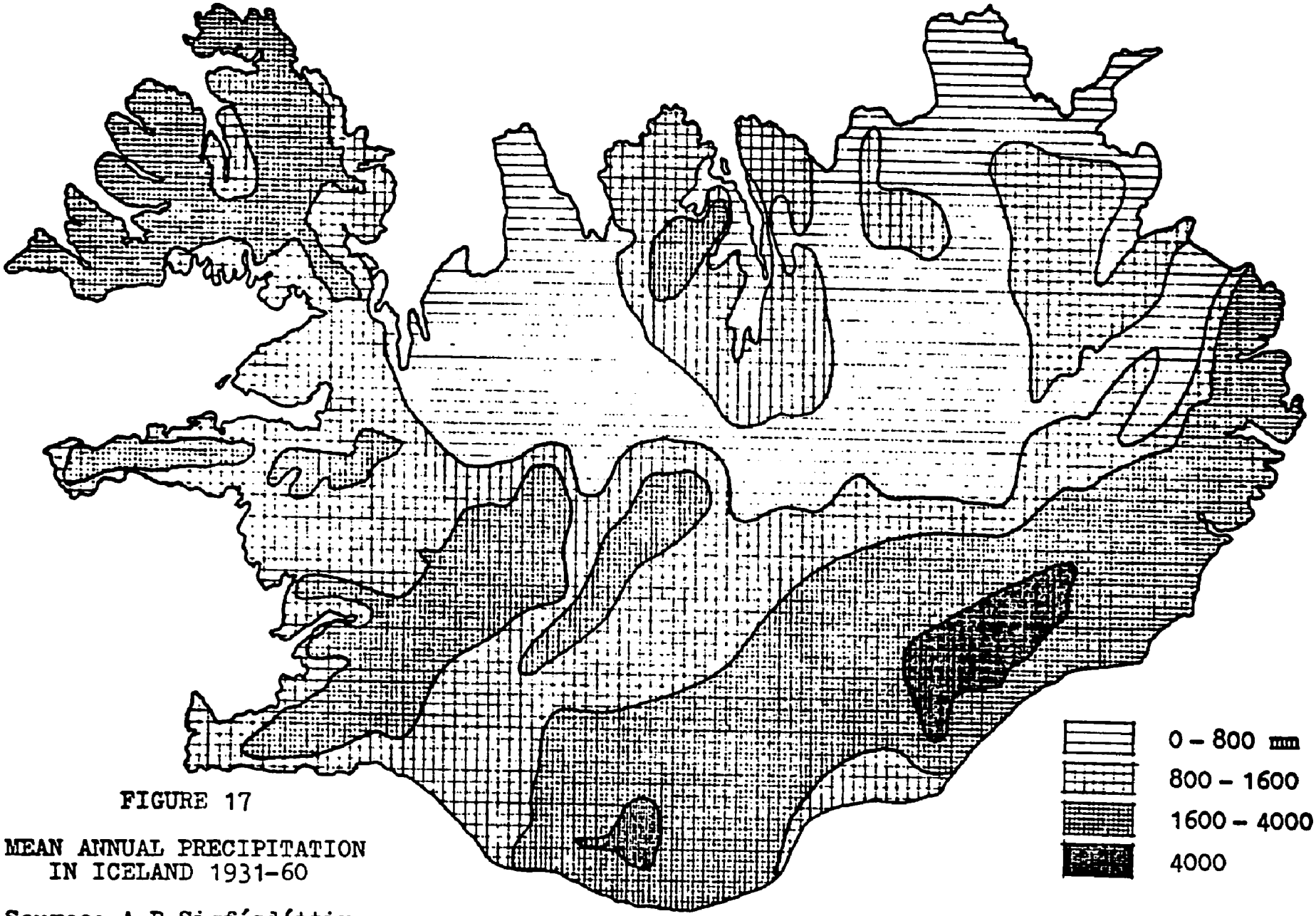


FIGURE 17

MEAN ANNUAL PRECIPITATION
IN ICELAND 1931-60

Source: A.B.Sigfúsdóttir

tation remains below 800 mm.[1]

The amount of precipitation is fairly evenly distributed over the year. On the south coast the winter months are wetter than in the summer, while on the north coast this is reversed.

In the south, rain is much more frequent than snow. In Vestmannaeyjar, off the south coast, the yearly total of precipitation is 206 days with an average of 47 days of snow. On the other hand Grímsey, off the north coast, has 117 days with precipitation with an average of 56 days of snow. The higher the ground, the greater is the relative amount of snow in the precipitation. The maximum, average, and minimum number of days with total snow cover annually and the average snow depth falling in winter and the maximum snow depths recorded are shown on Figure 18.

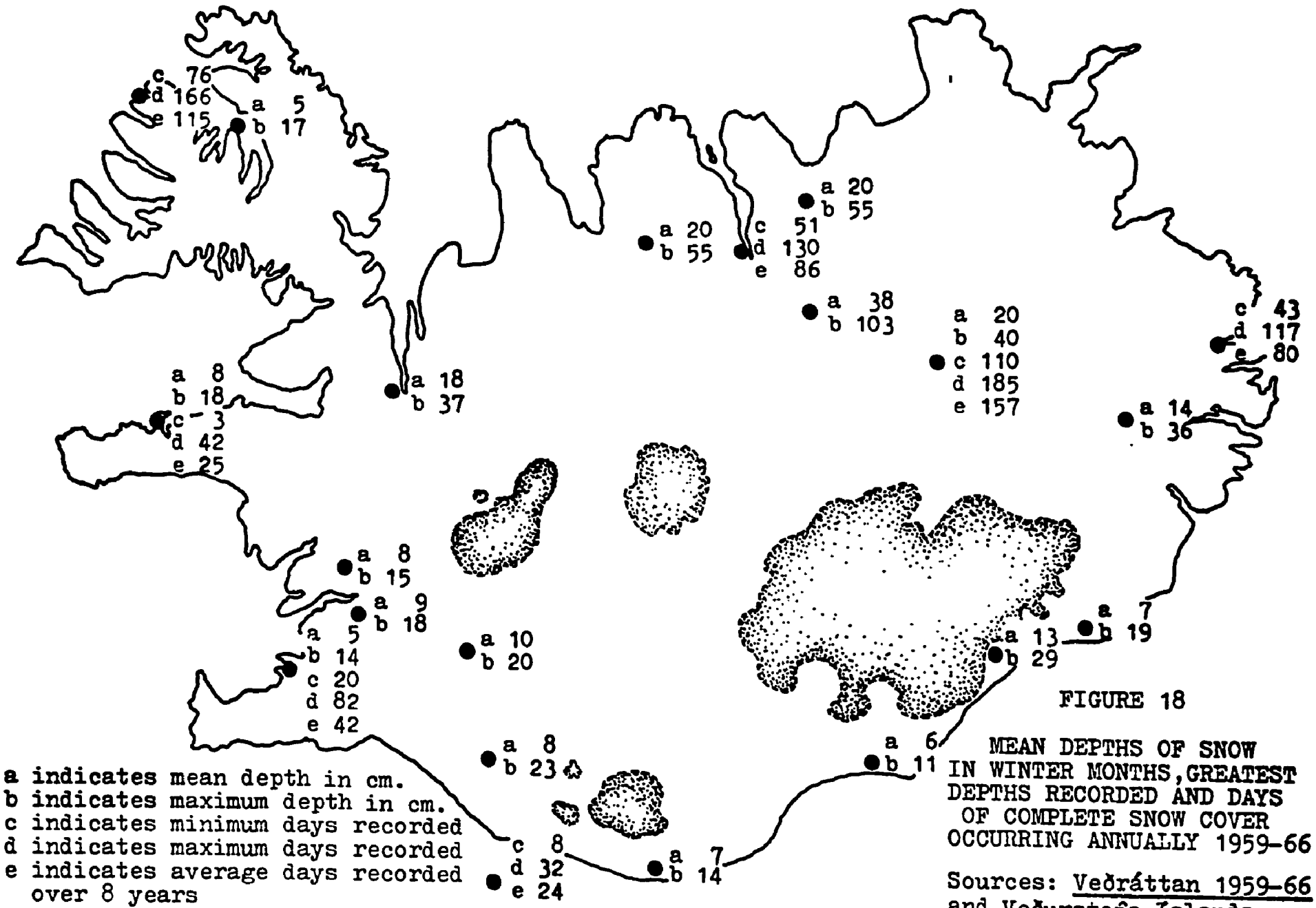
The figures indicate that total snow cover only lasts for a few weeks in the south, southwest and on the west coast, it lasts for up to three or four months in the northwest, north and east coasts, and for for five to six months in the interior.

Snow strongly affects the road traffic, and roads in exposed areas, especially on higher ground, are frequently blocked by snowdrifts from October to May.

Despite the northerly latitudes the temperatures in Iceland are relatively high, and seasonal fluctuations are

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[1] In contrast to Akureyri on the north coast which has an average of 530 mm, Reykjavík in the southwest has 1,100 mm.



a indicates mean depth in cm.
b indicates maximum depth in cm.
c indicates minimum days recorded
d indicates maximum days recorded
e indicates average days recorded over 8 years

FIGURE 18

MEAN DEPTHS OF SNOW IN WINTER MONTHS, GREATEST DEPTHS RECORDED AND DAYS OF COMPLETE SNOW COVER OCCURRING ANNUALLY 1959-66

Sources: Veðráttan 1959-66 and Veðurstofa Islands

small. The mean air temperature for the whole of Iceland's populated areas lies in January between 2°C (36°F) and 5°C (41°F), and in July between 7°C (45°F) and 12°C (54°F). See Figures 19 and 20.

Mean daily temperatures are generally cooler on the north than on the south coast, but the range of temperatures is also much larger on the north coast. Mean temperatures inland are cooler than on the coast, but here also, the ranges experienced are greater. It is generally true, however, that on the coast mean temperatures in mid-winter lie only just below the freezing point.

Strong winds are frequent in most areas of Iceland; an average of 2.5-4.0 meters per second is common and wind velocities corresponding to Beaufort scale 9 occur on the average from 4-15 days a year depending on location. Wind, however, except in combination with snow, does not create a major obstacle to road transport.

The most effective measure against drifting snow has proved to be the elevation of the road profile, and in the current program of improvement and rebuilding of the road system, snow clearance is a major consideration.

Besides, winter conditions in Iceland cause other difficulties for road transport than problem of snow, i.e. damage to bearing courses placed on frost-susceptible soils due to frost and thaw. This damage is caused by the formation of ice lenses in the frost-susceptible soil resulting in distortion of the bearing course. The difficulties occur in the spring, when the ice lenses melt, resulting in a super-

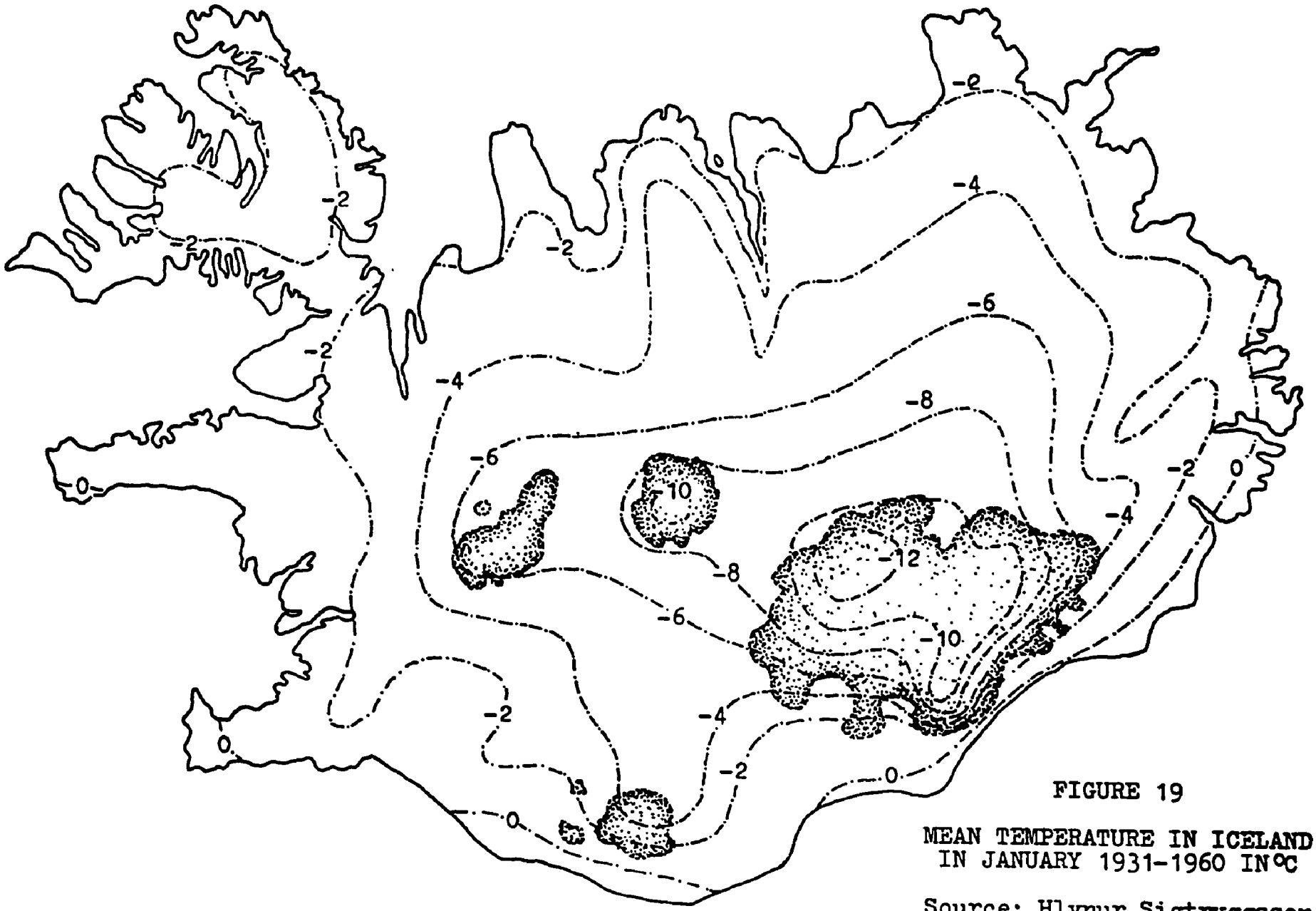


FIGURE 19

MEAN TEMPERATURE IN ICELAND
IN JANUARY 1931-1960 IN °C

Source: Hlynur Sigtryggsson

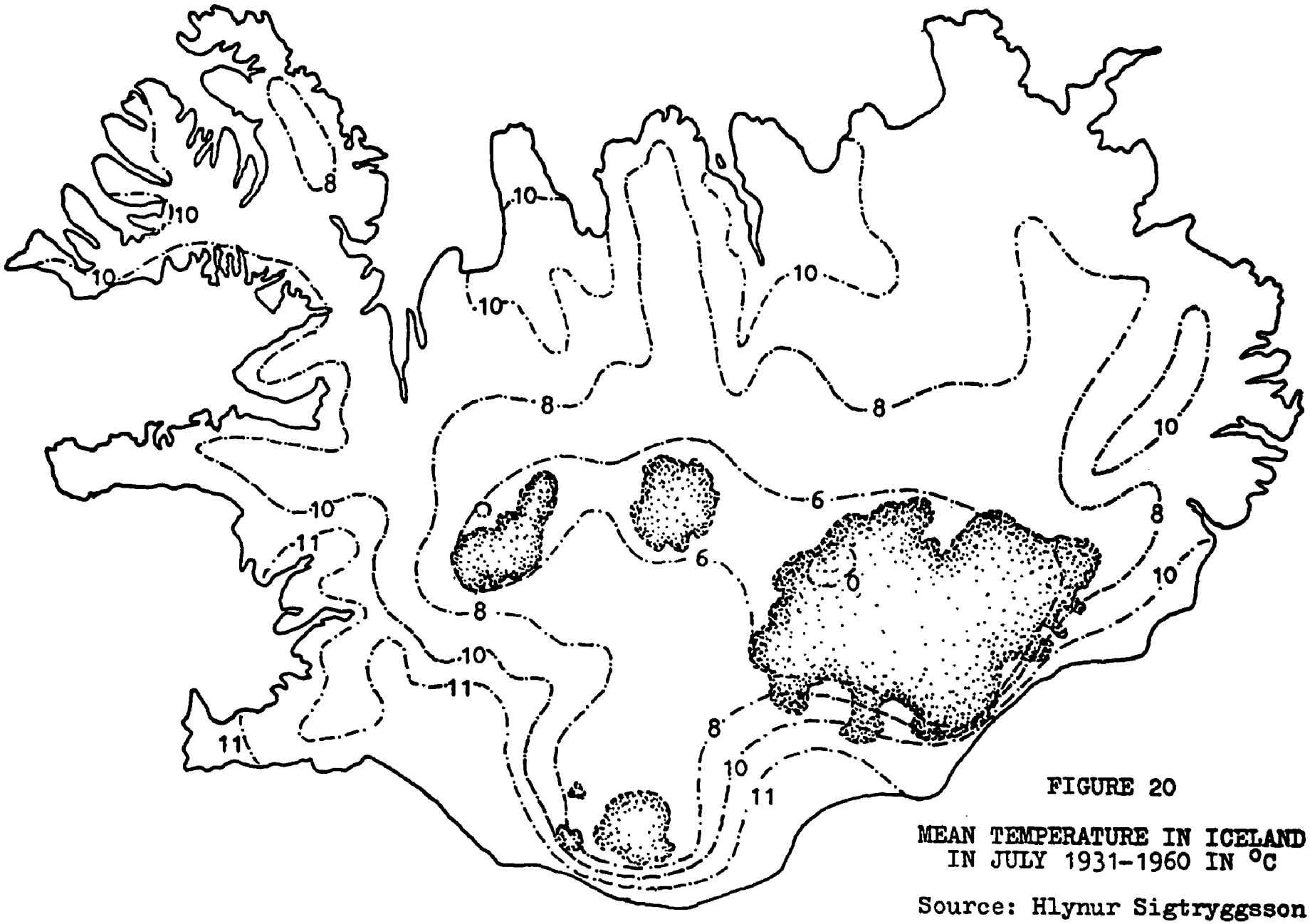


FIGURE 20

MEAN TEMPERATURE IN ICELAND
IN JULY 1931-1960 IN °C

Source: Hlynur Sigtryggsson

saturation of water in the bearing course with temporary loss of bearing capacity. Heavy traffic then causes break-ups which can render the road impassible for any but four-wheel-drive lightweight vehicles.

During the analysis and evaluation of the available driving routes to the schools, it has been recognized that local conditions such as topography, road alignment and localized weather conditions play such a part in some areas that the planned alternative for the transportation of students can be regarded only as an optimum based on distance limitations and the overall pattern. The detailed planning of the transport routes must be considered and eventually revised at the local level.

Present Facilities. Another major consideration regarding the location of facilities was the existing schools. Facilities which still have significant remaining lifespans capacities and building qualities, even though existing in unfavorable locations, were individually evaluated, and as a general rule incorporated into the proposed system.

The existing school locations in many instances have attained importance in terms of emotional, cultural and historical attachment for the district, and have frequently developed in natural locations as a consequence of transportation routes, utilization of hot springs, and natural setting, view, shelter, and the like. The great majority of school locations developed in the plan are therefore identical with the existing ones, the significant difference being the variation in school types (i.e. in terms of grades offered).

A substantial reduction in the total number of school locations is suggested, especially in the south. As shown in Figures 21 and 22, 151 schools of some kind that were in operation during the school year 1972-73 are reduced to 133 schools in the suggested plan.

Inferences and Verification. Any attempt to organize bus routes as loops, or according to other criteria, was deemed irrelevant in evaluating the location of a facility. There is a limited possibility of improving bus route patterns by shifting the location of facilities, and the results which can be expected are insufficient to justify any elaboration of the model. At present a substantial number of farmers drive children to school in their jeeps. It has been possible for them to fit this activity into their daily work schedule, and the number of children, road conditions and distances make the solution viable.

On the basis of such reasoning it was established to what extent daily transport could be applied and to what extent boarding school and home study plans were needed in order to serve the country's entire population.

In addition to these criteria regarding location of the schools, primary consideration was also given to the suggestions presently being put forward by the Economic and Planning Department of the Ministry of Education in its discussions with the local municipalities. These suggestions are to a large extent supported by the very criteria set forth above and followed in this study.

Turning back to the first step of the analysis in order

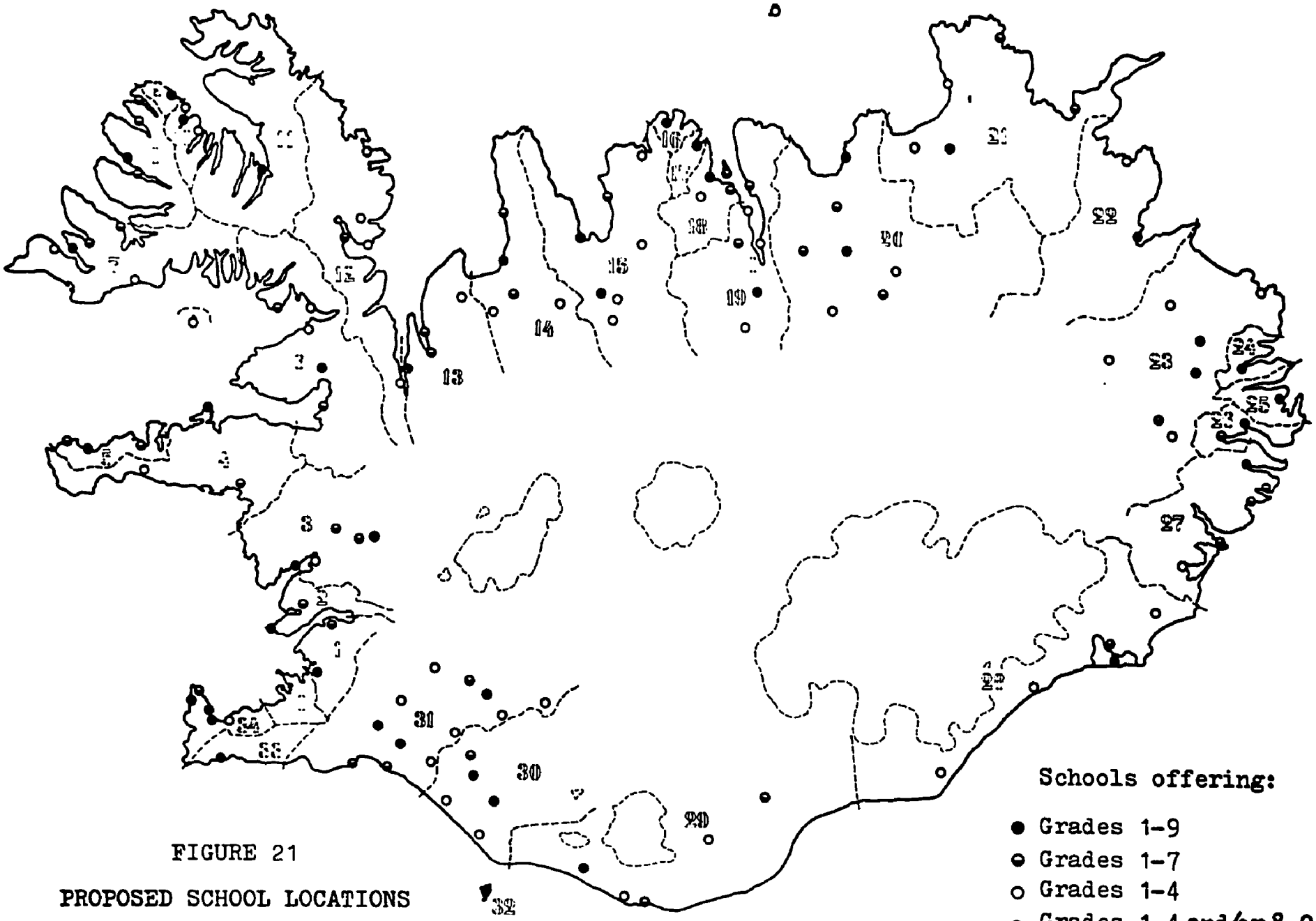


FIGURE 21

PROPOSED SCHOOL LOCATIONS

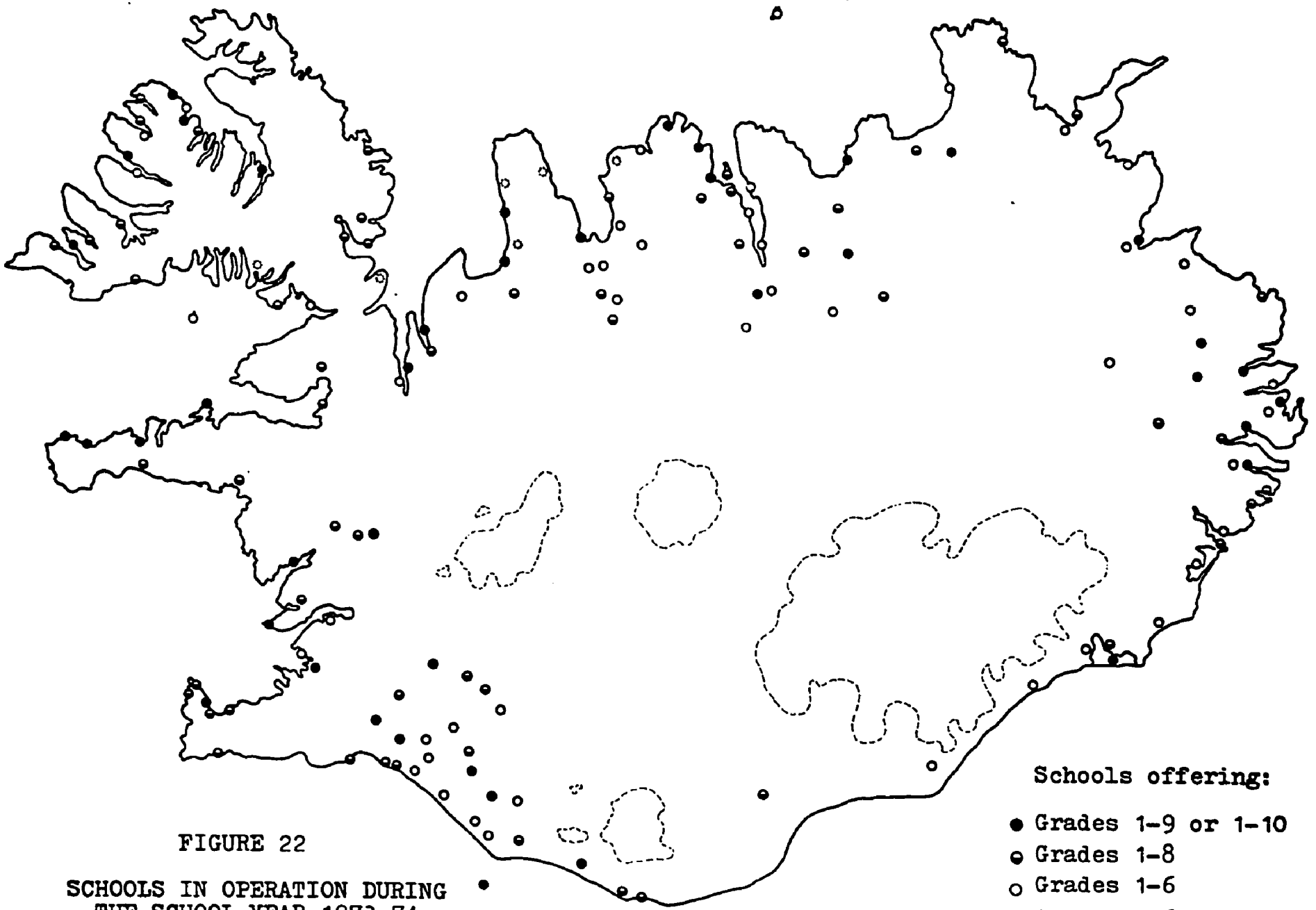


FIGURE 22

SCHOOLS IN OPERATION DURING
THE SCHOOL YEAR 1973-74

to test the selected grouping of grades into facilities, provided confirmation that this system of facilities gives more favorable results than the other alternatives. If we consider the grade groups of 1-3 and 1-6, for instance, we find that the 1-3 unit would average only 15 students while the 1-4 has about 20, given the same transport routes. The alternative of unit 1-6 replacing the unit 1-7 reveals increased difficulties in fulfilling the criterion of 4 to 5 teachers per school; an even more serious drawback of this alternative is that grade 7 would be offered in substantially fewer locations, other things being equal (37 schools instead of 79), and there would be a considerable increase in use of residences for this grade.

As seen in Appendix C and on the plan presented in Figure 22 (page 73), the 1-5 and 1-6 and 1-4+8-9 alternatives turned out to have little application and were excluded from the model except that units 1-4+8-9 and 8-9 only were appropriate in five locations, where relatively unfavorably located facilities were present.

The Proposed Schools and their Size

From the data presented under "School Location and Kind" and "Population of the School District", the schools in each school district were recorded and their respective student numbers computed (see Appendix D).

The number of facilities and corresponding required capacity having been established, three groups were arranged according to their type (grades offered) and total student number. These three types are respectively Type 1-9, Type 1-7, and Type 1-4 (see Tables 3, 4 and 5).

TABLE 3

SCHOOLS, GRADES AND NUMBER OF STUDENTS; TYPE 1-9

	Name	Grades 1-4	Grades 5-7	Grades 8-9	Total 1-7	Total 1-9	
1	Reykjanes	17	18+	12+	35	47+	S
2	Reykholt	-	-	49	-	49	S
3	Eiðar	22	-	47	-	69	S
4	Núpur	15	-	73	-	88	S
5	Laugaskóli	13	28	68	41	109	
6	Reykir, Hrútaf.	13	-	99	-	112	S
7	Laugar, Litlu L.	30	-	86	-	116	S
8	Lundur	17	37	69	54	123	
9	Skógar	39	33	68	72	140	
10	Vopnafjörður	63	52	34	115	149	S
11	Hella	55	63	61	118	179	
12	Seyðisfjörður	86	64	43	150	193	Eo
13	Varmahlíð	32	80	87	112	199	
14	Flúðir	46	68	87	114	201	
15	Bolungarvík	97	73	49	170	219	Eo
16	Hrafnagil	61	81	77	142	219	
17	Hvolsvöllur	87	87	57	174	231	
18	Blönduós	78	59	96	137	233	
19	Eskifjörður	91	68	78	159	237	
20	Stykkishólmur	95	71	79	166	245	
21	Sandgerði	96	72	78	168	246	
22	Fáskrúðsfjörður	85	64	98	149	247	
23	Höfn, Hornaf.	100	75	72	175	247	
24	Ólafsfjörður	106	86	57	192	249	
25	Hveragerði	101	76	77	177	254	
26	Egilsstaðir	112	93	57	205	262	
27	Patreksfjörður	90	91	91	181	272	
28	Dalvík	98	88	90	186	276	

(Continued)

	Name	Grades 1-4	Grades 5-7	Grades 8-9	Total 1-7	Total 1-9	
29	Varmá, Brúarl.	127	95	78	222	300	
30	Grindavík	139	104	69	243	312	Eo
31	Ólafsvík	107	81	124	188	312	
32	Neskaupstaður	146	111	74	257	331	Eo
33	Borgarnes	138	119	79	257	336	
34	Siglufjörður	151	113	76	264	340	Eo
35	Sauðárkrókur	168	128	85	296	381	Eo
36	Njarðvíkur	165	147	98	312	410	
37	Húsavík	212	159	106	371	477	Eo
38	Ísafjörður	222	202	135	424	559	
39	Selfoss	272	253	223	525	748	
40	Akranes	394	295	211	689	900	
41	Vestmannaeyjar	466	349	233	815	1048	Eo
42	Keflavík	524	393	262	917	1179	Eo

S, indicates special type.
Eo, indicates even distribution among grades.

TABLE 4

SCHOOLS, GRADES AND NUMBER OF STUDENTS; TYPE 1-7

	Name	Grades 1-4	Grades 5-7	Total 1-7
1	Reykhólar	12	28	40
2	Skútustaðir	14	29	43
3	Leirárskóli	28	21	49
4	Hrísey	29	22	51
5	Tálknafjörður	29	22	51
6	Ásgarður	30	23	53
7	Breiðdalsvík	29	24	53
8	Bíldudalur	32	24	56
9	Grenivík	34	25	59
10	Nesjaskóli	25	34	59
11	Árskógur	34	26	60
12	Hvammstangi	35	26	61
13	Stöðvarfjörður	35	26	61
14	Kirkjub.klaustur	29	33	62
15	Húnavellir	21	42	63
16	Flateyri	37	28	65
17	Laugaland	38	28	66
18	Djúpivogur	35	32	67
19	Varmaland	37	32	69
20	Víkurskóli	35	36	71
21	Raufarhöfn	41	31	72
22	Hallormsstaður	15	63	78
23	Stóru-Tjarnir	40	38	78
24	Þórshöfn	43	35	78
25	Suðureyri	49	36	85
26	Laugagerðisskóli	40	48	88
27	Laugaland	42	46	88
28	Þingeyri	43	45	88

(Continued)

	Name	Grades 1-4	Grades 5-7	Total 1-7	
29	Hólmavík	36	54	90	
30	Þorlákshöfn	53	40	93	
31	Kleppjárnsreykir	55	41	96	
32	Skagaströnd	57	43	100	
33	Hofsós	52	50	102	
34	Gerðar	60	45	105	
35	Búðardalur	62	46	108	
36	Laugarbakki	42	70	112	
37	Hafralækjarskóli	52	62	114	
38	Hellissandur	66	49	115	
39	Reyðarfjörður	66	49	115	
40	Reykholt	55	62	117	
41	Grundarfjörður	74	56	130	
42	Stokkseyri, Eyrarb.	92	81	173	S

S, indicates special type.

TABLE 5

SCHOOLS, GRADES AND NUMBER OF STUDENTS; TYPE 1-4

	Name	Grades 1-4	Total 1-4
1	Flatey	4	4
2	Fagurhólsmýri	6	6
3	Skeggjastaðir	6	6
4	Stafafell	6	6
5	Drangsnes	8	8
6	Hrollaugsstaðir	8	8
7	Klúka	8	8
8	Múli	8	8
9	Þingmúli	8	8
10	Örlygshöfn	8	8
11	Grímsey	9	9
12	Búrfell	10	10
13	Skjöldólfsstaðir	10	10
14	Stóru Vellir	10	10
15	Finnbogastaðir	11	11
16	Þorfinnsstaðir	11	11
17	Borgarfjörður	13	13
18	Hrífunes	13	13
19	Skúlagarður	14	14
20	Húnaver	16	16
21	Hólar	17	17
22	Kópasker	17	17
23	Króksfjarðarnes	17	17
24	Ketilsstaðir	18	18
25	Hjalteyri	20	20
26	Húsabakki	20	20
27	Lýsuhóll	20	20
28	Súðavík	20	20

(Continued)

	Name	Grades 1-4	Total 1-4
29	Hagi, Barðaströnd	21	21
30	Borðeyri	21	21
31	Flóðvangur	21	21
32	Hrafnabj.-Fossá	21	21
33	Sólgarðar	21	21
34	Ásaskóli	22	22
35	Hvanneyri	22	22
36	Steinsstaðir	22	22
37	Svalbarðseyri	22	22
38	Tjarnarbúð, Saurbæ	22	22
39	Ljósifoss	23	23
40	Reykjahlíð	24	24
41	Saurbæjarhreppur	24	24
42	Skeiðaskóli	26	26
43	Bergþórshvoll	27	27
44	Hnífsdalur	27	27
45	Laugavatn	27	27
46	Stóru Akrar	28	28
47	Þykkvibær	29	29
48	Vogar	32	32
49	Villingaholtsskóli	45	45

The following table summarizes the student number in all of the proposed schools.

TABLE 6

DISTRIBUTION OF STUDENTS AMONG SCHOOL TYPES IN ALL OF THE PROPOSED SCHOOLS

Schooltype	Number of Units	Number of Students Grades 1-4	Grades 5-7	Grades 8-9
General type 1-9 with uneven distribution among yeargroups	20	1,529	1,415	1,525
General type 1-9 with even distribution among yeargroups and special type 1-9	4	263	207	138
General type 1-9:Large units in towns with even and uneven distribution among yeargroups	13	3,104	2,454	1,775
Special type 1-4+8-9	4	80	-	305
Special type 8-9	1	-	-	49
Total all schools including grade 9	42	4,976	4,076	3,792
General type 1-7, even and uneven distribution among yeargroups	41	1,641	1,570	
Special type 1-7, subdivided and extreme in size	1	92	81	
Total all schools 1-7	42	1,733	1,651	
General type 1-4	47	814		
General type 1-4, small and large	2	49		
Total all schools 1-4	49	863		
Total[1]	133	7,572	5,727	3,792

[1] In addition 24 children in grades 8-9 go to school in Akureyri and 65 children in grades 1-2 need home study programs.

A comparison of this tabulation of the proposed schools with the actual figure for 1973, as seen in Table 7, shows some 70-140 students fewer in each yeargroup. This corresponds to the unusually high annual birthrate during 1958-1966 of 2.3-2.6% compared to the 1.9-2.1% for 1967-1971.

TABLE 7

THE ACTUAL STUDENT NUMBER FOR 1973

	Number of Students Grades 1-4	Grades 5-7	Grades 8-9
Total for the schools in 1973	8,196	6,059	3,951
The actual average in yeargroup for 1973 (in whole numbers)	2,049	2,020	1,976

The Typified School Facilities

Analysis of the capacity requirements revealed some differences in characteristics among the three facility types.

The school system where a school offering the lower grades only serves as a feeder unit for a school offering the upper grades also, results in an uneven distribution of students among the grades within the school, since approximately even yeargroups (i.e. number of students of the same age) are divided among more units in the lower than in the upper grades. This is, however, a most desirable feature of the system, as it facilitates minimum transportation and at the same time supports desirable student number for schools offering the upper grades.

Analysis of the capacity requirements for the proposed

schools showed that both schools with even and uneven distribution among grades occur in the Type 1-9 and Type 1-7 units.

Type 1-9 school had two differing distributions among the grades. One is uneven, due to the effects of the Type 1-4 school and Type 1-7 school as feeder units for the 1-9 school; when this effect is not present, as in the towns not surrounded by agricultural areas, there is an even distribution among the grades. Further, the Type 1-7 school showed a differing uneven distribution from the 1-7 unit of the Type 1-9 school.

A division of grades into groups of 1-4, 5-7, and 8-9 gives the following number of schools offering the respective grade groups.

TABLE 8

NUMBER OF SCHOOLS OFFERING THE GRADE GROUPS 1-4, 5-7 AND 8-9

	Grades 1-4	Grades 5-7	Grades 8-9	Schooltype
No of schools	27	27	27	1-9
"	42	42	-	1-7
"	49	-	-	1-4
"	4	-	4	1-4+8-9
"	-	-	1	8-9
Total	122	69	32	

Schools with the same number of students in each of the 9 year groups are excluded from the above table, as they do not influence the picture of uneven distribution.

Assuming an even number of students in each year group, the above number of grade units gives us the following distribution of the student number in year groups in the grade units 1-4, 5-7 and 8-9.

TABLE 9

RELATIVE DISTRIBUTION OF YEARGROUP SIZE

	Grades 1-4	Grades 5-7	Grades 8-9
Number of grades in grade groups	4	3	2
Number of school units offering the grade groups	122	69	32
Relative size of yeargroups	52%	70%	100%
	75%	100%	

At this point the question arises as to what range of student capacity is to be covered by a given size of facility.

Analysis of different alternatives for class groupings within the facilities indicated that the smallest increment requiring a difference in facility capacity is approximately one class, or group, of 20-28 students over the grade range of 1-7.

A combination of this premise with the size distribution of the proposed school facilities indicated a requirement of six different sizes of the Type 1-9 schools, four different sizes of the Type 1-7 schools and two different sizes of the Type 1-4 schools to cover the spectrum of required capacities.

Type 1-9 Schools. The spectrum covered by the typified 1-9 facilities of six different capacities ranging from a total of 130 to 282 students, are the 20 facilities with uneven distribution among the grades out of the total of 42. Of the remaining 22 facilities, two with even distribution among the grades located in towns and villages come under the same category in terms of capacity. See Figure 23, and Tables 3, page 75, and 6, page 81.

TABLE 10

TOTAL NUMBER OF STUDENTS IN THE RESPECTIVE GRADE GROUPS IN THE 20 SCHOOLS OF TYPE 1-9 WHICH FORM THE BASIS FOR THE ESTABLISHMENT OF THE TYPIFIED UNITS

	Grades 1-4	Grades 5-7	Grades 8-9	Total
Total number of students	1,529	1,415	1,525	4,469
Number in yeargroups	382	472	763	
Relative size of yeargroups	50%	62%	100%	

TABLE 11

NUMBER OF STUDENTS IN EACH TYPIFIED SCHOOL UNIT 1-9

Number of Typified Units	Number of Students Grades 1-4	Grades 5-7	Grades 8-9	Total
4	110	90	82	282
9	90	78	80	248
3	70	66	78	214
1	52	54	76	182
3	24	36	70	130
Total 20 units				

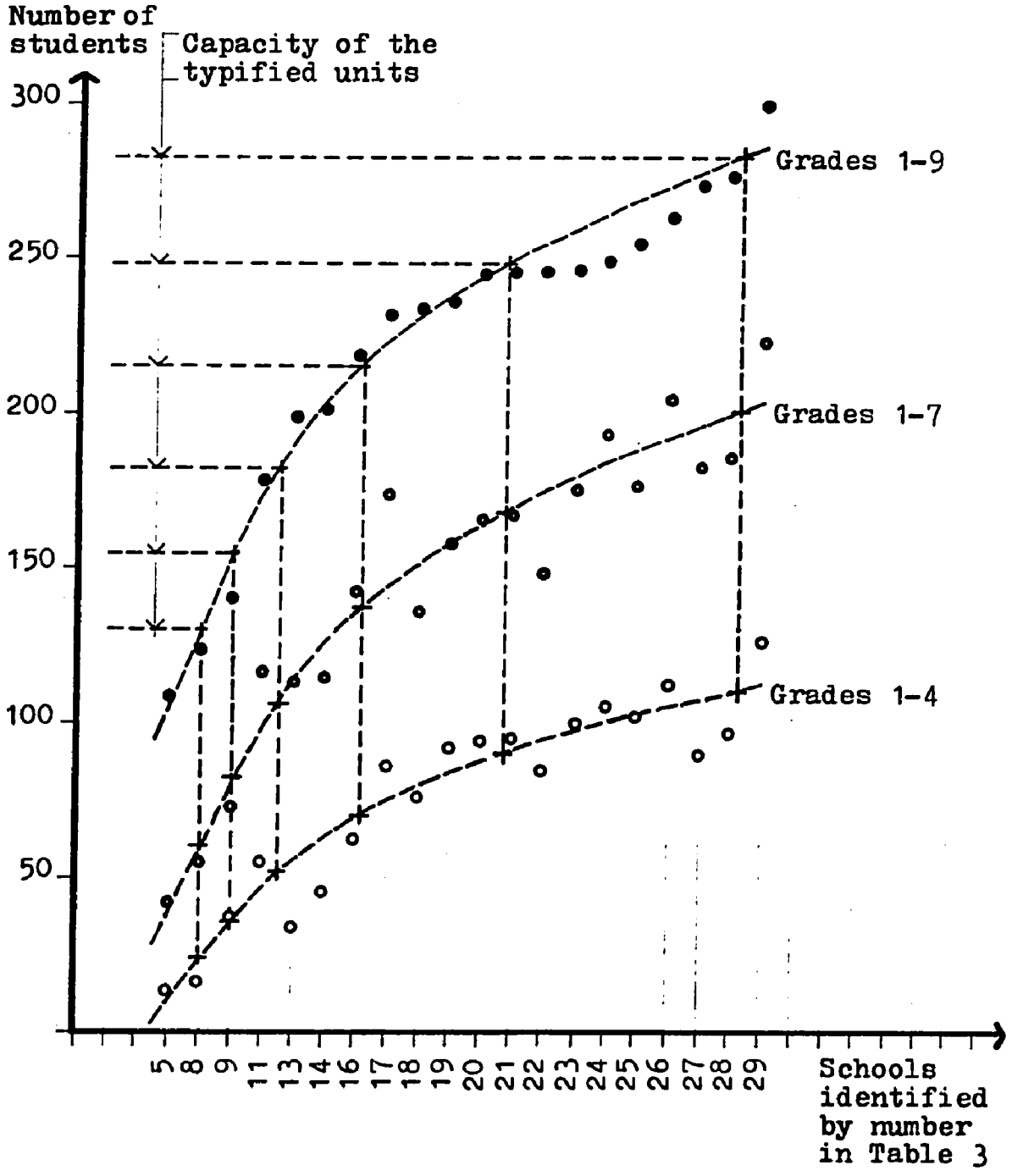
TABLE 12

TOTAL NUMBER OF STUDENTS IN ALL TYPIFIED SCHOOLS 1-9

	Grades 1-4	Grades 5-7	Grades 8-9	Total
	440	360	328	1,128
	810	702	720	2,232
	210	198	234	642
	52	54	76	182
	72	108	210	390
Total	1,584	1,422	1,568	4,574
Number in yeargroups	396	474	784	
Relative size of yeargroups	50%	54%	100%	

FIGURE 23

GRAPHICAL ANALYSIS OF SCHOOLSIZES, NUMBER OF STUDENTS AND DISTRIBUTION AMONG GRADE GROUPS, IN SCHOOLS OFFERING GRADES 1 - 9



Type 1-7 Schools. The spectrum covered by the typified 1-7 facilities of four different capacities ranging from a total of 55 to 114 students is 41 facilities out of the total of 42, the remaining one being subdivided and of extreme size. See Figure 24, and Tables 4, page 77, and 6, page 81.

The 41 proposed school units Type 1-7, which form the basis for the establishment of the typified units, included units with both even and uneven distribution among grades.

TABLE 13

TOTAL NUMBER OF STUDENTS IN THE RESPECTIVE GRADE GROUPS IN THE 41 SCHOOLS OF TYPE 1-7 WHICH FORM THE BASIS FOR THE ESTABLISHMENT OF THE TYPIFIED UNITS

	Grades 1-4	Grades 5-7	Total
Total number of students	1,641	1,570	3,211
Number in yeargroups	410	523	
Relative size of yeargroups	78%	100%	

TABLE 14

NUMBER OF STUDENTS IN EACH TYPIFIED SCHOOL UNIT 1-7

Number of Typified Units	Number of Students Grades 1-4	Grades 5-7	Total
8	60	54	114
9	49	45	194
9	38	36	74
15	28	27	55

Total, 41 units

FIGURE 24

GRAPHICAL ANALYSIS OF SCHOOLSIZES, NUMBER OF STUDENTS AND DISTRIBUTION AMONG GRADE GROUPS, IN SCHOOLS OFFERING GRADES 1 - 7

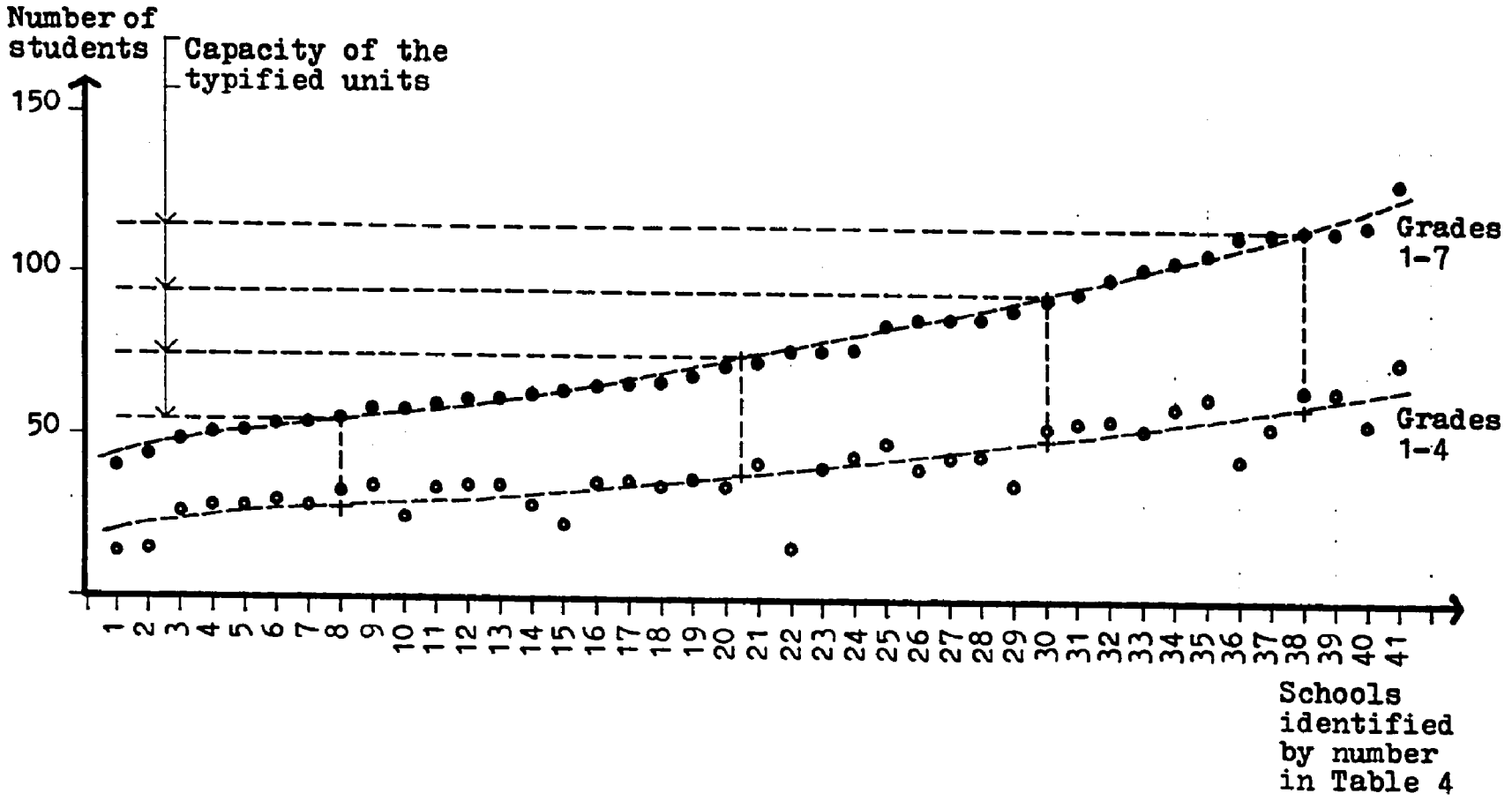


FIGURE 25

GRAPHICAL ANALYSIS OF SCHOOLSIZES, NUMBER OF STUDENTS AND DISTRIBUTION AMONG GRADE GROUPS, IN SCHOOLS OFFERING GRADES 1 - 4

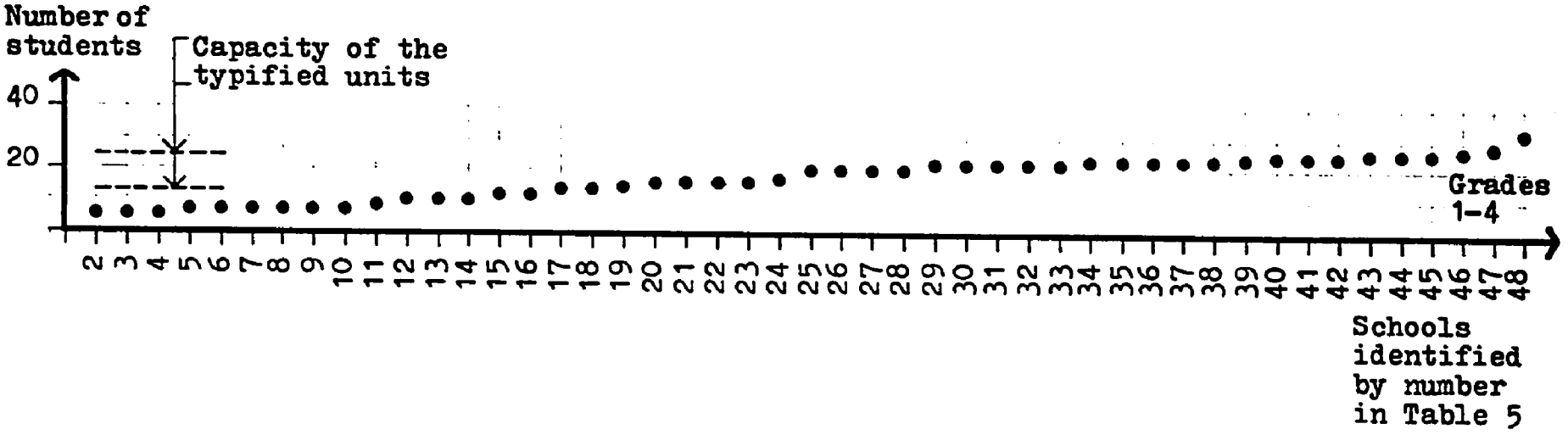


TABLE 15

TOTAL NUMBER OF STUDENTS IN ALL TYPIFIED SCHOOLS 1-7

	Grades 1-4	Grades 5-7	Total
	480	432	912
	441	405	846
	342	324	666
	420	405	825
Total	1,683	1,566	3,249
Number in yeargroups	420	522	
Relative size of yeargroups	80%	100%	

The spectrum covered by the typified 1-4 facilities of two different capacities of 12 and 24 students, is 47 facilities out of the total of 49 the remaining 2 being of extreme sizes. See Figure 25, and Tables 5, page 79, and 6, page 81.

FINDINGS

The purpose of this chapter, as stated originally, has been to come to a conclusion regarding the appropriate types of rural school facilities, and to determine their performance requirements in terms of student capacity. These recommendations are presented in Figure 26.

As stated, the facilities offering grades 1-9, with an even distribution of students among the grades, are not included in the analysis of typified capacities; most of these are located in larger towns. Although at this stage their functional design problems are not considered as

complex, such facilities are in no less need of being investigated than the group chosen for further analysis in this study.

The small unit size making up the facility system makes it relatively flexible in dealing with fluctuations in pupil number. Capacity tolerance will be considerable. This can be seen, for instance, if we consider a year group of five or ten or a class of fifteen or eighteen students in a district. A 30% fluctuation would create a class size of 20 or 24, which does not greatly affect the school system in regard to facility need.

FIGURE 26

THE TYPIFIED SCHOOL FACILITIES AND THE REQUIRED STUDENT NUMBERS

TYPE 1 - 9

Grades 1 - 4	Grades 5 - 7	Grades 1 - 7	Grades 8 - 9	Grades 1 - 9
110	90	200	82	282
90	78	168	80	248
70	66	136	78	214
52	54	106	76	182
37	45	82	74	156
24	36	60	70	130

TYPE 1 - 7

60	54	114
49	45	94
38	36	74
28	27	55

TYPE 1 - 4

24
12

CHAPTER III

PLANNING OF THE FACILITIES

INTRODUCTION

Based on the conclusions of the previous chapter regarding the recommended type and student capacity for the rural school facilities, this chapter deals with the determination of their performance requirements.

Three main tasks have been undertaken:

1) Analysis of data related to educational requirements, curriculum implementation and policy, with reference to facility requirements.

2) Investigation of literature and related sources relevant to school facility requirements.

3) Establishment of priorities and selective evaluation.

In order to establish parameters of application to the architectural design, these three main tasks have been conducted concurrently.

Criteria for the objective measurement of these design factors are not available at this time. The analysis and evaluation of some of the factors underlying this study must therefore be modified to some extent by subjective value-judgements.

Based on such performance criteria conceptual solutions have been attempted and are here presented along with architectural design proposals for the selected facility types.

DATA ANALYSIS

To establish the performance requirements, the following data and variables were considered as relevant and have been analyzed.[1]

1. Curriculum Content.
   a. Required subject matters.
   b. Learning objectives.
   c. Social-behavioral objectives.
2. Instructional Methods.
   a. Grade organization.
   b. Group sizes.
   c. Instructional methods.
3. Administration Policy.
   a. Administrative structure of the schools.
   b. Staff requirements and regulations.
   c. Division of labor in teaching.

With few exceptions these factors will be regarded as less stable over a period of time than the set of factors treated in the preceding chapter. They will, however, in general not be subject for re-evaluation in this study, as they are regarded as underlying assumptions.

As in the preceding chapter, the analysis has been focused on the significant characteristics which have

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[1] See categorization page 25.

application in the final design of the facilities.

The performance requirements were formulated according to the following five parameters (see Figure 27).

1. The occupants. Based on the established capacity requirements of the typified facilities, a scheme for grade organization was constructed and this parameter established.

2. The curriculum. Based on governmental studies on revision of the curriculum and its implementation and on interviews with selected individuals, this parameter was established and analysed.

3. Flexibility requirements. Based on the same governmental studies and on present trends in education, some key concepts for operational flexibility were formulated.

4. Expansion requirements. Based on the population analysis presented in chapter II and on general considerations of expected future development, this parameter was identified.

5. Space requirements. Based on parameters 1, 2, 3, and 4, on present space regulation for maximum allowable cost, and on reviewed literature and sources relevant to school facility space standards, this parameter was formulated.

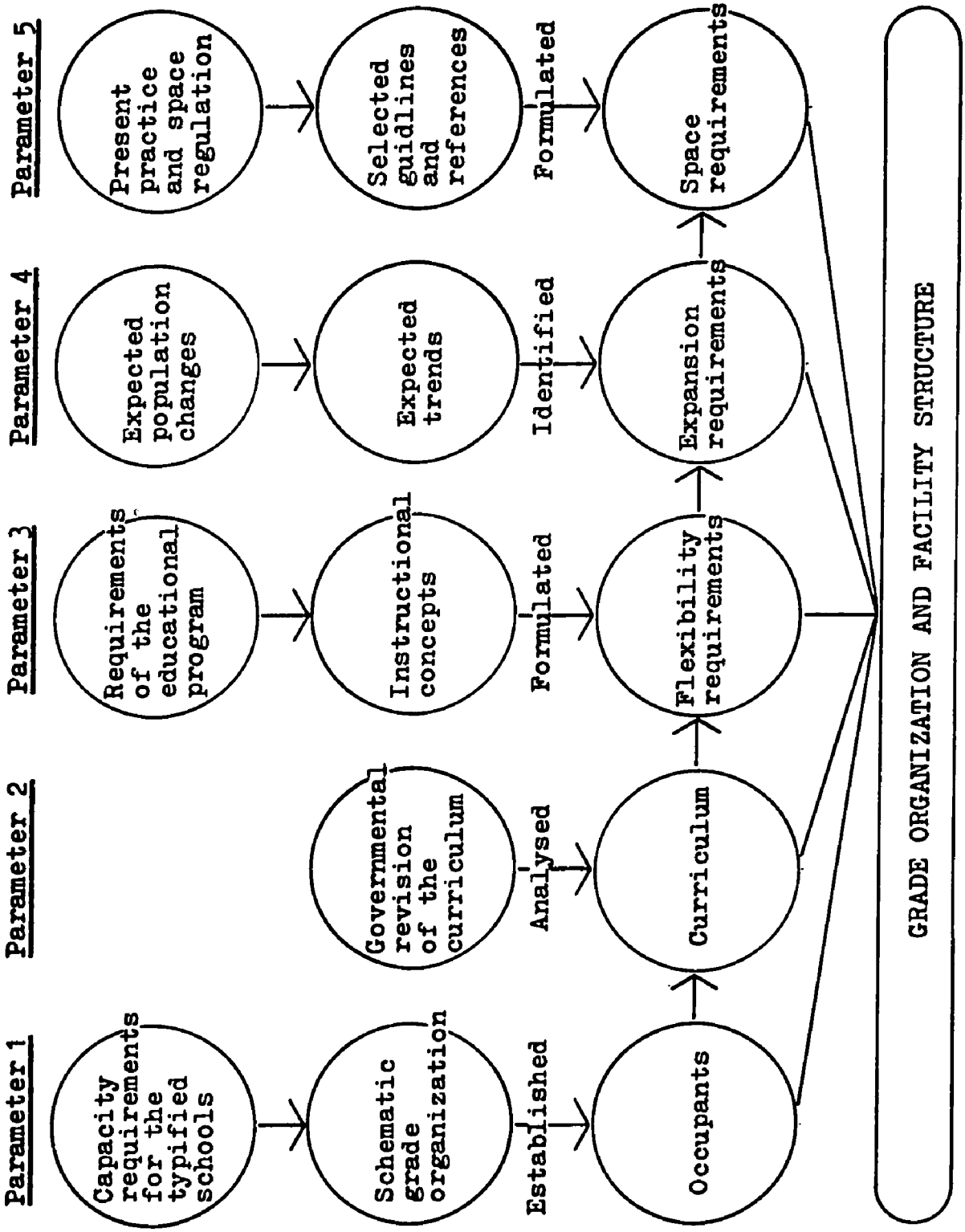
On the basis of these five parameters the grade organization and facility structure was constructed through critical evaluation of applicable alternatives.

The Occupants

Capacity requirements for the typified schools. From the analysis presented in the previous chapter the number of students in each of the yeargroups for the typified units

FIGURE 27

SCHEME OF ANALYSIS



was obtained (see Appendix E). As has been explained earlier, the student number varies greatly. For instance, the first grade varies from 6 to 27, with the exception of the small 1-4 marginal units of 3 students per yeargroup, and grade 7, from 9 to 30. In contrast, but in accordance with the objectives, grades 8 and 9 are relatively large; furthermore, these grades are fairly even with the student number varying from 35 to 41 for each of the two yeargroups.

This low student number in each grade makes graded instruction difficult, and even impossible, for the smaller units; provision, however, is made in the compulsory school law for a higher quota of governmentally paid teaching time for the smaller schools.

Paragraph 79 of the proposed compulsory school law states:

> .....
> Fjölda kennslustunda, sem ríkissjóður greiðir, eða endurgreiðir, skal miða við heildarfjölda nemenda, er stunda nám samtímis í grunnskólum hvers skólahverfis og annast skólanefnd skiptingu milli einstakra skóla.
> Hámarksfjölda kennslustunda á kennsluviku skal miða við það, sem hér segir:
> Séu nemendur samtímis í grunnskóla:
> a) allt að 20, verði kennslustundir á hvern nemanda 3,
> b) 21-100, verði kennslustundir 20, og að auki 2 á hvern nemanda,
> c) 101-350, verði kennslustundir 60, og að auki 1.6 á hvern nemanda,
> d) fleiri en 350, verði kennslustundir 130, og að auki 1.4 á hvern nemanda.
> Sé meðaltal kennslutíma í bekkjardeildum grunnskóla annað en meðaltal kennslutíma samkvæmt hámarki 45. greinar, breytist hámark kennslustundafjölda, sbr. a-d lið hér að framan, í réttu hlutfalli við það frávik.
> .....
> Verði kennslu samkvæmt námsskrá, svo og nauðsynlegri hjálparkennslu, eigi komið fyrir innan þeirra marka, sem tilgreind eru hér að framan, sakir óhentugrar stærðar aldursárganga eða af öðrum gildum ástæðum, skal bæta við stundafjöldann því sem til þarf. Slík viðbót er hverju sinni háð samþykki fræðslustjóra, sem í hlut á, og menntamálaráðuneytisins.

.....

The number of hours of instruction paid for, or reimbursed by the government shall be in accordance with the total number of students concurrently attending the compulsory schools in each schooldistrict and shall be subdivided among schools by the school board.

The maximum number of hours of instruction per instruction week shall be as stated here:

If the number of students occupying the compulsory school at the same time is:

a) up to 20, the number of hours of instruction shall be 3 per student,
b) 21-100, the number of hours of instruction shall be 20, and additionally 2 per student,
c) 101-350, the number of hours of instruction shall be 60, and additionally 1.6 per student,
d) more than 350, the number of hours of instruction shall be 130, and additionally 1.4 per student.

If the average number of hours of instruction differs from the maximum average stated in paragraph 45,[1] maximum number of hours of instruction shall be adjusted in accordance to a-d above, in proportion to that difference.

.....

If instruction and necessary tutoring in accordance with the curriculum is not possible within the above stated frame, because of the inconvenient size of yeargroups or for other legitimate reasons, the number of hours of instruction shall be increased as necessary. Such increase always requires the approval of the appropriate superintendent and the Ministry of Education.

(Translation M. J.)

Paragraph 80.

Ríkissjóður greiðir eða endurgreiðir sveitarfélögum þann launakostnað við grunnskóla, sem hér greinir:

a) Stundafjölda til stjórnunarstarfa er svarar til allt að 7% af hámarki kennslustundafjölda samkvæmt 79.gr., þó ekki minna en 5 stundir á viku.
Stundafjölda samkvæmt þessum staflið skal varið til lækkunar á kennsluskyldu skólastjóra og aðstoðarskólastjóra vegna stjórnunar skóla, eins og hún verður ákveðin og til almennra skrifstofustarfa að hámarki andvirði þess stundafjölda, sem umfram lækkun á kennsluskyldu er,.....

The National Treasury pays or reimburses the commune salaries for the compulsory school as stated here:

a) Hours for administration work, up to 7% of the maximum instruction time according to paragraph 79, but not less than 5 hours a week.

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[1] See Table 1, page 40.

> Working-hours according to this passage shall be used for decreasing the instructional duties of the principal and assistant principal because of their administrative duties as will be decided; and for general administration up to the value of the hours exceeding the decrease in instructional duties,.....
> (Translation M. J.)

The teacher quota for the typified units has been computed according to these and other requirements stated by the law. See Appendix E.

According to the law each compulsory school unit will have a principal. In addition, units having 10 or more full-time teachers are entitled to an assistant principal. In areas where there are small units offering the lower grades only, these units can be considered for administrative purposes as a branch of the comprehensive 1-9 school.

Paragraph 38 of the compulsory school law states:

> fyrir hverja bekkjardeild grunnskóla skal skólastjóri velja aðalkennara. Hann fylgist með námi nemenda sinna og þroska, leiðbeinir þeim og hefur samband við forráðamenn þeirra.
>
> The principal is to elect a main teacher for each class of the compulsory school. He supervises the studies and development of his students, guides them and maintains contact with their families.
> (Translation M. J.)

As mentioned in the preceding chapter, the Ministry of Education has set the objective that schools offering grades 6-9, and wherever possible those offering grade 5, are to have on their staff at least 4 to 5 teachers to allow for specialization.

This division of labor in teaching is considered of great importance by the Educational Research Department of the Ministry of Education. The reports administered by the

Research Department on the revision of the curriculum, and discussed below under the heading of Curriculum, consistently supports the need for specially trained teachers to provide instruction in different subjects.

The compulsory school law provides that if a student completes all the subject matter required during eight years, his compulsory education is considered finished. A student can also ask for earlier transfer to a higher school if his transfer is supported by his head teacher, principal and school counsellor.

It is outside the scope of this study to come to a conclusion about the question of graded versus ungraded instruction. It has, however, become clear during this investigation that the student number and age distribution in the rural setting makes graded instruction difficult, particularly in terms of the number of teachers needed, where the student number ranges from 6 students to a third or a half of a regular class in each yeargroup, as is the case for over two thirds of the rural school units.

The Curriculum

Governmental revision of the curriculum. As previously mentioned, the Department of Educational Research of the Ministry of Education has administered studies on the revision of the curriculum. At the present stage the following studies have been completed: 1) Icelandic, 2) social studies, 3) biology, 4) physics and chemistry, 5) Danish, 6) English, 7) music, 8) art. In preparation are studies on

mathematics and home economics.

The studies are presented in the form of written reports which have been made available by the Ministry of Education. An examination of these studies showed that the statements and opinions presented below are relevant to facility requirements.

Since the reports, with few exceptions, do not refer directly to the facility requirements, and since no study doing so is available, interviews with selected persons involved in conducting the studies and/or coordinating the succeeding development of instructional material and methods have been undertaken, and are reported below.

These interviews are believed to represent the leading opinions of the respective specialist groups, and thus indicate the stage which the governmental research in educational facility requirements has reached.

Icelandic, including reading. In a statement prepared in 1972 by Mr. Baldur Ragnarsson for the Research Department of the Ministry of Education, the key approach is the assumption that the mother tongue is to be regarded as a mode of behavior, and not only Icelandic but all school work is to be based on that fact. This makes it unwise to regard the instruction in Icelandic as an isolated subject but rather as an integral part of the entire school curriculum.

The report discusses the learning of Icelandic under the following seven headings which can be regarded as the main or key phases in an interwoven unity: 1) speech, 2) dramatic expression, 3) general reading, 4) reading of

poetry, 5) writing, 6) grammar, 7) thought, language and meaning.

The need for spaces is not discussed in this statement but the general classroom situation is apparently the point of reference, except in the case of Dramatic Expression.

Most of the phases suggest a general classroom environment for the group and teacher as a whole. In some instances, however, subgrouping and teamwork is suggested, with group sizes varying from the whole class down to two or three students. Dramatic Expression, on the other hand, does require an arrangement of free space for acting, visible from the entire group, and in some instances a stage. The need for a good library is pointed out and also for keeping some sort of book collection easily accessible in the classroom.

In an interview on 28 September, 1973, Ragnarsson, present project coordinator, recommended the following in response to the question of group sizes appropriate to instruction in Icelandic: 1) remedial reading in groups of 1 to 5 students in grades 1-4; 2) recital in groups of 8 to 12 for grade 4 and above; 3) presentation to large groups of two or three times the basic group, by guests such as writers and actors, etc.

Ragnarsson sees the proportion of the united basic group of 24 to 30 students under instruction decreasing as appropriate environments for other instructional patterns are provided, possibly leaving half or less than half of the time for the united basic group.

On the question of particular environmental conditions Ragnarsson pointed out: 1) The spaces for small groups' instruction, recital, remedial reading and tutorial studies need to be well soundproofed from the adjacent spaces. 2) A select collection of books is to be kept in the instruction space and easily accessible to the students. 3) The instruction space for teaching Icelandic in the upper grades, especially grades 7 and 9, is to be in close proximity to the school library. 4) The need exists for a space with a stage or auditorium. 5) Variety in the environment, such as a view to the outside, is desirable as a stimulation in incidental episodes.

Social studies. In its report on the revision of instruction in social studies, prepared in 1971, a curriculum development commission appointed by the Ministry of Education points out the importance of defining the objectives which the subject content and methods are to serve.

The commission suggests that a number of subjects, such as sociology, history and geography, be organized into one unified social studies course. Some specialization, however, particularly in physical geography, beyond and including grade 7, is suggested. Connections with other subjects, such as cultural geography, biology, Icelandic, religion, foreign languages, music and art, are pointed out, with emphasis on an interdiciplinary specification of objectives and course content and on cooperation between instructors.

The commission offers outline suggestions regarding objectives and content. It points out the need for a variety

of teaching methods to be used in order to aid students with differing abilities in attaining the objectives.

The report does not make detailed suggestions for facilities and equipment. The following considerations, however, are pointed out as primary requirements:

The classroom space is to provide for specific project areas permitting free movement and varying working arrangements such as group work. Storage space for projects and equipment is needed, to avoid constant movement and rearrangement. Furthermore, there is a need for storing of supplies, and space where teachers can work on course planning. The use of library facilities and audiovisual equipment is strongly emphasized. Cooperation with other courses, for instance in the form of team teaching requiring a group size of 40-100 students, and social activities among students are considered to be among the important factors which the facility is to accommodate.

An interview on 25 October, 1973, with Mr. Andri Ísaksson, former Director of the Curriculum Revision Plan, revealed that the plans for instruction in social studies lay emphasis on student socialization through social exchange and contact among students on the one hand and between students and instructors on the other, applying the inductive approach as a facilitating device.

Ísaksson envisions a typical lesson in social studies as follows: The instructor presents the assignments or topic to a basic group of 24-30 students, whereupon the group breaks up into work teams of 6-10 in which the students

discuss and work on the assignment, and at the end of the session the results may be presented to and discussed by the unified group. This work team arrangement will occupy 2/3 or more of the instruction time.

In some instances, especially in the upper grades, a small group of 3-5 is required for more independent and elaborate study projects. Furthermore, a group of two to four times the basic group will be required for certain presentations.

The social studies are fairly well suited to non-graded instruction within the frame of certain steps. Broadly, these steps involve the following groups: 1) grades 1 to 3 or 4, 2) grades 3 or 4 to 6 or 7, and 3) grades 6 or 7 to 9.

On the question of desirable environmental character Ísaksson named variety and multiplicity in broad terms together with real-life situations as desirable settings for the conduct of meaningful social studies.

Biology. In the report on biology prepared by a curriculum development commission appointed by the Ministry of Education in 1969, the suggestion made in the report on physics and chemistry,[1] of that physics, chemistry and biology should be regarded as a single organizational whole in the curriculum of natural science.is confirmed. The same general point of view regarding change in instructional methods and to some extent also in the curriculum is expressed by

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[1] The report on physics and chemistry referred to on pages 107-108 was prepared before the one on biology, in fact it was the first one of the curriculum studies.

both commissions. The need for subject unification and coordination with other subjects, such as social studies in the first four grades and later including geography, is heavily stressed.

In terms of space and teaching arrangements the biology requirements are considered identical to those of physics and chemistry, with the addition of field trips.

The requirement for equipment is regarded as considerably greater for instruction in biology than in physics and chemistry, particularly in terms of specimen exemplars and models.

As in the physics and chemistry report, these demands for facilities are considered by the commission to be very modest.

In an interview on 20 October 1973, Mr. Reynir Bjarnason, project coordinator, pointed out the following in regard to the question of instruction arrangement and group size appropriate to the teaching of biology: 1) Instruction will most generally be in blocks of two periods. 2) Presentation to the basic group as a whole will occupy approximately 40% of the instruction time; laboratory exercises by students in groups of 2-6, the group being smaller in the upper grades, under direct supervision of the teacher, will occupy another 40%; and laboratory demonstration by the teacher will occupy 20% or less of the instruction time. All three activities may have to occur during a single block of time, and the clear distinction between them may disappear. 3) Large group presentation to two to four times the basic group.

In the development of the instructional text material the subject is so arranged as to facilitate ungraded instruction.

Bjarnason pointed out that, during the development of the text, growing emphasis has been laid on field trips and environmental recognition. Furthermore, connection with other subjects will include social studies no less than physics and chemistry.

On the question of particular environmental setting Bjarnason sees plants, rodents and aquaria as important elements of the instructional environment in biology, as well as connections with the outside. In terms of equipment adequate access to water and electricity are predominant.

Physics and chemistry. The above mentioned report on the curriculum in physics and chemistry in the compulsory school was prepared in 1968 by a 5-man commission appointed by the Educational Research Department of the Ministry of Education.

The commission points out a need for changing the pattern of authoritarian instruction to one involving more student participation and learning by experience. In terms of course content the commission suggests that the latest experiences gained in the U.S.A. and Britain be used as a guide in developing textbooks and instruction methods for physics and chemistry for the Icelandic school system.

The commission indicates four main tasks in the teaching of physics and chemistry: 1) Laboratory exercises by the students. 2) Demonstrations by teachers with the assistance

of students. 3) Lectures and discussions. 4) Showing of films, slides, models and other audiovisual materials. Emphasis is put on the first two, i.e. laboratory exercises and demonstrations.

As to building and furniture the commission does not make specific suggestions, beyond noting that a classroom, with adjacent storage, equipped with sinks and electric outlets, be provided for physics and chemistry and in addition biology, especially in the lower grades, when circumstances require.

The suggested group size is 28 students and one teacher.

These suggestions are considered by the commission to be very moderate, and the requirements as minimum, for the realization of the suggested changes in curriculum and instructional methods.

An interview on 18 October, 1973, with Mr. Örn Helgason, project coordinator, revealed the leading opinion on the development of the new text material in physics and chemistry to be that no tangible division is relevant either between the text and exercises, i.e. theory and practice, or the main tasks of instruction mentioned above. The subjects, physics and chemistry, are considered as a unified course. To serve the objective of uniform instruction it is assumed that the basic class unit will simultaneously conduct all the exercises under the supervision of the teacher. For certain laboratory exerxises, however, the students will be divided into sub-groups of 2-6 students, regularly 4.

On the question of appropriate environmental setting,

Helgason expressed the opinion that a regular classroom space with movable tables, adequate number of sinks and electric outlets located to avoid congestion of students, as the most appropriate. He further pointed out that the equipments planned for instruction in physics and chemistry for the compulsory stage are relatively simple and easily portable.

Danish. in 1971 a curriculum development commission of six, appointed by the Ministry of Education, delivered a report on the instruction content and teaching of Danish in the compulsory school.

In the report the commission states the objective to be the acquisition of skill in general application of Danish, rather than in grammar, liguistics and history - or, as it is stated, a knowledge of, rather than about, the language.

Development to a more direct method of instruction through speaking exercises is suggested, especially for the lower grades, i.e. learning by using the language. In the upper grades writing and some translation will become part of the curriculum.

The report does not make suggestions regarding group sizes or instruction arrangement, but it appears that the suggestions, if implemented, would require a certain amount of groupwork.

The report suggests a regular classroom, equipped for the teaching of language. Adjacent to the classroom is to be a small room to provide work space for the teacher and storage space for equipment and material.

In an interview on 2 October, 1973, Mr. Hörður Bergmann, project coordinator, gave emphasis to the objective of increased student participation in the instruction of Danish.

In response to the question of the group size appropriate to instruction in Danish, Bergmann pointed out that in an ongoing project for developing instructional textmaterial this objective is aimed at through developing exercises appropriate for group work. In addition to the basic group of 24-30, Bergmann sees a medium sized group of 12-15 or less, and a small group of 5-6.

The proportion of speaking exercises to reading and writing will vary from approximately two thirds in grade 4 to approximately one third in grade 9 in which Danish becomes elective.

In regard to desirable environmental conditions Bergmann considers a view to the outside as an important factor to stimulate unplanned discussions.

English. In the outline of curriculum in English for grade 7 prepared by the Department of Educational Research of the Ministry of Education in September 1972, the primary setting is envisaged as a regular classgroup and a teacher.

The instructional methods suggested are based primarily on verbal communication with the aid of visual material. In addition to books, electronic audio equipment in the form of tape and records is considered a prime necessity. The report does not include discussion of the instructional environment required other than the alternative mentioned above.

In an interview on 24 October, 1973, Mrs. Jaquelene Hannesson, project coordinator, named the oral approach in a group setting as the primary instructional method for the lower grades while in the upper grades reading and writing are introduced, increasing in proportion to occupy approximately two-thirds of the instruction time in grade 9, in which English becomes elective.

In response to the question of appropriate group size, Hannesson specified 12-15 students as a preferable maximum. A typical session begins with the group as a whole, and thereafter breaks up into working teams of 4-6 in which the students talk with each other and the instructor shares his time between the groups and guides discussion and other activities. In the upper grades a certain amount of independent work in groups of 5-6 students was indicated.

Hannesson regards ungraded class arrangement as difficult in the teaching of English, especially in the lower grades. Concerning desirable environmental condition, Hannesson considers good visual contact with the outside world as an important factor for language instruction.

Music. In a report prepared in 1972 by a curriculum development commission appointed by the Ministry of Education, suggestions are made regarding the objectives and extent of the musical curriculum.

The commission establishes two major teaching arrangements: the whole class of ca. 24-30 students and smaller groups which are not further defined. A school choir of 50 students is suggested.

Particular emphasis is laid on dramatization and rythmic activities in instruction of younger students, and a connection with physical education is suggested.

The report recommends that a particular classroom be designated for musical education and view of the emphasis on rythmic activities an area of 90 square meters is suggested. The classroom is to be equipped with a small movable stage, cabinets for storage of various musical instruments, music books and records, and a piano.

The report states that the general assembly hall should not be used for musical instruction, because of possible conflicts with events in the scheduling of choir, orchestral and/or band practice. As no other arguments are suggested or have been encountered in this investigation, this restriction is not considered critical in setting functional criteria for the use of space in rural schools.

In an interview on 19 October, 1973, Mr. Stefán Edelstein, project coordinator, named the following group sizes as the most appropriate for instruction in music at the compulsory stage: 1) small groups of 3-6 students and a teacher for instrumental activities; 2) medium group of 12-15 students for cooperative instrumental activity, band, etc.; 3) the basic group of 24-30 for classroom instruction (including rythmic activities), requiring a free floor space of 70-90 square meters; 4) large group of 2, 3 or 4 times the basic group, particularly in the upper grades, and in addition a group ranging from 12 to 50 students for choir activities.

Edelstein sees team work and cooperation with different activities and subject areas throughout the curriculum as an important factor, e.g. stimulating the student to recognize sound and music as an interwoven factor of our daily environment. He also pointed out the need for a soundproof studio workshop for tape recording and sound experimentation.

Art (handicraft, needlework, drawing). In the report prepared in 1972-73 by a commission appointed by the Ministry of Education to revise and develop the curriculum and instruction in art and craft, the subject is divided into three distinct sub-units - handicraft, needlework and drawing. The instruction time is divided into 25.5% for handicraft, 25.5% for needlework, 35% for drawing and 14% for electives. Instruction is coeducational, and the emphasis is laid on acquisition of certain basic skills and knowledge by each student.

The objectives are the training of students in the distinction of the relationship of man to his surroundings, in the recognition of different qualities, in the development of independent value judgements, and in the awakening of an interest in creativity.

In handicraft the subject matters emphasized are woodwork, metalwork, leatherwork, enamel and bookbinding. In needlework they are embroidery, crochet, knitting machine-sewing and dressmaking. And in drawing they are draughtsmanship, painting and home arts. In addition, but less emphasized as electives, are weaving, pottery and photography.

Some specific suggestions are made as to the space and

equipment needed for instruction and storage. These suggestions refer to those compulsory schools which have yeargroups of approximately 75 to 90 students, or a total of 675-810.

As seen in Appendix D, only four schools outside the two main centers, Reykjavík and Akureyri, have as many as this number.

The report does not specify the functional requirements of the program.

In an interview on 18 October, 1973, Mr. Þórir Sigurðsson, project coordinator for Reykjavík, emphasized the importance of individual instruction in art and craft.

Responding to the question of the appropriate group size, Sigurðsson pointed out that the practice of dividing in two the basic group of 24-30 students for instruction in art and craft is the one most commonly adopted. Groupwork of 5-6 students Sigurðsson sees having some application for instruction in drawing. Another important activity is instruction of larger units such as presentations to a group 2 or 3 times the basic group.

Sigurðsson regards as highly desirable the idea of providing small bays accommodating for instance 2 to 4 students for each of the different tasks such as woodwork, metalwork, ceramics, sewing, drawing, etc., arranged so as to be effectively supervised by one instructor as an alternative for the small school.

Mathematics. A report on mathematics is under preparation by a curriculum development commission appointed by the

Ministry of Education, and some of the course material is already being tested out.

An interview with Mr. Hörður Lárusson, present Director of the Curriculum Revision Plan, on 20 October, 1973, revealed that the following instructional arrangements are regarded as the most promising and practical in learning mathematics in the Icelandic compulsory school of the near future: 1) a basic group of 24-30 students, instructed by one teacher, 2) learning consisting chiefly of independent work by the students and work in small groups of 2-4, under direct supervision of the instructor. For instance, during a typical session the instructor might present a topic to the basic group, after which the group breaks up into small groups to deal with the topic, and at the end of the session the results could be compared or presented to the whole basic group again. For presentation to the basic group, a variety of visual material will be used. Another major instructional learning activity in mathematics will be presentation by a specialized instructor to a large group of, for instance, 3 times the basic group. Regarding instructional arrangements, it is believed that there are only minor variations throughout the entire grades range. Laboratory exercises to a supplementary group of 3-5 students in the slower learner category, are considered essential, especially in the lower grades.

Furthermore, Lárusson envisions team teaching coming into use in the instruction of mathematics, especially in order to use specially qualified teachers more effectively.

Lárusson sees a connection with other subjects of the curriculum such as social studies, mother tongue, and art and craft having importance since he regards mathematics as a supportive skill whose meaning and usefulness first becomes clear to the student through practical application.

Home economics. This subject is presently being investigated by a curriculum development commission appointed by the Ministry of Education.

An interview on 23 October, 1973, with a member of the commission, Mrs. Halldóra Eggertsdóttir, revealed that the following educational arrangements are being considered by the commission: 1) Instruction consisting of two main tasks, one theory and book oriented instruction occupying approximately one-third of the instructional time and the other practical exercises occupying the other two-thirds. 2) Instructional groups, consisting of half of the basic group of 24-30 students. 3) For the practical exercises these groups of 12-15 students are subdivided into work teams of 4. 4) In theory, however, the basic group of 24-30 might in some instances be taken as a whole.

The primary subject matters emphasized in the course of practical home economics are cooking, washing and cleaning. The instruction is coeducational and there are no precedents or plans for ungraded instruction.

The instruction time is planned in blocks of 4 sessions Eggertsdóttir pointed out that, typically, such a block begins with some sort of explanation or demonstration by the instructor, occupying one session or less and followed by

practical exercises by the students.

In response to the question of desirable environmental setting Eggertsdóttir agreed with the suggestion that a home-making laboratory is highly desirable.

As a general conclusion it can be said that the limited scope of available data on curriculum requirements permits only generalized inferences. This difficulty neither prohibits nor invalidates the generalized conclusions and recommendations made in this study.

Flexibility Requirements

Few qualities in educational buildings are valued so highly at the present time as flexibility. What this means in terms of building performance is, however, less commonly agreed upon, and clear definitions are scarce. As stated by the Educational Facilities Laboratories, "flexibility is a high abstraction and only gets its meaning when broken down into specific requirements to fit particular cases."[1]

Requirements of the educational program. Heavily stressed in the literature of the last decade has been the demand for possible alterations in individual classroom size. This demand arises from developments in curriculum and teaching methods. There are few educational requirements that have had more influence on recent school building design. School designers have responded to this in several

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[1] Educational Facilities Laboratories, Educational Change and Architectural Consequences, (New York: Educational Facilities Laboratories, 1968) p.15.

ways, but the movable partition is undoubtedly the most common solution.

Recently, however, there has been a growing scepticism among educators and facility planners as to the effective use of these features.

Donald P. Yates, examining 20 selected schools in the U. S., comes to the following conclusions as to the changing concept of flexibility and utilization:

> There was evidence that the concept of flexibility in school buildings has changed rapidly in recent years and is now characterized by wall-less or open spaces which are divided by movable cabinets, chalkboards and movable furniture and equipment. Non-loadbearing walls were a basic feature of flexibility in all schools, but there was little evidence of these being relocated to change size or use of space. Operable walls were the most frequent space dividers found in the schools but were generally not used as frequently and effectively as were open spaces. Easily movable furniture and equipment were considered to be the most essential and best used features of flexibility. The more recently completed schools showed a higher degree of flexibility, characterized by more openness of space, than those planned and constructed in the early 1960's.[1]

In general it is accepted that the school program should dictate the school space. That is to say, the school space should be a tool suited for the particular tasks demanded by the program. Further, it is generally accepted that the school program is subject to changes within a span of time that is short relative to the lifetime of the school building. Another and even more significant factor is the variety of approaches in teaching and learning that are due

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[1] Donald P. Yates, "Flexibility in School Plant Development and Utilization" (unpublished doctoral dissertation, the University of Tennessee, 1968).

to personal differences and training. So it follows that the flexible building should be a tool suited for a wide variety of tasks. To fulfill this premise we need to define the characteristics of these tasks and their varying accommodation requirements.

A promising approach is to seek to determine the boundaries of the range within which the functional requirements might develop during the time under consideration.

A common demand of all programs in primary and secondary education is that different kinds of opportunities should be offered for teaching and learning different things in different ways.

From the above discussion of curriculum requirements and the extensive available literature relating to instructional patterns and educational practices, qualified in the light of what can be expected to be applicable in the Icelandic compulsory school, it may be inferred that the key issue which dictates the space arrangement is the group size. There are other issues relating to flexibility of the structure, e.g. the use of equipment and electronic devices, but their role is not so important in determining the spatial arrangement.

Some of the issues influencing the question of group sizes shall now be examined.

The pedagogical, curricular and methodological development of the school system should come about as an evolutionary continuity rather than as a reform under heavy pressure from the society or government. New teaching methods planned to

suit each pupil's own individual inclinations are appearing in the forefront of such development. Teaching media are developing fast. Audiovisual instruction is already common practice and cassette television is soon to be available. A retrieval system drawing on a central data bank is around the corner, and this will be followed by a global communication network. A dynamic variety of working methods means more work at the planning stage and less ordinary class work. The common class grouping is supplemented by alternative course grouping at various levels, and by individual coaching.

Multi-purpose instruction in a wide context is one of the characterizing themes in today's school discussion. The need for cooperation as a method is increasing among pupils and teachers.

The Council of Educational Facility Planners describes the component facets of the learning process in terms of 1) reaction learning, 2) interaction learning and 3) action learning, focussing on the students.[1]

Reaction learning may occur either when students are in a group or when they are alone and involves learning experiences where students learn by reacting to a material presented by a teacher, programmed material, books, and the like. It is pointed out that "it is conceivable that some day reaction learning may be conformed largely to retrievable materials and the role of the teacher in reaction learning considerable altered."

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[1] The Council of Educational Facility Planners, Guide for Planning Educational Facilities (Columbus, Ohio, 1969), p. 72.

Interaction learning, involves an exchange of ideas and opinions with others. It can occur only in a group setting.

Action learning is characterized by those situations in which the student learns by doing. It can occur both in a group setting and in an individual setting.

Castaldi divides instructional methods in two groups: 1) methods commonly associated with group instruction and 2) self-instruction.

The former group consists of:

1) Presentation, where "the student receives the instructional stimuli via sight and hearing, the learner being quite passive, the teacher transmits ideas to students by a number of means, such as spoken words, writing on the chalkboard or audiovisual equipment."

2) Demonstration, a method that differs fron presentation in that sight plays a major role in the transfer of ideas to pupils. The teacher sets up experiments more closely approximating a direct experience by the pupil.

3) Diagnostic evaluation - the testing, evaluation and analysis of pupil progress.

The latter group consits of:

1) Self-instruction through use of teaching machines. Such machines vary in complexity but the general principle is programmed learning presented to the student to which he is required to respond.

2) Self-instruction by use of automatic tape replay.[1]

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[1] Basil Castaldi. Creative Planning of Educational Facilities (Chicago: Rand McNally, 1969), pp. 245-247.

In answering the question asked by progressive educators ("as the individual student moves through a formal education program, what different kinds of opportunities should he have for learning different things in different ways?"), Educational Facilities Laboratories, Inc., sketches five kinds of activities and settings which educators have come to feel should take place for maximum learning:

1) A conventional class having more application in the lower than the upper grades.

2) For independent study, a private intimate space with minimum of distraction, in combination with a library learning center. This activity increases substantially in the upper grades.

3) For dialogue, a two-way relationship with an intimate environment, e.g. a small space where a teacher and student may talk together with a fair amount of privacy.

4) In seminar or small group instruction involving 12 or fewer students with or without a teacher, space for close communication by discussion or other direct working relationship.

5) In presentations and large unified group instruction, space for an essentially one-way communication of a body of information. This activity is being used more in the upper grades. It involves the possible use of inexpensive videotapes and international telecommunication via satellite, providing opportunities for bringing the world's people and events into each school.[1]

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[1] Educational Facilities Laboratories, Educational Change and Architectural Consequences (New York: Educational Facilities Laboratories, Inc., 1968).

Instructional concepts. In viewing this new situation it appears that for making inferences applicable to final design the teaching can be divided into three simplified categories: 1) classroom teaching (the basic group) 2) group work (large or small groups), and 3) individual work.

In addition to the basic traditional classroom group of 24-30 pupils there may be groups of various sizes and combination at various levels and in elective or voluntary subjects. This adds a number of new dimensions to the group size, which may even change during the course of a single session.

Thelan has defined the optimal group size as,

> ... the smallest group in which it is possible to have represented as a functional level all the socialization and achievement skills required for the particular learning activity at hand.[1]

In fact this implies, as set forth by Thelan, that a group size may vary from two to some hundreds of students due to function, purpose and social condition.

This principle, if applied, calls then for a wide variety of spaces providing an appropriate setting for each group.

Several suggestions are available as to the most suitable group sizes.

Frazier considers the following as promising; 1) large group, 2) seminar groups (of 8-15 students), 3) laboratory groups (of 3-8 students), 4) tutorial

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[1] H. A. Thelan, "Group Dynamics in Instruction: The Principle of Least Group Size," The School Review 57, (1949) pp. 139-148.

instruction, 5) independent study.[1]

On the other hand, Castaldi sets forth group sizes of 6, 15, 30, 60, 90, 150 and 300 students,[2] while Savela suggests: 1) large group, multiple of the basic group of 96 pupils or more depending on the school's size, 2) basic group of 32 pupils, 3) small groups of 4-12 pupils, and additionally group work in 4) discussion group of 12-16 pupils, 5) working group of 2-5 pupils , and 6) private study.[3]

Daleman envisions the following setting: 1) Conveyance of information for the large group of 70-140 students, 2) informal meeting for the basic group of 25-35 students, 3) informative processing in course groups 12-18 students, 4) information dialogue, 5) information treatment in detail.[4]

It is obvious from these cited examples and from the opinions of other authorities not quoted here that there is a wide variety of possible group sizes.

Granted that the absence of validated research and a recognition that the subjective origin of recommendations

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[1] Alexander Frazier, ed., The New Elementary School (National Educational Association of the U. S. Dept. of Elementary School Principals, 1968), p. 63.

[2] Basil Castaldi, Creative Planning of Educational Facilities (Chicago: Rand McNally, 1969).

[3] Arno Savela, "Peruskuulu uudistaa opetustillt (the Open Plan School - the School of the Future)," Aarkkitehti 7, (1971) pp. 34-36.

[4] Harald Daleman, "Schulbau heute für Morgen," DLW Nachrichten 53, (1972), pp. 37-40.

in the area does not lend scholarly credence for establishing specific suggestions for the Icelandic schools, the general trends can, however, be inferred in order to provide a point of reference. Such inferences of the general trends indicate that at least the following teaching/learning groups might be useful and are likely to occur in the Icelandic compulsory school, each with specific space requirements (see Figure 28):

1. The basic group of 18-28 pupils.
2. Large group, multiple of the basic group by 2 to 4 depending on the school's size.
3. Small groups, 4-12 pupils.
4. Private study.

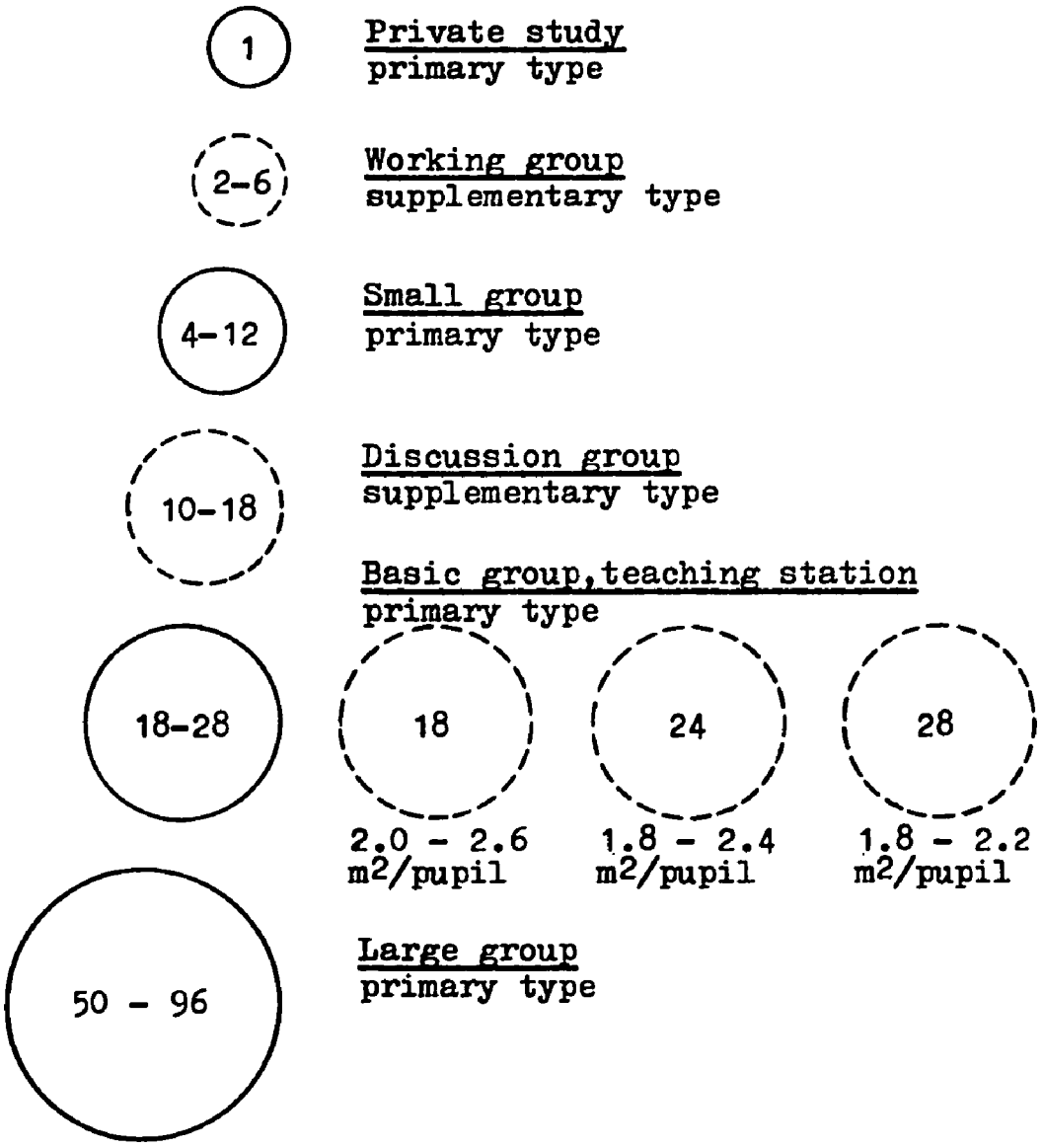
In addition supplementary discussion groups of 10-18 students and a working group of 2-6 students might be considered.

Expansion Requirements

The uncertainties common to all educational facilities imply that the planning approach must involve a set of principles which will provide buildings capable of responding to the needs of growth. The facility must be planned so that it can meet these needs. Not only does it require space around it but it must be internally planned to permit future expansion without serious interruption of its performance capability. It must permit expansion to be made in managable increments to match any gradual change in the education program and community needs, and to correspond to the uncertainty and limitations of available funds.

FIGURE 28

TEACHING/LEARNING GROUP TYPES



Expected population change. The population distribution and socioeconomic development expected during the planning and forecast period analysed in the preceding chapter (see Appendix B), revealed that a low population growth rate is to be expected in the rural areas. The small size of the typified unit also makes feasible that it be designed with a flexibility within the range of the population growth generally expected to occur during the forecast period up to 2001 or beyond.

Since the need for growth has been established to be fairly limited in scope in the near future, the problem of expansion is not critical for these rural school facilities. Nevertheless, the problem of building in stages is one which needs to be considered because of the limited available funds. A related problem is the need for additions to existing facilities, either on a permanent basis or as a process of phasing out; this problem may require different design solutions although the approach can be the same as it is in completely new facilities.

Expected trends. In some areas socioeconomic conditions may change because of industry or other enterprises which can not be foreseen at the present. Attempts to meet these uncertainties can only be made through individual evaluations of each setting.

Another and more uncertain factor is represented by the changing methods and operations of the schools. At present there is little evidence to indicate the direction in which future long term development might go in terms of facility

requirements. Higher standards, however, usually require additional spaces.

Space Requirements

In determining the different areas needed, the functional relationships between different task groups must also be brought into play. For example, as tasks in one department increase, its size has to be correlated with the sizes of other functionally related departments, if a balanced space allocation is to prevail. This requirement has critical implications in making detailed space assignments to various differentiated tasks.

A comprehensive survey of such relationships is outside the scope of this study; such analysis could, however, provide a useful guide for both the building designer and the Icelandic government in its control of cost allowances and at the same time direct the design development in a more flexible manner than would be possible with a static room-size schedule.

A schedule of room-size accommodation is closely related to and partly determined by the concept of spatial arrangement itself; this in turn is a design decision resting on appropriate criteria of values. The room-size schedule is then found more effective as a tool in the design process than as a parameter for the performance requirement.

Present practice and space regulation. Analysis of the space-allowance standard now in use shows that the relationship of allowable space per student for the combined primary

and secondary school, i.e. grades 1 to 8, follows closely the function $8 - \frac{P}{350} = A$, where P is student number and A is m^2 per student, determined to be valid within a calculated range of 120 to 400 students per facility. For comparison it is to be noticed that the norms refer to double occupation of classrooms for grades 1 to 6.[1]

In general this space allowance is approximately adequate to fulfill the established performance criteria within the following range: 1) schools having at least one class or approximately 24 students in each yeargroup; and 2) schools within the existing range of uneven distribution which have a total of at least 300 students. The remaining schools proposed in this study, most of which are to serve smaller school populations in villages or rural areas and which have uneven distribution among grades, need more space.

Selected guidelines and references. In general, validated research on optimum size or capacities of instructional spaces is scarce or does not exist. Despite the promising projects sponsored by Educational Facilities Laboratories, Inc., the facility planner still has to rely on professional judgements, opinions and practices which may not be based on empirical findings. At this stage of affairs it is important to recognize the subjective origin of the practices and opinions applied in designing school facilities.

The situation requires that each school facility planner consider the particularities of each individual school setting.

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[1] Menntamálaráðuneytið, Reglugerð nr. 159/1969, um stofnkostnað skóla ásamt lögum nr. 49/1967, um skólakostnað (Reykjavík: Menntamálaráðuneytið, 1969), and Indriði H. Þorláksson, August, 1973.

In approaching this task several methods and approaches can provide useful aid. The conceptual task-tool-space approach (see Figure 29), has also been described by Castaldi as "The Functional Analysis Approach":

> The most satisfactory method of determining the size of instructional spaces is to list all of the major activities that are expected to occur in a given space, together with the type of equipment and number of pupils that will be involved in each activity. A layout designating the space needed for the equipment and for each pupil or group of pupils will yield the approximate area needed for the activity in question. The total area included in a teaching space is the sum of the combination of activities carried on simultaneously which requires the greatest floor space. It is presumed that other teaching experiences can be conducted effectively within the given space even though the room is larger than it actually needs to be for the activity under consideration.[1]

Grade Organization and Facility Structure

Paragraphs 48 and 49 in the proposed compulsory school law, state the objective of graded teaching for grades 5 and above. The same policy objective has been stated in the suggestion, prepared by the Ministry of Education, for school organization in districts planning new facilities. As mentioned earlier, this objective is difficult for the small school units to reach because of the low number of students in each yeargroup.

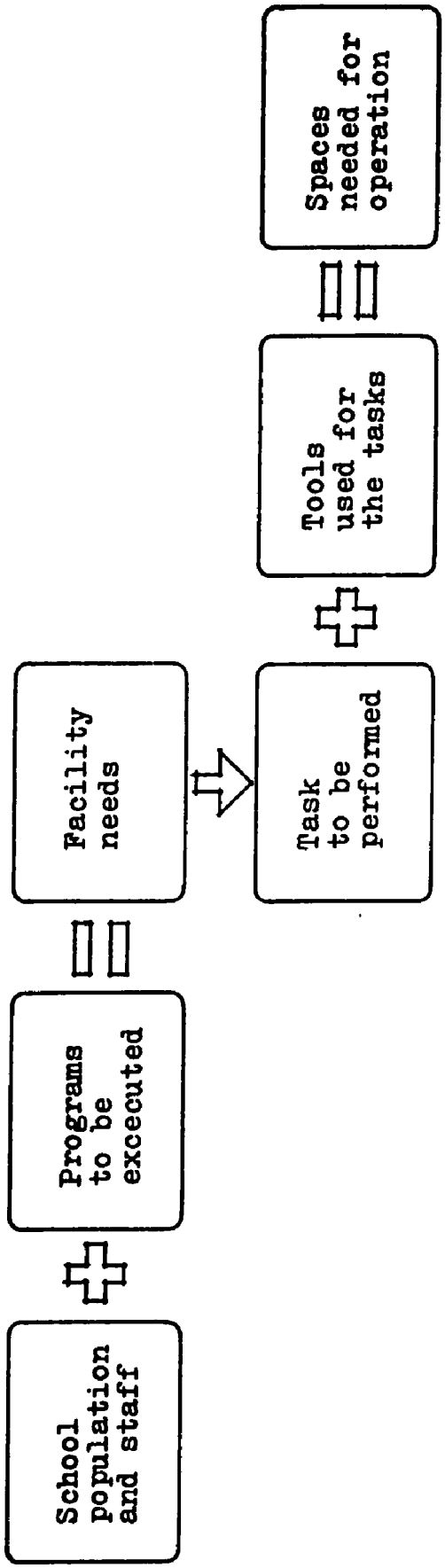
In the light of different opinions which prevail at present regarding the benefits of graded class organization, the opportunities incorporated in ungradedness as expressed

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[1] Basil Castaldi, Creative Planning of Educational Facilities (Chicago: Rand McNally, 1969), p. 249.

FIGURE 29

PRIMARY RELATIONSHIP OF THE FUNCTIONAL ANALYSIS APPROACH



by Rollins, Glogan, Goodlad and Anderson, and others,[1] and the doubts generally expressed by educators about the chronological age as the most valid criterion for the grouping of students into classes, the issue of graded versus ungraded instruction in these small units becomes crucial in importance.

Since this issue appears presently at a stage where decision depends as much on individualized policy as on empirical evidence, an investigation of other benefits relating to both alternatives has been undertaken. It was found that graded instruction for these small units requires a schedule arrangement and facility less easily adaptable to different teaching arrangements.

The substantial variation in weekly school time in the different grades (22 sessions in grade 1 and 38 sessions in grade 9), and in geographical setting which requires the use of the same school bus for all grades, makes a single usage of the basic teaching stations an obvious necessity for the rural areas.

In establishing a facility structure in terms of the number of basic teaching stations needed for the typified school units (Type 1-4, Type 1-7 and Type 1-9), several alternatives were investigated. An ungraded structure for the basic groups up to and including grade 7 appears most suitable with regard to the facilities, since this structure permits: 1) the assignment of a regular group size home

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[1] Sidney Philip Rollins, Developing Nongraded Schools, Lillian Glogan and M. Fessel, The Nongraded Primary School, Goodlad and Anderson, The Nongraded Elementary School.

station to each group up through grade 7, 2) the restricting of 90% of the groups to a size of 18-24 students. For each of the typified units the number of required teaching stations and the proposed grade grouping was then recorded according to this alternative (see Appendix E).

Another variation of this alternative is to carry the ungradedness for the basic group only up to grades 4, 5, 6 or 7. This suggestion, in addition to requiring additional teaching stations, gives a substantially higher number of basic groups. Since the number of teachers remains the same, this reduces the opportunities for flexibility in teaching arrangements, for variety in subjects offered, and for individualized teaching. The criterion of only grades 7 and above being graded requires one additional home station for three out of four typified 1-7 units and three out of six of the typified 1-9 units, with other postulates remaining unchanged.

Departing from the concept of a home station for each basic group makes possible a decrease in the number and an increase in the use of teaching stations. A drop in the number of teaching stations, however, excludes the alternative of rotating classes and graded arrangement, greatly restricts alternatives in scheduling, and limits the possibilities for flexible grouping and instructional arrangement.

The alternative of using subject stations in favor of home stations with ungraded classes is covered.

The only one of the above discussed alternatives not

covered is the combining of graded instruction and a home station for each group. But as this combination requires a substantially higher number of basic teaching stations and a facility less flexible in comparison with the other above-mentioned alternatives within the same amount of space, and in addition causes substantial difficulties in scheduling teachers for the stated amount of instruction hours, this combination appears less desirable.

It is to be noted that these inferences are valid in general, but that some of the units involve slightly different alternatives, due to their particular size and the distribution between yeargroups.

In establishing priorities for the rural schools with yeargroups of 6 to 18 students, gradedness up to and including grade 7 has not been considered feasible, given the condition of providing a home station for each yeargroup. On the other hand, the possibility of a home station or a separate classroom for each of these proposed ungraded classes has been investigated in terms of applicability. Investigation showed that home stations are feasible conditional upon ungradedness and not far from the common space standard presently applied in Iceland. This alternative was then elected for further study.

CONCEPTUAL SOLUTIONS

Establishing a conceptual solution for any proposed school facility must include a recognition of the balance considered proper among the relevant criteria. The conceptual

solutions advanced here may be regarded as a body of beliefs, assumptions and knowledge established through critical analysis.

These comprise the following:

1. Matching of Function and Structure, with reference to the structure being static and the function being multiple and dynamic with regard to time.

2. Primary Spatial Organization, such as the relative merits of centralized and decentralized facility and the like.

3) Primary Environmental Character, such as esthetic qualities, orientation, relationship between indoors and outdoors, and the like.

Matching of Function and Structure

The premise that the building is to fulfill a set of specific functions and that these functions are to determine its design, becomes complex when the functions are dynamic and multiple and of varying duration.

As McClurkin observes,

> Demands on school facilities have expanded progressively from shelter to comfort, to controlled learning environment, to positive aids to learning.....

and as he continues,

> .....although the basic goals of education have changed little in recent decades, the knowledge and understanding of how to attain these goals has changed greatly.[1]

It is a commonly accepted premise that a radical and accelerating change in instructional practices is to come

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[1] William Dean McClurkin, School Building Planning (1964)

within a relatively short time; indeed some major changes in educational practices have occurred recently, or are taking place at the present.

A common denominator for all such new developments is the individualization of instruction, i.e., the recognition of individual differences in students and the adaptation of educational programs to these differences. The schools are trying toserve the particular needs of each child, including the talented child and the slow learner.

> Until recently there was no economically practical way to make instruction truly individual. ...Today, however, innovating educators start with the student and with many programs. On the premise that no single program is applicable to everyone, they attempt to meet each student where he is and adapt a combination of programs to his needs. Around this central idea the various new procedures fall readily and fruitfully into place. .....[1]

There are several patterns which show promising potentiality toward this end; some of these are widely used. None, however, has scientifically substantiated superiority. So it follows that scholarly approval can not be lent to the selection of any particular instructional pattern.

A prerequisite in the planning of facilities is that they be highly responsive to the educational desires of the particular people who will use them. It is generally accepted that the school can not only enhance and stimulate the educational process but that it can retard desirable educational development by not responding to essential functional and environmental needs.

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[1] Educational Facilities Laboratories, Educational Change and Architectural Consequences (New York: Educational Facilities Laboratories, 1968), p. 12.

It is therefore essential that the building can permit changes in the educational process, in terms of both teaching programs and instructional practices. As the time lapse between the introduction of a new method and its general application is considerable, provision can often be made some time in advance for the most promising alternatives which are likely to be introduced.

There are three alternatives for matching a static building and a dynamic function over a long period of time: 1) to dispose of the building and build a new one, 2) to change the building, 3) to make the building less specific and not exclusively tailored to a particular function.

It has been and still is a common attitude to regard buildings as somewhat eternal, to build for the future, and disposable buildings have not developed. Functional changes have been met by altering less permanent interior parts and by designing uniform spaces fairly adaptable to many functions. A distinction between permanent and temporary elements has been made, so as to allow, for instance, changes in interior walls, doors, and the like, without interrupting the structure, enclosure, mechanical services or main circulation.

In fitting an essentially static structure to a multiple, dynamic and continuously developing functional pattern, the most promising approach is to establish the range of variation of the key determinants considered relevant for a chosen period. When this has been done a design strategy covering the maximum range of such variables can be formulated.

This approach to the problem is made with a view to designing schoolhouses which do not conform to any single fixed pattern of school organization, since the alternative, namely that of planning the school facility to match one particular instructional pattern, carries with it the danger of early obsolescence following any changes in instructional practices.

In the view of educators and school planners, as it appears in the literature and other sources pertinent to this study, some aspects of school organization have an extraordinarily strong relationship to the spatial arrangement of the facilities, while other features, only weakly related to the spatial arrangement, may be applied effectively within a much wider range of environmental conditions.

It was found that a facility corresponding to the following key patterns would provide an approximate spatial arrangement encompassing the essence of all the major ideas for instructional organization currently appearing in the major literature:

1. A continuum from the self-contained classroom to the open space arrangement.
2. A continuum from graded to ungraded class grouping.
3. A continuum from home station assigned to each group to a departmentalized organization.

A facility adequately providing environments for these three primary patterns would incorporate provision for concepts such as variable group size, team teaching,

programmed instruction, the use of instructional technology and the like.

The new programs and instructional methods often require more specialized spaces. In general, but especially in small schools, these spaces get relatively low utilization. From the standpoint of cost these needs are difficult to fulfill. Therefore a search must be made for a solution which involves high multiple use of space.

Primary Spatial Organization

In view of the age distribution, the school size, and especially the social background of rural children, a unified spatial concept is suggested rather than a decentralized one, such as sub-unit or cluster arrangements.

The need for security and belongingness supported by educators is not invalidated, because of small unit size, age distribution and social condition. The social goal here is to bring the rural pupils together, help them learn to know children from other families and of different ages.

This unified spatial concept should create a single focus or heart of the facility. However, where two-storey structure may be desirable, for instance in the larger schools, the focus might have to be repeated on two floors. Furthermore, this concept should be accompanied by a spatial organization facilitating a clear and strong sense of orientation and direction within the building.

The circulation pattern should not be subject to congestion and the people should flow easily and directly

through the building.

At present both the social scientists and the educators emphasize the importance of socialization in the educational process.

According to Ruch:

> Man everywhere seems to have certain basic psychological needs which he expresses through the social pattern of his particular culture. [1]

And Castaldi concludes:

> If, as is quite evident, social activities underly the development of feelings of belongingness and security among individuals, and if human beings come better adjusted to their social environment, as these two psychological needs are met then a wide variety of sensibly planned social activities and groupings in school will tend to produce well adjusted students. [2]

Accepting this premise, a well-formed lobby and suitable areas for congregation throughout each building should be provided.

Primary Environmental Character

The question as to whether the school environment can influence learning to any significant degree, has not been settled; there is a strong likelihood, however, that the environment can to some extent facilitate the process.

As stated by Educational Facilities Laboratories:

> The richest possible direct experience with the physical world has, according to recent psychological research, a good deal to do with the vigour and

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[1] Floyd L. Ruch, Psychology and Life (Chicago: Scott Foresman and Co, 1958), p. 138

[2] Basil Castaldi, Creative Planning of Educational Facilities (Columbus, Ohio, 1969), p. 109.

sharpness of the young child's intellect.[1]

Some psychologists argue that man is most satisfied when occupied by challenge. Of the two attention models, the voluntary and the involuntary, the student's school work relies most heavily on the voluntary one. Since these two attentions can not take place simultaneously, involuntary attention relieves the voluntary one. In this case a neutral, uniform, unchallenging environment containing minimal message and stimulation potential seems unlikely to cause any involuntary attention. Thus voluntary attention may become more weary than in an environment which more specifically occupies the involuntary one.

In school the environmental factor has crucial general importance, since the occupants are to a certain extent closed off from the outside world for a long and continuous stay.

The hypothesis that esthetic experience is a human necessity for mental well-being, satisfaction and intellectual ability is accepted here. By esthetic experience is meant an intellectual experience aroused and stimulated by a message received through the senses. This message tends to challenge the involuntary attention to understand and sense relationships which in turn are experienced as satisfaction and pleasure.

Educators aver that the watching of nature is an

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[1] Educational Facilities Laboratories, Educational Change and Architectural Consequences (New York: Educational Facilities Laboratories, 1968), pp.24-25.

effective medium for teaching the basic concepts and relationships of life, its complexity and harmony. It is logical to assume, therefore, that the building itself has somewhat similar potentialities as a medium for the teaching of man's cultural relationships and his attitude to materialistic creation.

Those seeking new concepts and forms in architecture today agree on the desirability of maximizing the number of factors of concern. The response to this problem has been characterized by methods proven effective in natural science. Since these methods in general require quantified measurement criteria considerable efforts have been made to measure a wide variety of parameters related to feelings, behavior, and the like. This has resulted in an overload of information which in turn has led to intensive search for analytical tools to deal with the complexity. Less attention has been given to the non-quantifiable aspects. This has resulted in a considerable confusion in architectural trends which strongly characterizes the last decade.

One of the fundamental questions which calls for an immediate answer is: Do the parameters which are measurable at present cover a sufficiently broad spectrum of human values to substantiate criteria satisfactory as an objective for environmental design - or do we require the built environment to be something more than a tool for an explicit purpose ?

Here we reach the question of expression as a mean for environmental qualities and cultural continuity.

During the last decade architectural expression has, with some exceptions, been applied as a secondary factor in school design. This factor is, however, the primary responsibility of the architect in his duty to maintain proper balance among all criteria by applying the "right" set of values. What "right" means is a philosophical and cultural question to which no universal answer can be found.

If, for the sake of argument, we disregard function as the only key to purpose and regard it as one among many qualities of matter, we may have to rethink our attitude toward matter - from artifacts as merely instrumental, to be seen and evaluated only in the light of the purposes for which they are fitted, to objects with certain qualities or character to which we respond as a whole because of what they signify. To cultivate matter would then not only be limited to applying a set of operations intended for fitting the object to particular tasks but a broader concern to increase the object's total capabilities.

The long arctic winter night and short daylight has made sunlight one of the most important values in the Icelandic environment. Recognition of direct sunlight as an element in building design is therefore highly desirable. On the other hand, any overuse which can result in physical inconvenience is to be avoided.

The building should provide a feeling of shelter and security from the rather hostile, but scenic, surrounding nature. The natural environment of Iceland expresses the strength of natural forces, such as wind and water, rather

than growth and complex life systems.

In Iceland a view into nature from a well sheltered building has become the single most commonly valued quality of the relation of man-made environment to its surroundings. To be able to see for long distances towards mountains, lakes, valleys, etc., and to watch the weather change such scenes every few hours is highly valued. This need has its roots partly in the Icelanders' philosophical attitude of regarding nature as alive, not only in the biological sense but as having a soul. Without elaborating further on this subject, it is recommended that an architectural concept of a school facility for rural Iceland should recognize view as one of the primary factors in the relationship and orientation of buildings to their surroundings.

DESIGN PROPOSALS

Material and Construction

As this study does not address the question of building technology and construction methods the design proposals presented here refer to the practice of construction and building technology applied in Iceland at the present.

It is realized that different technology might and would create different designs, however, the relatively slow rate of change in the Icelandic building industry during the past decade both in terms of material used and working methods does not point toward radical change during the immediate future.

The Icelandic building industry consists of small local contractors relying on skilled craftsmen rather than mechanization. At present the construction of new schools is under the management of the local authorities, however, the government is exercising increased supervision.

The chief building material is concrete and suitable aggregates are available within a few miles all over the country. Concrete has thus become the material used both for structure and enclosures. The concrete is poured on the place in wooden forms of different types. Precasting is only in its early stage and standardized building parts and prefabricated components are not available.

On the exterior the concrete is frequently exposed. Insulation of styrofoam is placed inside and covered with plaster. Interior walls are most commonly of lightweight lava-stone blocks generally plastered but walls of wood fiber boards on wood frames are also in use. For windows double plated thermal glass in wooden frames is the common practice. Doors and frames are of wood in natural finish or painted. Cabinet work and attached furnishing is of wood or plastic laminate.

The most common heating system is central heating by warm water with radiators placed beneath the windows. The heat source is either hot water from geothermal source or heated by electric resistance heaters. Still certain amount of buildings are heated by oil, especially in the rural areas. In the light of the recent oil crisis the Icelandic government has declared the policy of utilizing

the country's resource in hydroelectric power for heating in all areas where geothermal energy is not available.

Most frequently ventilation of buildings is through open windows with supplementary mechanically forced system where needed.

Depending on location, school buildings are connected with water and sewer system of the community or separate systems are provided.

The designs presented here refer to a structural system of concrete poured into wooden forms on the place. The modular grids chosen give possibilities for reuse of forms and more rational working methods.

With regard to other aspects the designs refer to the common practice described above.

Design Proposals

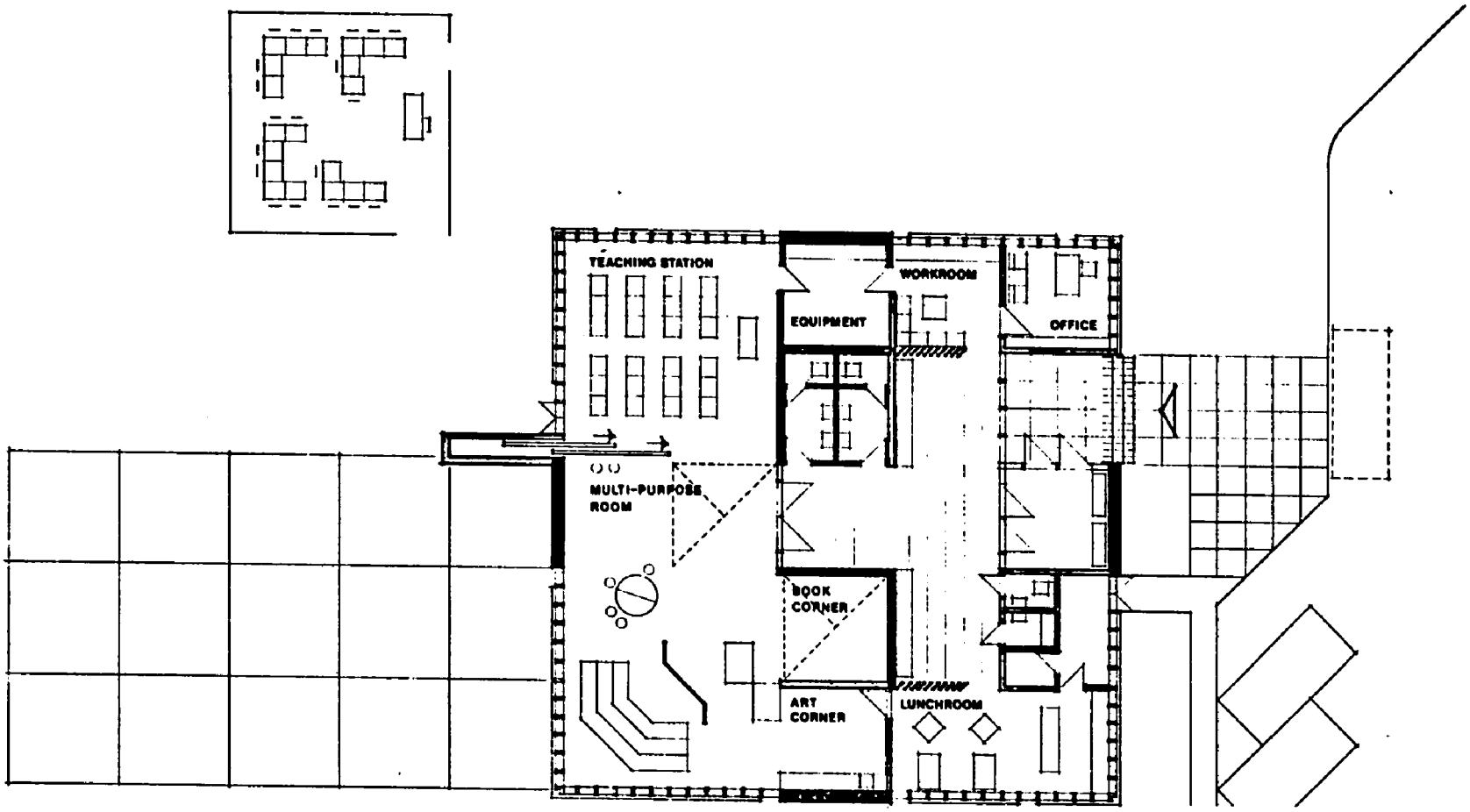
Type 1-4: The design drawings show a school for grades 1 to 4 accommodating 24 students who are transported daily to and from school. An alternative design shows a house for the principal combined with the basic structure (see Figure 30, pp. 146-153, 8 drawings).

Type 1-9: The design drawings show a school for grades 1 to 9 accommodating 248 students who are transported daily to and from school. An alternative design shows a dormitory included in the structure for 16-20 students (see Figure 30, pp. 154-162, 9 drawings).

FIGURE 30

DESIGN PROPOSALS FOR TWO SELECTED TYPES OF SCHOOLS: TYPE 1-4, FOR 24 STUDENTS AND TYPE 1-9, FOR 248 STUDENTS

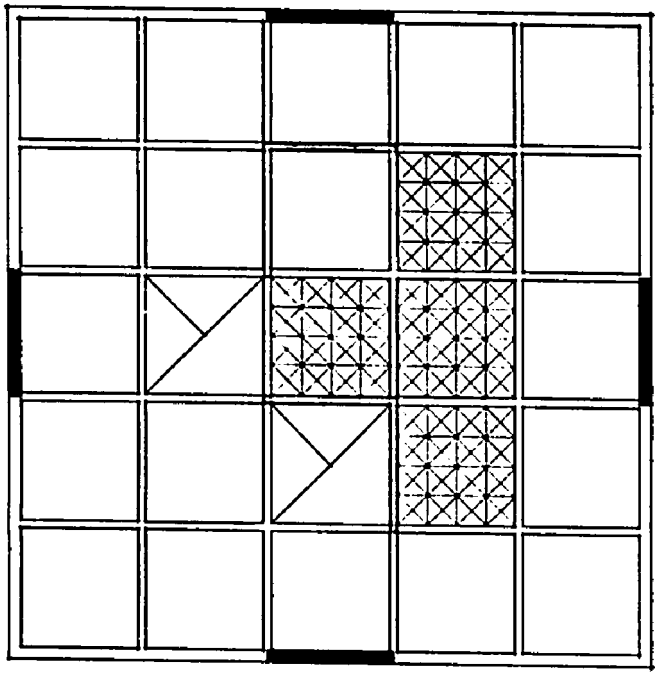
See the Following 17 Pages of Drawings.



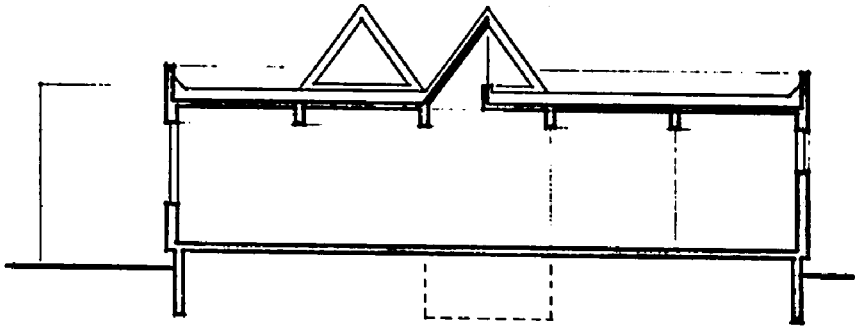
PLAN 1:200

TYPE 1-4

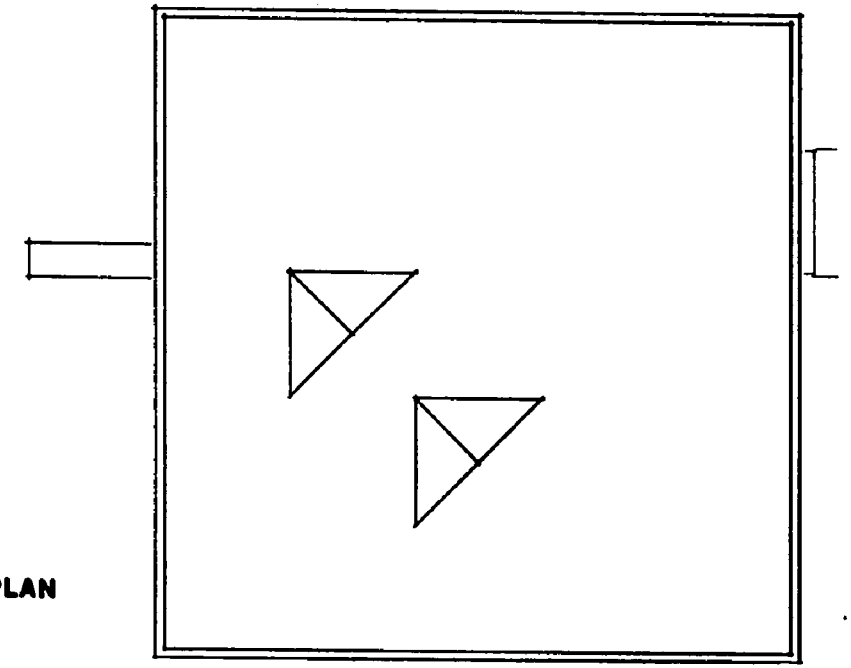
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STRUCTURAL SYSTEM 1:200

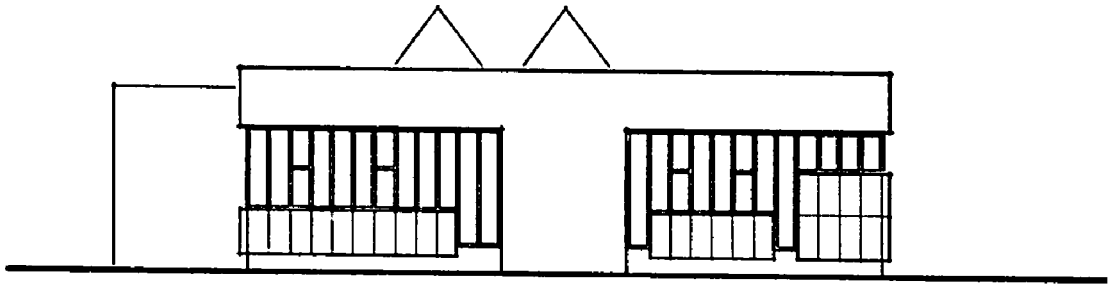


SECTION 1:200

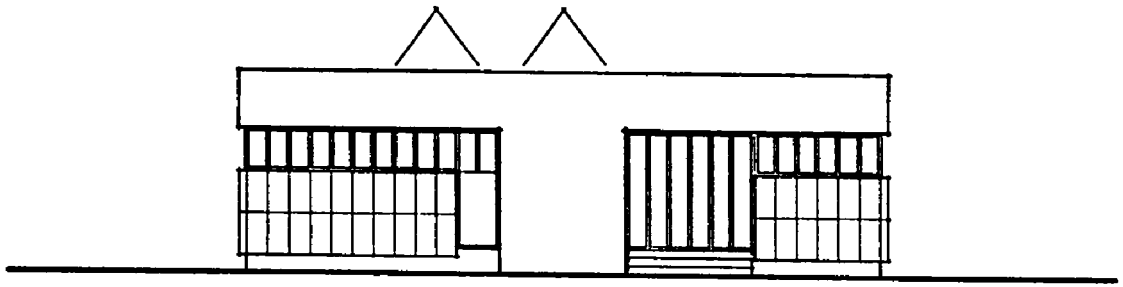


ROOFPLAN

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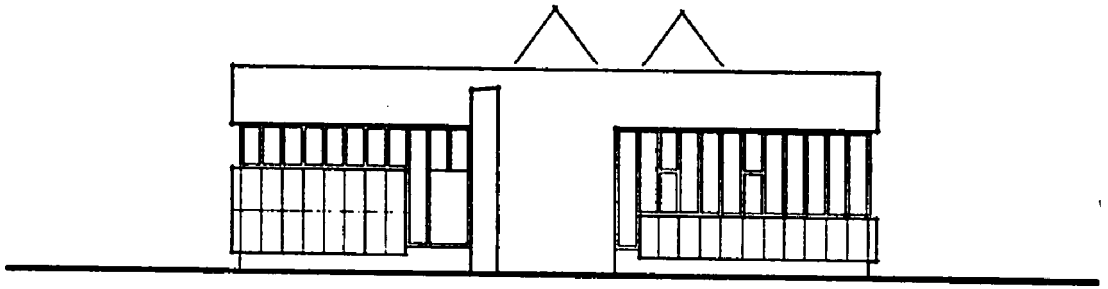


NORTH ELEVATION

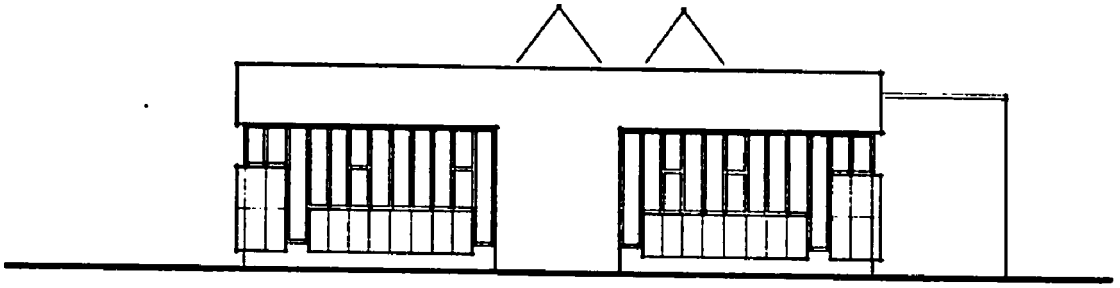


WEST ELEVATION

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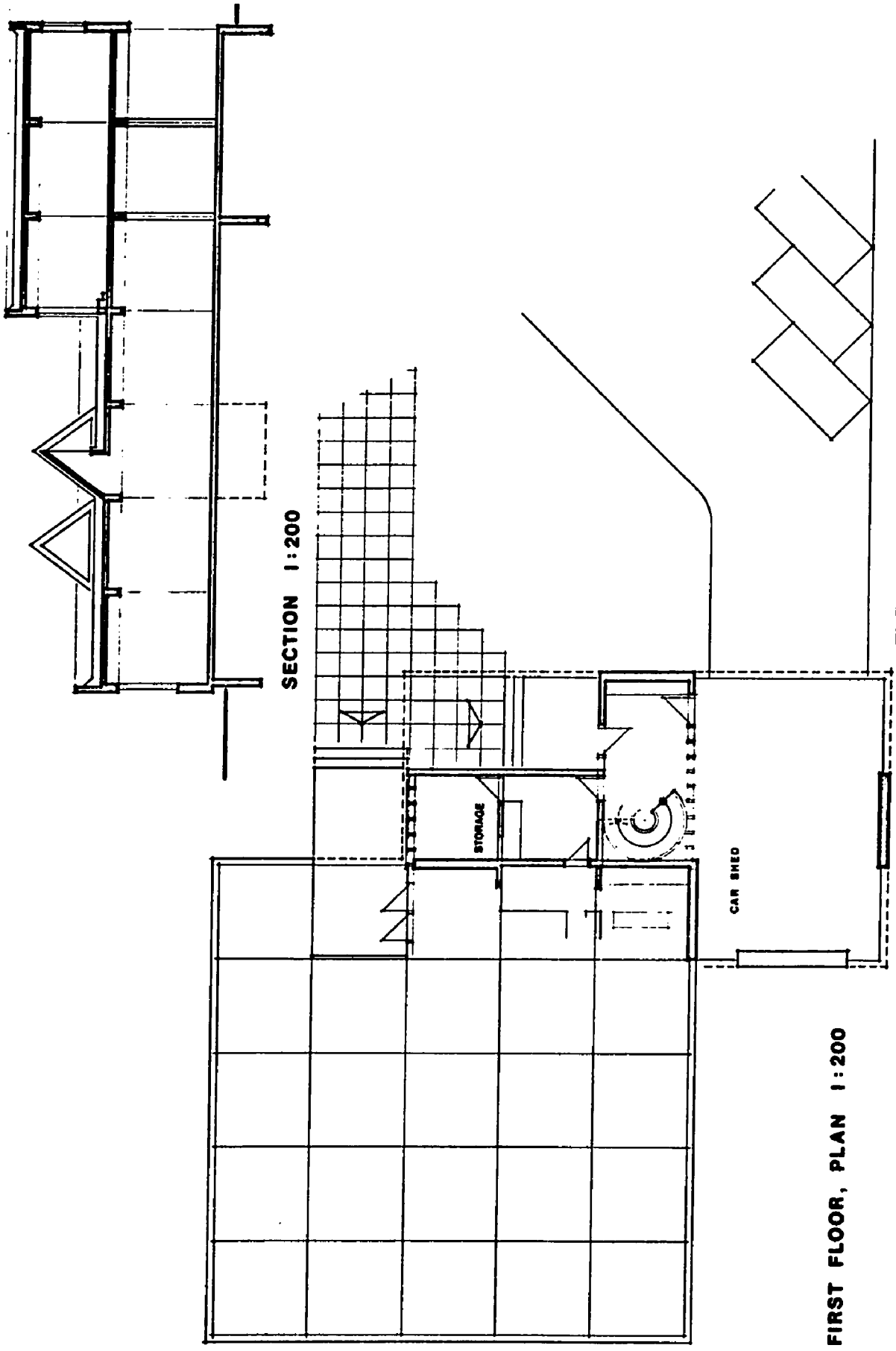


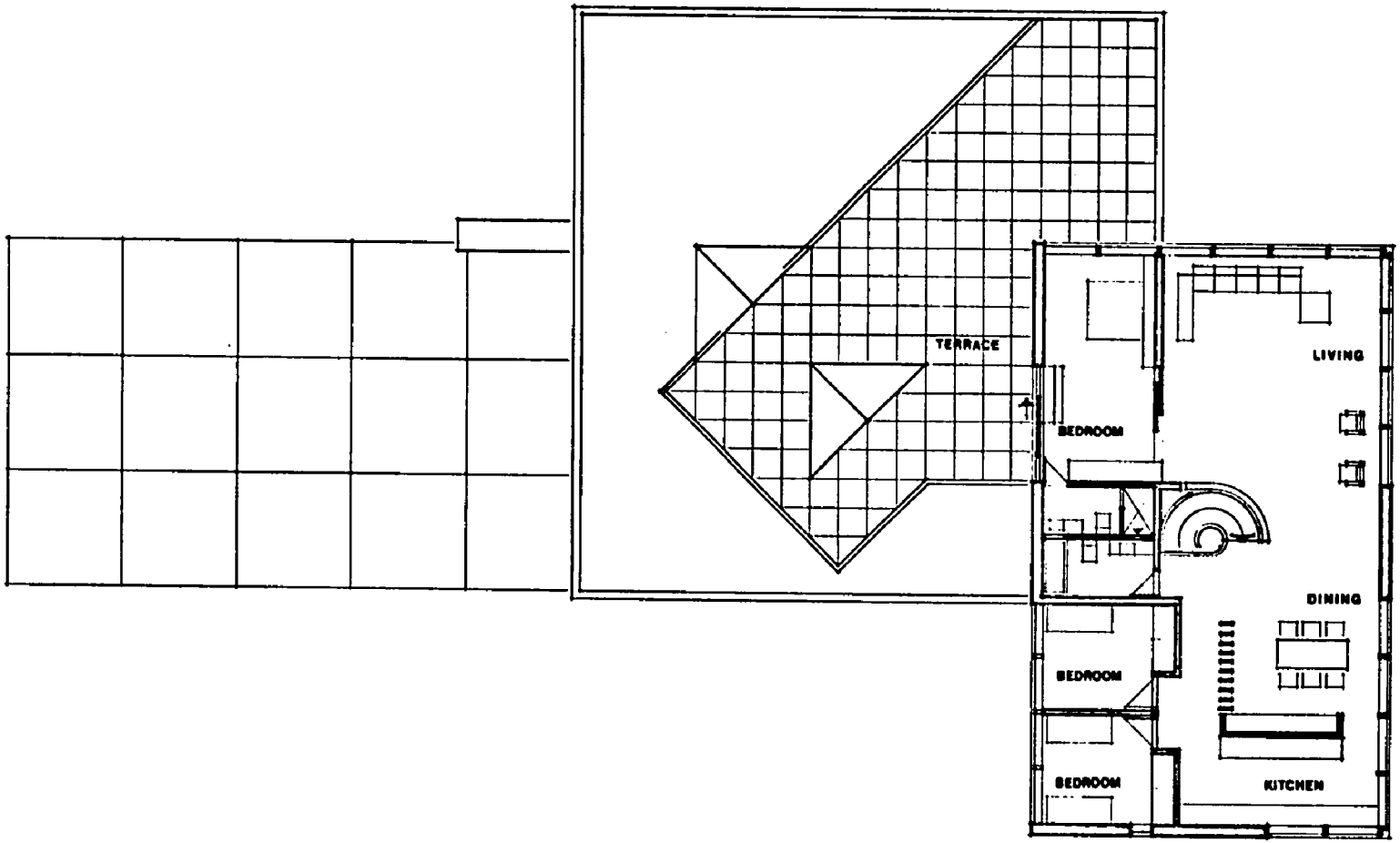
EAST ELEVATION



SOUTH ELEVATION

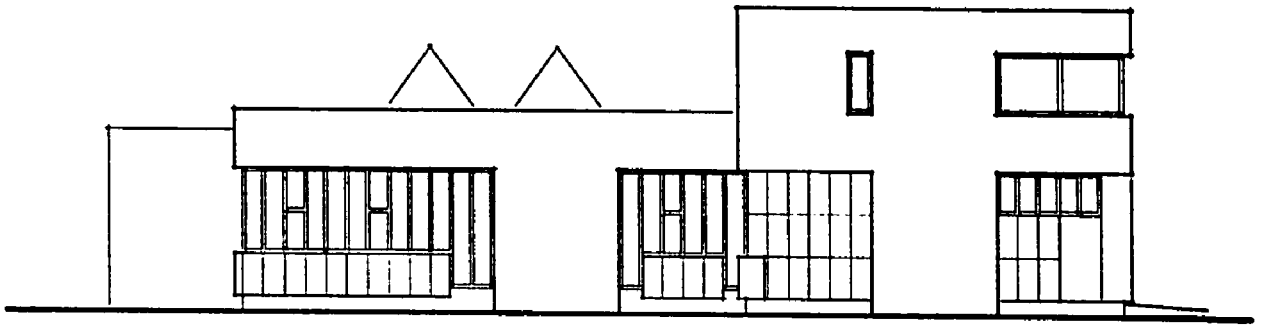
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SECTION 1:200
STORAGE
CAR SHED
FIRST FLOOR, PLAN 1:200

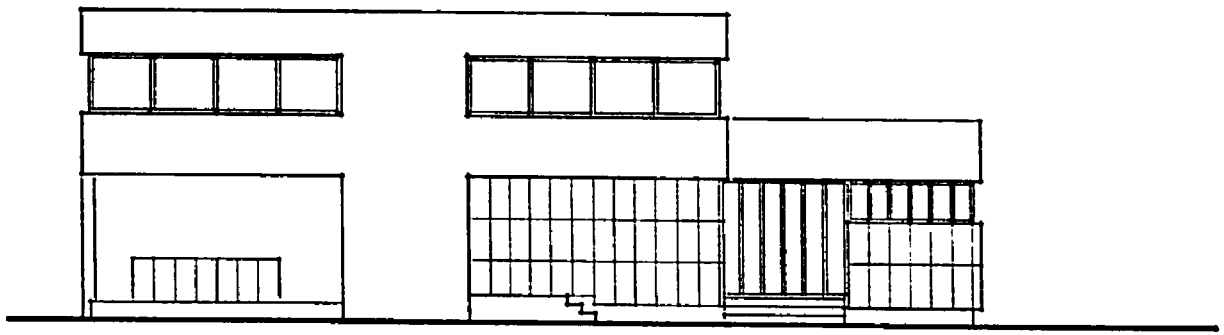


SECOND FLOOR, PLAN 1:200

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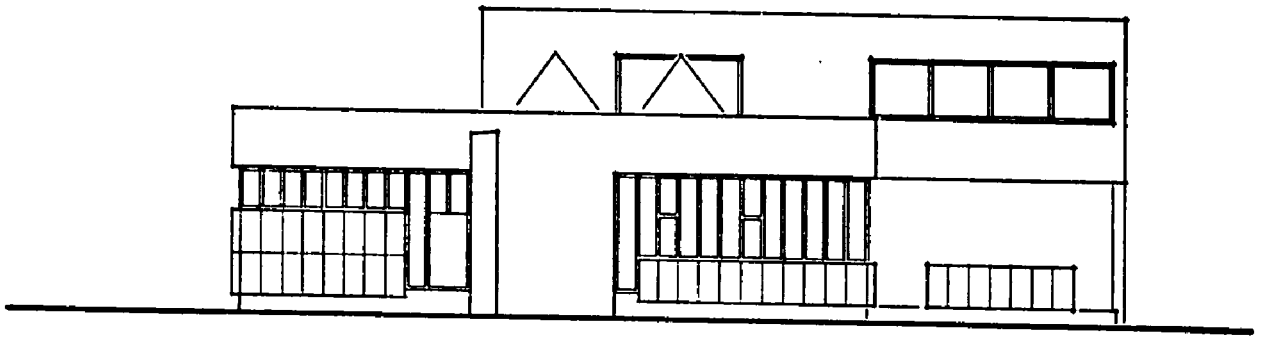


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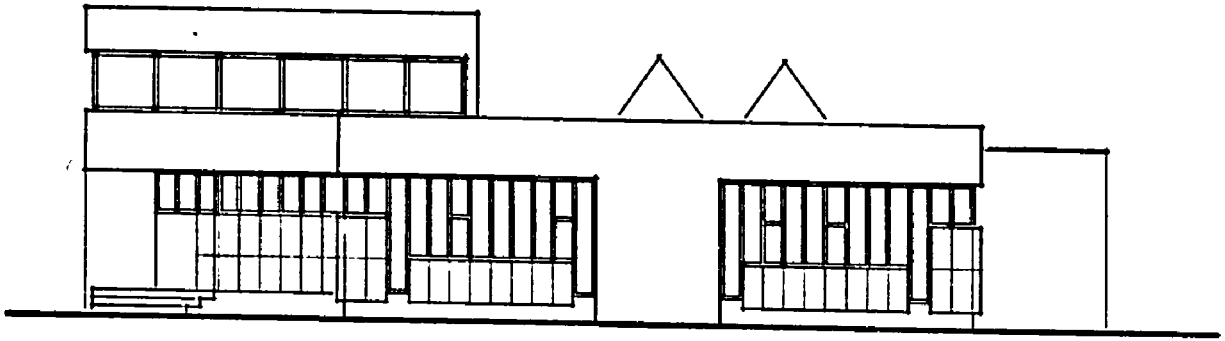


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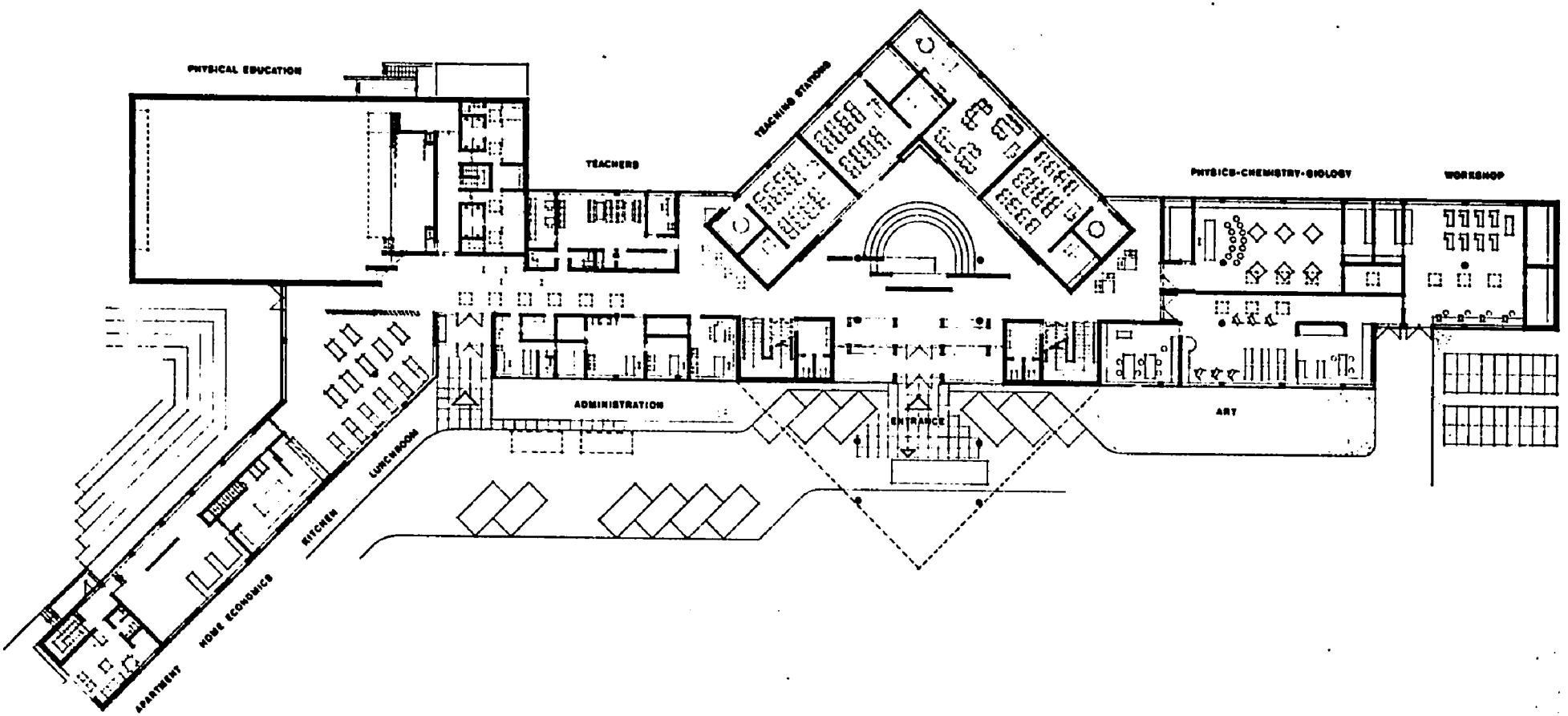


EAST ELEVATION



SOUTH ELEVATION

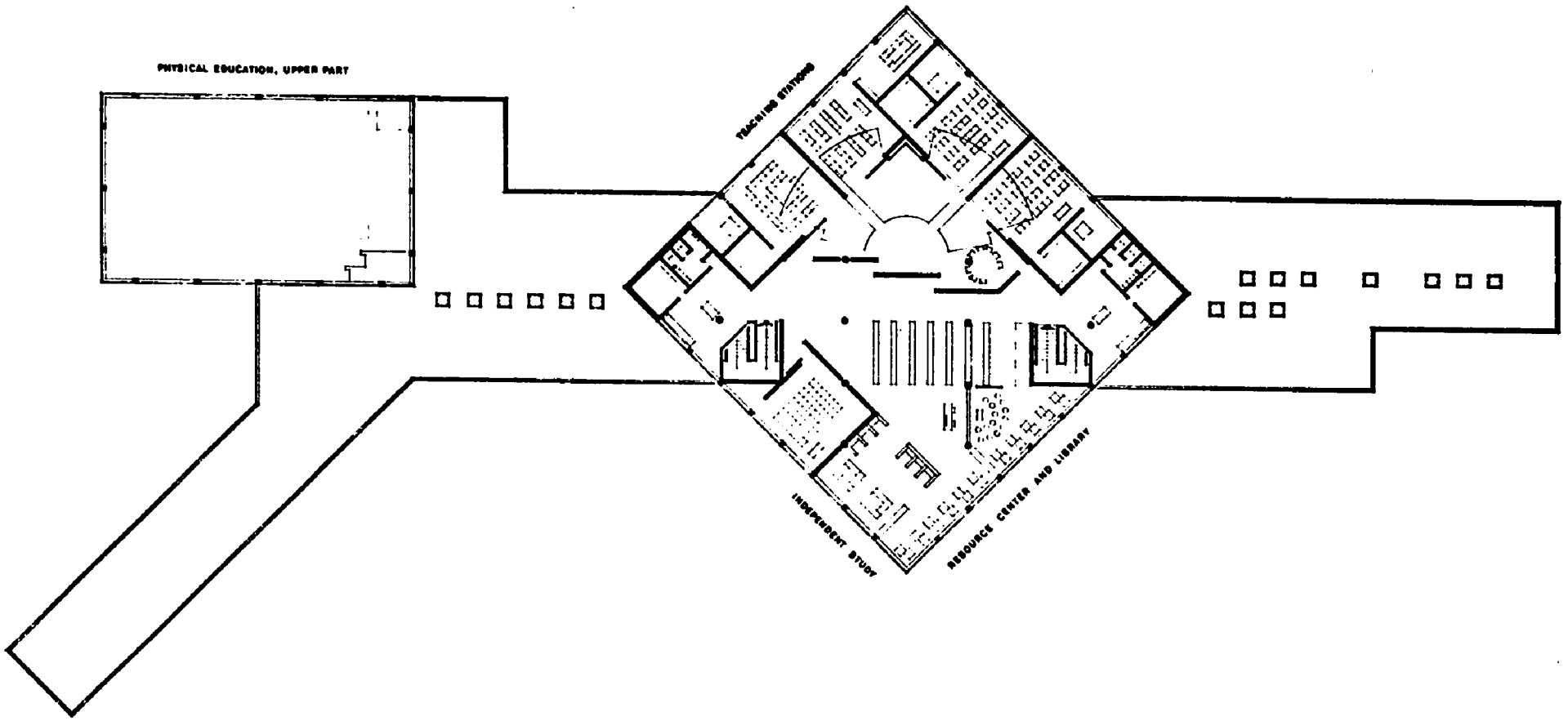
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FIRST FLOOR, PLAN 1:500

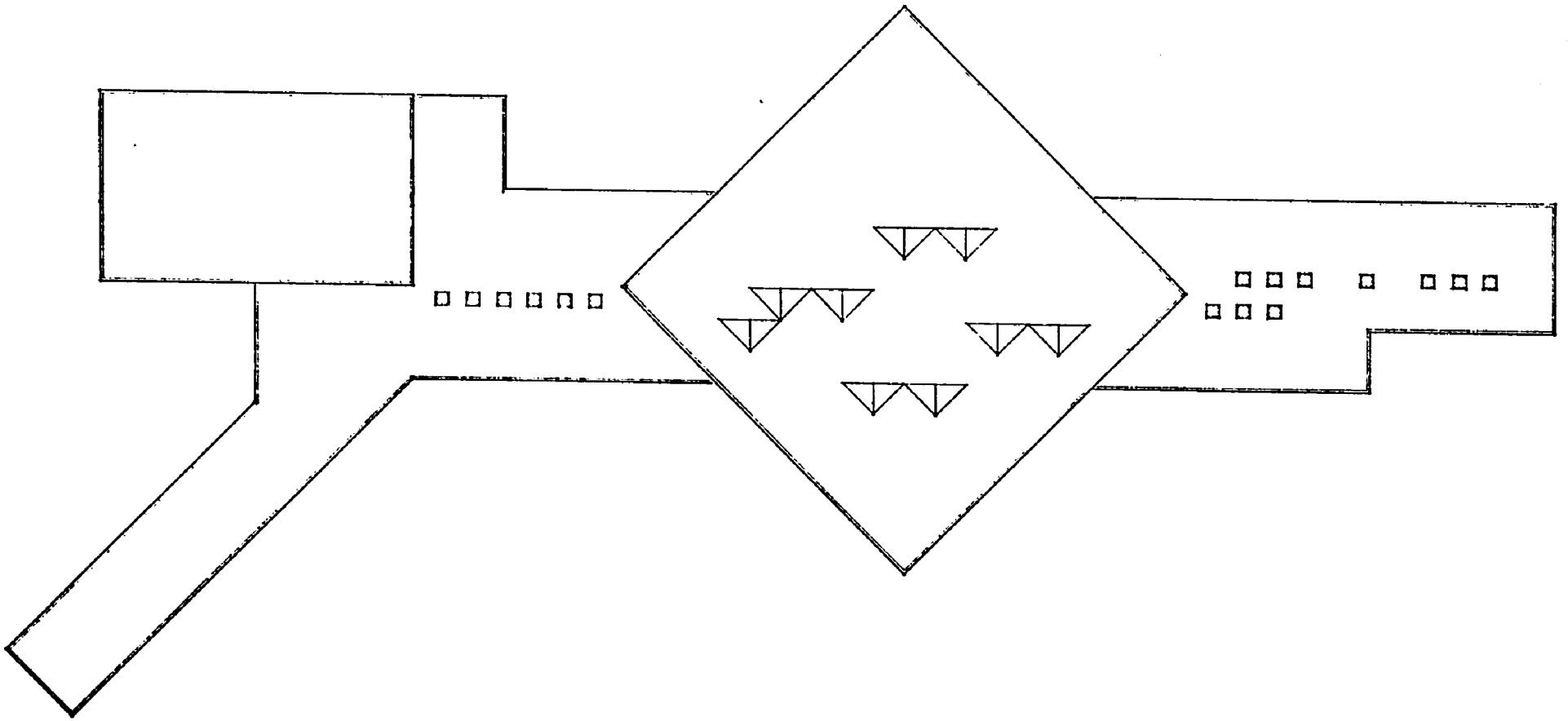
TYPE 1-9

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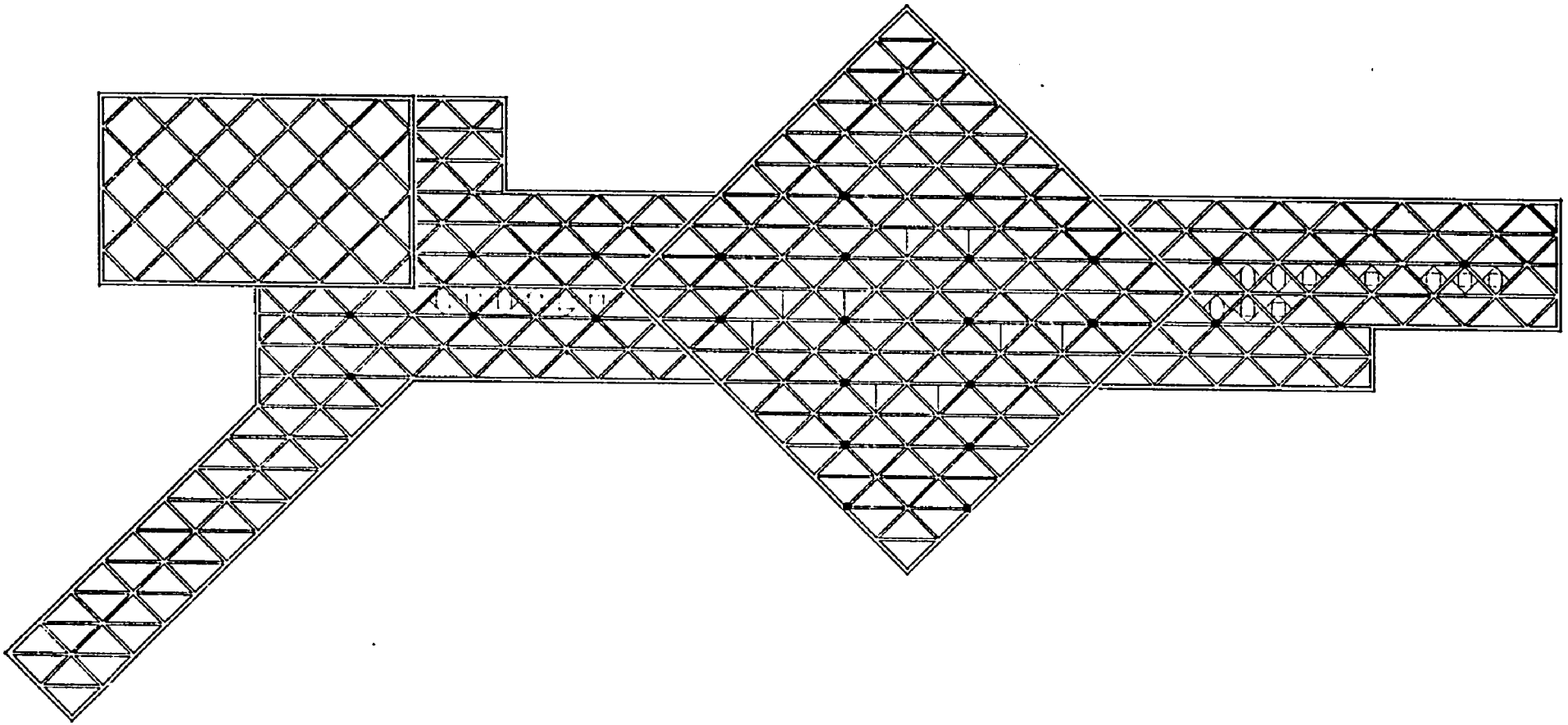
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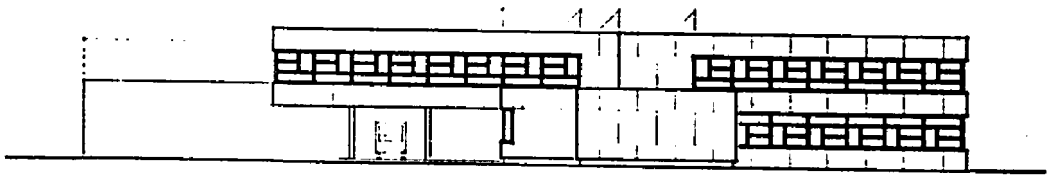
ROOFPLAN 1:500

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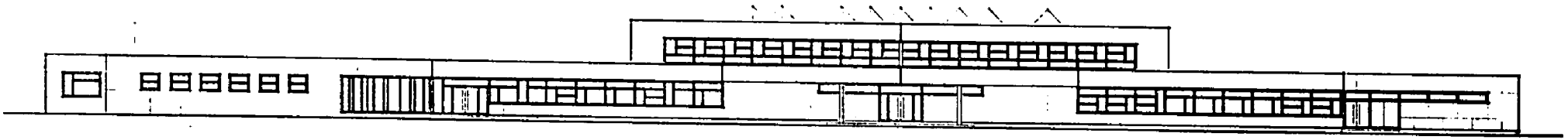


STRUCTURAL SYSTEM 1:500

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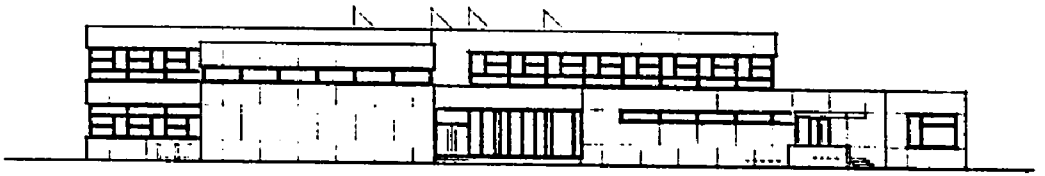


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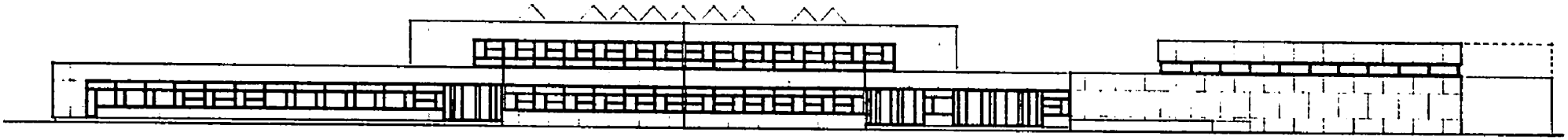


SOUTH ELEVATION

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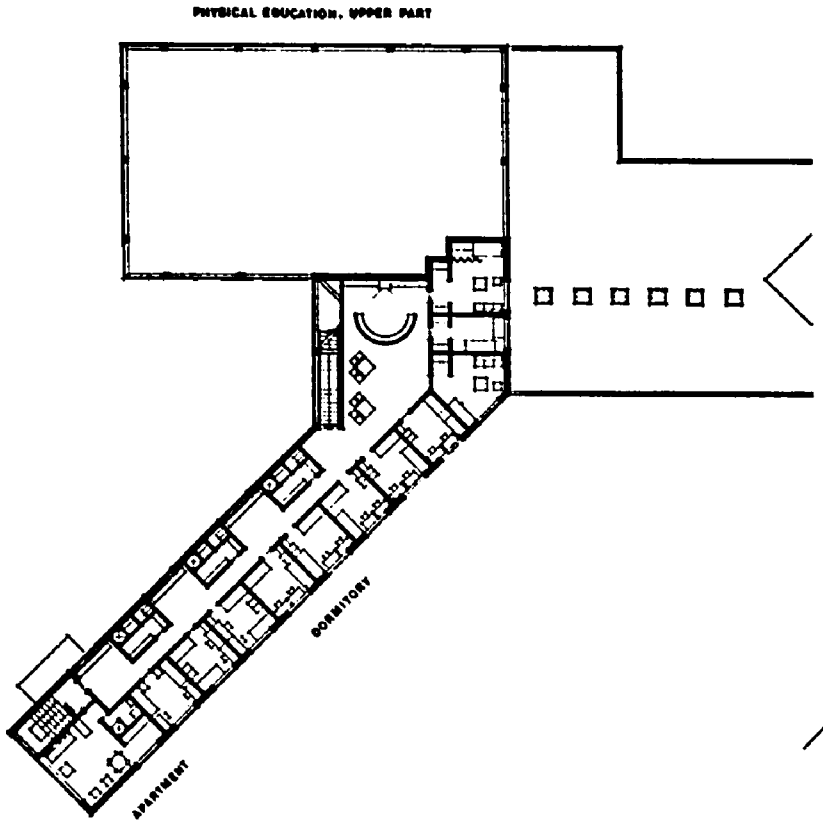


WEST ELEVATION

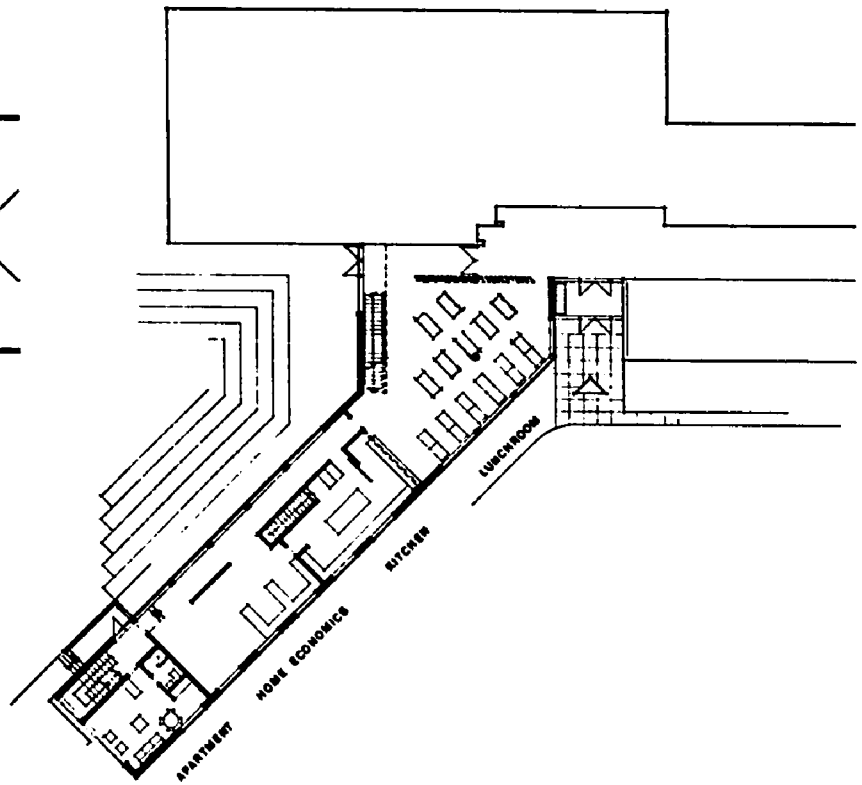


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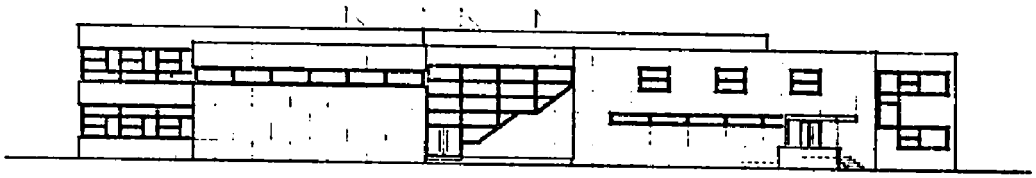


SECOND FLOOR, PLAN 1:500

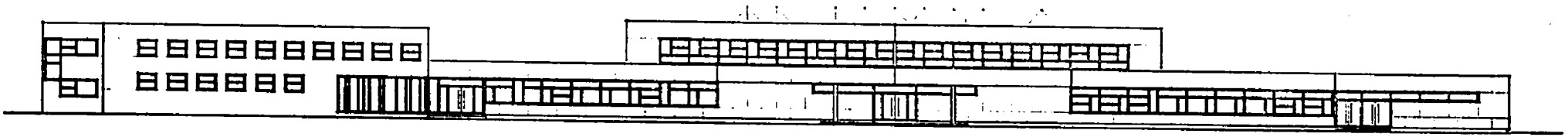


FIRST FLOOR, PLAN 1:500

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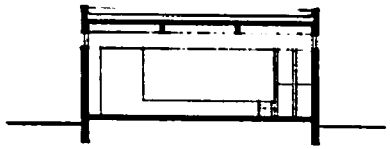


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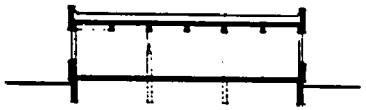


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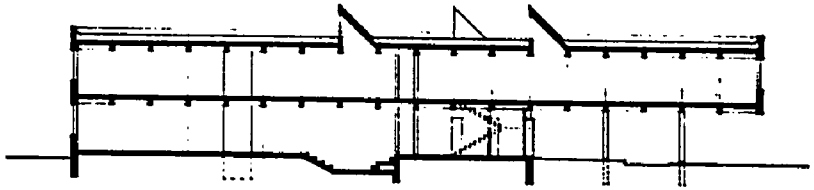
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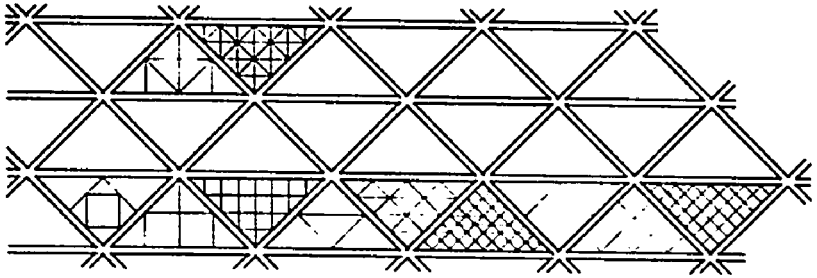
SECTION 1:500



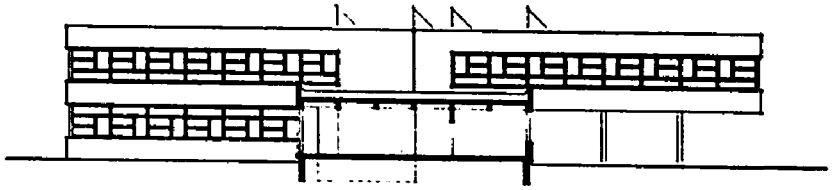
SECTION



SECTION



STRUCTURAL GRID, SUBDIVISION 1:250



SECTION AND ELEVATION

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CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The purpose of this study has been to establish guidelines and criteria for the design of facilities for compulsory education in rural Iceland. In doing so the focus has been on the kinds of facilities, their performance requirements and conceptual solutions.

The analysis and conceptualizations were divided into two distinct phases: planning for the facilities and planning of the facilities.

In planning for the facilities a comprehensive model of locations and facility types over the entire country was constructed. This model was based on the government's own policy commitment and recommendations, substantiated by systematic analysis of relevant factors such as population distribution, geographical condition and weather, and transportation. In order to relate these factors a set of maps covering all populated areas of Iceland was prepared. On the basis of these and other relevant criteria, such as existing facilities, the number, location, kind in terms of grades offered and student capacity of the proposed school

facilities was established. The proposed schools were analyzed according to the student capacity required, upon which a set of typified facilities covering the appropriate spectrum was then established.

These findings, presented in Figure 26, reveal the essential types of school facilities needed for rural Iceland.

The most significant conclusion arrived at in this phase is the desirability of a hierarchy of facilities, in terms of grades offered, and the resulting uneven distribution of students among grades. In addition, analysis of the capacity requirement shows interesting size relationships under the proposed system; as when, for instance, in grades 8 and 9 the school population for the typified units varies only from 35 to 41 students for each of the two yeargroups.

Following this in importance is the wide application in the remote areas of the small unit serving grades 1-4 only. This unit appears feasible and desirable in numerous locations where there are as few as three students in each yeargroup.

In planning of the facilities the significant parameters for the performance requirements which have application to their final design were formulated. Based on types and capacity requirements established in planning for the facilities and through critical evaluation of these parameters, a hypothetical grade organization, facility structure and conceptual solutions were established. Based on these performance requirements design proposals for two selected facility types were created.

The design of the 1-4 unit indicates that on an area of approximately 246 m^2 it is possible to provide a teaching environment furnishing accommodation for a substantial variety of teaching arrangements, for a group of up to 24 students. This unit provides at the same time an inviting setting for meetings and social activities of the community. The design of this unit lends further support to the feasibility of this type of unit as an important component of the school system.

The design of the 1-9 unit has its significance in the composition and spatial arrangement. This arrangement provides for a high multiple use of spaces, and the interrelationship of the classroom, or basic group space, is believed to be especially effective with regard to multiple instructional patterns. It permits a variety of group size compositions.

These designs indicate that the established performance criteria of functional capability can be met; it is believed, furthermore, that they can be met on the condition of a proper balance among other criteria, and without sacrificing other architectural considerations.

RECOMMENDATIONS

To implement the educational policy successfully and to realize the hopes connected with the extended schools, especially in the rural areas, a substantial development of the facilities is necessary. This need occurs in the sector of operation and functional capability, with regard to the multiplicity and development of the instructional process,

and in the sector of other architectural considerations.

Throughout the course of the research and conceptualization reported here it has become clear that extensive cooperation is essential between the groups developing the educational programs on one hand and those concerned with the facility design on the other. Such a joint planning effort should be extended to include follow-up studies of the constructed facilities.

In setting guidelines and cost limitation standards, primary emphasis should be laid on avoiding prototype room arrangements. It is in fact questionable whether the allowable cost can not be achieved by a simple area/student ratio combined with specific educational function requirements. These and other questions call for further study.

The Ministry of Education should prepare an educational program description sufficiently detailed to communicate the expected educational process, in terms of instructional patterns, administrative operations, desirable practices and other essential factors forming the demands for the school environment. The absence of such data has been a major obstacle in formulating the performance criteria established here.

Educators and architects who are designing buildings at present should be giving consideration to the people who are coming later on, rather than limiting their attention to the solution of the immediate problem. The buildings of today will have stood for only half or less of their expected lifetime by the year 2000. The functional qualities most

highly valued at the present may, long before that time, have lost much of their current significance. The modern schoolbuilding should therefore be designed so as to provide for a maximum of the instructional arrangements which can be foreseen and are considered relevant for each setting. This does not imply that priority should not be given to the immediate problems; rather it points out that in order to respond to these problems in a meaningful way a look ahead is essential. It is hoped that this study provides some perspectives which can enable the reader to envision how this problem might be tackled in the planning for and of school facilities for rural Iceland throughout the nineteen eighties.

Paragraph 23 of the compulsory school law states:

> Menntamálaráðuneytið lætur gera framkvæmdaáætlun um skólabyggingar fyrir allt landið:
> a) er taki til allt að 10 ára tímabils. Framkvæmdaáætlun þessa skal endurskoða svo oft, sem ástæða þykir til;
> b) árlega framkvæmdaáætlun, sem fylgi tillögum til fjárveitinga í fjárlögum. Röðun framkvæmda miðast við, hvar skólabyggingaþörf er brýnust að áliti ráðuneytisins.
>
> The Ministry of Education shall have a conductive plan prepared for school buildings for the entire country:
> a) which covers a 10-year period. This conductive plan shall be revised as often as necessary;
> b) an annual conductive plan to accompany the annual budget proposals. Priority of projects established according to needs judged by the Ministry of Education.
>
> (Translation M. J.)

It is believed that the study presented here can provide a basis and a useful aid for the Ministry of Education in fulfilling the above stated commitment.

APPENDIX A

THE SCHOOL AGE POPULATION ACCORDING TO SCHOOL DISTRICTS, COMMUNES AND TOWNS

DISTRICT NO 1[1]

Commune		Total Birthrate[5]			Mean Nr in Yeargroup[6]	
		57-61	62-66	65-71	57-66	62-71
2602[2]	Mosfellshreppur[3] (+v)[4]	126	142	116	26.8	25.8
2603	Kjalarneshreppur	24	36	36	6.0	7.2
2604	Kjósarhreppur	34	33	29	6.7	6.2
	Total	184	211	181	39.5	39.2

Notes:

[1] This and the subsequent tables, No 1 to 34, represent the respective school districts.

[2] Number of the commune, or town: Source: Tölfræðihandbók, Hagstofa Íslands, 1967, and Ísland, hreppa-, sýslu- og kjördæmaskipting (hreppakort), Landmælingar Íslands, 1967.

[3] Name of commune/town.

[4] (v), indicates that the commune is a village, and (+v), indicates that there is a village(s) included in the commune.

[5] The figures indicate total number of children living in the commune/village/town, on the 1st of December 1972, and born during the stated period including both years.

[6] The figure indicates the ten years' mean of the two stated periods.

Sources: The birthrate figures (5 and 6 above) were made available for this study by the Ministry of Education. They are processed by the Skýrsluvélar ríkisins from the Hagstofa Íslands national census computer file.

DISTRICT NO 2

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
3501	Hvalfjarðarstrandarhr.	17	17	17	3.4	3.4
3502	Skilmannahreppur	15	8	5	2.3	1.3
3503	Innri-Akraneshreppur	17	16	9	3.3	2.5
3504	Leirár- and Melahreppur	15	16	11	3.1	2.7
3000	Akranes (town)	543	507	448	105.0	95.5
	Total	607	564	490	117.1	105.4

DISTRICT NO 3

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
3505	Andakílshreppur	25	40	25	6.5	6.5
3506	Skorradalshreppur	3	6	4	0.9	1.0
3507	Lundarreykjadalshr.	6	15	12	2.1	2.7
3508	Reykholtsdalshreppur	39	40	19	7.9	5.9
3509	Hálsahreppur	18	14	9	3.2	2.3
3601	Hvítársíðuhreppur	16	11	3	2.7	1.4
3602	Þverárhlíðarhreppur	6	10	9	1.6	1.9
3603	Norðurárdalshreppur	11	18	14	2.9	3.2
3604	Stafholtstungnahr.	17	15	21	3.2	3.6
3605	Borgarhreppur	21	24	19	4.5	4.3
3606	Borgarneshreppur (v)	127	147	124	27.4	27.1
3607	Álftaneshreppur	9	11	13	2.0	2.4
3608	Hraunhreppur	8	8	9	1.6	1.7
	Total	306	359	281	66.5	64.0

DISTRICT NO 4

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
3701	Kolbeinsstaðahreppur	13	19	17	3.2	3.6
3702	Eyjahreppur	7	3	7	1.0	1.0
3703	Miklaholtshreppur	22	27	17	4.9	4.4
3704	Staðarsveit	21	19	13	4.0	3.2
3705	Breiðavíkurhreppur	11	11	7	2.2	1.8
3710	Helgafellssveit	12	7	6	1.9	1.3
3711	Stykkishólmshreppur (v)	127	108	117	23.5	22.5
3712	Skógarstrandarhreppur	7	9	10	1.6	1.9
	Total	220	203	194	42.3	39.7

DISTRICT NO 5

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
3706	Neshreppur (v)	69	96	68	16.5	16.4
3707	Ólafsvíkurhreppur (v)	116	134	127	25.0	26.1
3708	Fróðárhreppur	4	3	5	0.7	0.8
3709	Eyrarsveit (+v)	96	111	75	20.7	18.6
	Total	285	344	275	62.9	61.9

DISTRICT NO 6

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
3801	Hörðudalshreppur	7	3	3	1.0	0.6
3802	Miðdalahreppur	21	18	26	3.9	4.4
3803	Haukadalshreppur	8	10	8	1.8	1.8
3804	Laxárdalshreppur (+v)	42	45	42	8.7	8.7
3805	Hvammshreppur	11	15	5	2.6	2.0
3806	Fellsstrandarhr.	7	6	8	1.3	1.4
3807	Klofningshreppur	3	1	3	0.4	0.4
3808	Skarðshreppur	6	7	6	1.3	1.3
3809	Saurbæjarhreppur	24	23	21	4.7	4.4
4501	Geiradalshreppur	14	12	17	2.6	2.9
4502	Reykhólahreppur	19	21	13	4.0	3.4
4503	Gufudalshreppur	10	8	9	1.8	1.7
4505	Flateyjarhreppur	4	7	3	1.1	1.0
	Total	176	176	164	35.2	34.0

DISTRICT NO 7

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4505	Múlahreppur	3	0	0	0.3	0.0
4601	Barðarstrandarhreppur	23	33	21	5.6	5.4
4602	Rauðasandshreppur	14	16	9	3.0	2.5
4603	Patrekshreppur (v)	122	119	106	24.1	22.5
4604	Tálknafjarðarhreppur (+v)	25	39	33	6.4	7.2
4605	Ketildalahreppur	4	3	2	0.7	0.5
4606	Suðurfjarðahreppur (+v)	37	43	31	8.0	7.4
	Total	228	253	202	48.1	45.5

DISTRICT NO 8

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4701	Auðkúluhreppur	1	3	6	0.4	0.9
4702	Þingeyrarhreppur (+v)	52	58	45	11.0	10.3
4703	Mýrahreppur	24	25	12	4.9	3.7
4704	Mosvallahreppur	11	11	7	2.2	1.8
4705	Flateyrarhreppur (v)	60	40	35	10.0	7.5
4706	Suðureyrarhreppur (+v)	49	60	62	10.9	12.2
	Total	197	197	167	39.4	36.4

DISTRICT NO 9

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4801	Hólshreppur,Bolungarv.(v)	117	127	116	24.4	24.3
	Total	117	127	116	24.4	24.3

DISTRICT NO 10

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4803	Súðavíkurhreppur (+v)	33	35	17	6.8	5.2
4000	Ísafjörður (town) and Hnífsdalur (v)	361	332	290	69.3	62.2
	Total	394	367	307	76.1	67.4

DISTRICT NO 11

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4804	Ögurhreppur	4	10	4	1.4	1.4
4805	Reykjafjarðarhreppur	25	16	10	4.1	2.6
4806	Nauteyrarhreppur	12	10	6	2.2	1.6
4807	Snæfjallahreppur	6	4	1	1.0	0.5
	Total	47	40	21	8.7	6.1

DISTRICT NO 12

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
4901	Árneshreppur	19	20	10	3.9	3.0
4902	Kaldrananeshreppur (+v)	17	17	7	3.4	2.4
4903	Hrófbergshreppur	5	7	1	1.2	0.8
4904	Hólmavíkurhreppur (v)	41	37	29	7.8	6.6
4905	Kirkjubólshreppur	9	8	8	1.7	1.6
4906	Fellshreppur	6	9	7	1.5	1.6
4907	Óspakseyrarhreppur	8	11	8	1.9	1.9
4908	Bæjarhreppur (+v)	25	27	25	5.2	5.2
	Total	130	136	95	26.6	23.1

DISTRICT NO 13

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
5501	Staðarhreppur	18	23	11	4.1	3.4
5502	Fremri-Torfustaðahr.	9	10	4	1.9	1.4
5503	Ytri-Torfustaðahr.	36	20	24	5.6	4.4
5504	Hvammstangahreppur (v)	30	36	39	6.6	7.5
5505	Kirkjuhvammshreppur	26	15	9	4.1	2.4
5506	Þverárhreppur	18	14	16	3.2	3.0
5507	Þorkelshólshreppur	20	22	24	4.2	4.6
	Total	157	140	127	29.7	26.7

DISTRICT NO 14

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
5601	Áshreppur	18	17	12	3.5	2.9
5602	Sveinsstaðahreppur	15	14	6	2.9	2.0
5603	Torfalækjarhreppur	18	13	18	3.1	3.1
5604	Blönduóshreppur (v)	81	69	82	15.0	15.1
5605	Svínavatnshreppur	13	12	13	2.5	2.5
5606	Bólstaðarhlíðarhr.	16	19	22	3.5	4.1
5607	Engihlíðarhreppur	9	15	17	2.4	3.2
5608	Vindhælishreppur	5	5	7	1.0	1.2
5609	Höfðahreppur (v)	58	69	49	12.7	11.8
5610	Skagahreppur	4	9	11	1.3	2.0
	Total	237	242	237	47.9	47.9

DISTRICT NO 15

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
5701	Skefilsstaðahreppur	8	9	4	1.7	1.3
5702	Skarðshreppur	12	15	8	2.7	2.3
5703	Staðarhreppur	19	16	13	3.5	2.9
5704	Seyluhreppur (+v)	22	30	25	5.2	5.5
5705	Lýtingsstaðahreppur	40	33	25	7.3	5.8
5706	Akrahreppur	50	38	31	8.8	6.9
5707	Rípurhreppur	12	17	14	2.9	3.1
5708	Viðvíkurhreppur	5	16	10	2.1	2.6
5709	Hólahreppur	22	26	20	4.8	4.6
5710	Hofshreppur	27	34	23	6.1	5.7
5711	Hofsóshreppur (v)	22	35	24	5.7	5.9
5712	Fellshreppur	8	5	2	1.3	0.7
5713	Haganeshreppur	16	18	8	3.4	2.6
5714	Holtshreppur	14	15	10	2.9	2.5
5100	Sauðárkrókur (town)	175	158	178	33.3	33.6
	Total	452	465	395	91.7	86.0

DISTRICT NO 16

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
5000	Siglufjörður (town)	211	207	171	41.8	37.8
	Total	211	207	171	41.8	37.8

DISTRICT NO 17

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
6501	Grímseyjarhreppur (v)	7	10	12	1.7	2.2
6200	Ólafsfjörður (town)	111	145	120	25.6	26.5
	Total	118	155	132	27.3	28.7

DISTRICT NO 18

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
6502	Svarfaðardalshreppur	45	29	20	7.4	4.9
6503	Dalvíkurhreppur (v)	110	129	115	23.9	24.4
6504	Hríseyjarhreppur (v)	33	44	29	7.7	7.3
6505	Árskógshreppur (+v)	37	44	42	8.1	8.6
	Total	225	246	206	47.1	45.2

DISTRICT NO 19

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
6506	Arnarneshreppur (+v)	28	31	24	5.9	5.5
6507	Skriðuhreppur	11	18	16	2.9	3.4
6508	Öxnadalshreppur	12	18	4	3.0	2.2
6509	Glæsibæjarhreppur	24	28	21	5.2	4.9
6510	Hrafnagilshreppur	27	36	39	6.3	7.5
6511	Saurbæjarhreppur	38	30	28	6.8	5.8
6512	Öngulstaðahreppur	46	35	40	8.1	7.5
6601	Svalbarðsstrandahr. (+v)	22	29	26	5.1	5.5
6602	Grýtubakkahreppur (+v)	38	39	45	7.7	8.4
	Total	246	264	243	51.0	50.7

DISTRICT NO 20

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
6604	Hálshreppur	26	36	25	6.2	6.1
6605	Ljósavatnshreppur	30	41	29	7.1	7.0
6606	Bárðdælahreppur	19	14	14	3.3	2.8
6607	Skútustaðahreppur (+v)	67	55	38	12.2	9.3
6608	Reykdælahreppur	46	45	36	9.1	8.1
6609	Aðaldælahreppur	47	52	39	9.9	9.1
6610	Reykjahreppur	11	13	13	2.4	2.6
6611	Tjörneshreppur	12	14	4	2.6	1.8
6703	Fjallahreppur	0	2	2	0.2	0.4
6100	Húsavík (town)	237	281	206	51.8	48.7
	Total	495	553	406	104.8	95.9

DISTRICT NO 21

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
6701	Kelduneshreppur	31	16	20	4.7	3.6
6702	Öxarfjarðarhreppur	22	29	13	5.1	4.2
6704	Presthólahreppur (+v)	31	31	19	6.2	5.0
6705	Raufarhafnarhreppur (v)	52	48	48	10.0	9.6
6706	Svalbarðshreppur	15	13	7	2.8	2.0
6707	Þórshafnarhreppur (v)	57	47	43	10.4	9.0
6708	Sauðaneshreppur	6	3	7	0.9	1.0
	Total	214	187	157	40.1	34.4

DISTRICT NO 22

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7501	Skeggjastaðahreppur (+v)	20	7	7	2.7	1.4
7502	Vopnafjarðarhreppur (+v)	107	97	61	20.4	15.8
	Total	127	104	68	23.1	17.2

DISTRICT NO 23

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7503	Hlíðarhreppur	9	22	15	3.1	3.7
7504	Jökuldalshreppur	22	18	14	4.0	3.2
7505	Fljótsdalshreppur	24	16	17	4.0	3.3
7506	Fellahreppur	18	25	23	4.3	4.8
7507	Hróarstunguhreppur	17	14	16	3.1	3.0
7508	Hjaltastaðahreppur	7	15	11	2.2	2.6
7509	Borgarfjarðarhreppur (+v)	38	22	11	6.0	3.3
7601	Skriðdalshreppur	15	10	12	2.5	2.2
7602	Vallahreppur	22	17	12	3.9	2.9
7603	Egilsstaðahreppur (v)	89	100	96	18.9	19.6
7604	Eiðahreppur	18	19	14	3.7	3.3
	Total	279	278	241	55.7	51.9

DISTRICT NO 24

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7510	Loðmundarfjarðarhreppur	0	0	0	0.0	0.0
7511	Seyðisfjarðarhreppur	3	4	4	0.7	0.8
7000	Seyðisfjörður (town)	108	118	88	22.6	20.6
	Total	111	122	92	23.3	21.4

DISTRICT NO 25

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7605	Mjóafjarðarhreppur	3	1	5	0.4	0.6
7606	Norðfjarðarhreppur	19	8	5	2.7	1.3
7100	Neskaupstaður (town)	179	174	176	35.3	35.0
	Total	201	183	186	38.4	36.9

DISTRICT NO 26

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7607	Helgustaðahreppur	3	3	2	0.6	0.5
7608	Eskifjarðarhreppur (v)	106	116	106	22.2	22.2
7609	Reyðarfjarðarhreppur (+v)	69	87	75	15.6	16.2
	Total	178	206	183	38.4	38.9

DISTRICT NO 27

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7610	Fáskrúðsfjarðarhr.	10	16	15	2.6	3.1
7611	Búðarhreppur (v)	88	102	89	19.0	19.1
7612	Stöðvarhreppur (+v)	31	32	51	6.3	8.3
7613	Breiðdalshreppur (+v)	44	37	33	8.1	7.0
7614	Beruneshreppur	13	5	8	1.8	1.3
7615	Búlandshreppur (v)	44	44	37	8.8	8.1
7616	Geithellnahreppur	8	12	9	2.0	2.1
	Total	238	248	242	48.6	49.0

DISTRICT NO 28

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
7701	Bæjarhreppur	10	10	5	2.0	1.5
7702	Nesjahreppur	20	21	25	4.1	4.6
7703	Hafnarhreppur (v)	93	114	136	20.7	25.0
7704	Mýrahreppur	10	11	7	2.1	1.8
7705	Borgarhafnarhreppur	12	9	10	2.1	1.9
7706	Hofshreppur	12	7	7	1.9	1.4
	Total	157	172	190	32.9	36.2

DISTRICT NO 29

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
8501	Hörglandshreppur	8	13	12	2.1	2.5
8502	Kirkjubæjarhr. (+v)	26	25	20	5.1	4.5
8503	Skaftártunguhreppur	10	13	9	2.3	2.2
8504	Leiðvallarhreppur	6	5	6	1.1	1.1
8505	Álftavershreppur	4	4	4	0.8	0.8
8506	Hvammshreppur (+v)	66	57	44	12.3	10.1
8507	Dyrhólahreppur	19	16	16	3.5	3.2
8601	Austur-Eyjafjallahr.	29	39	26	6.8	6.5
8602	Vestur-Eyjafjallahr.	27	27	16	5.4	4.3
	Total	195	199	153	39.4	35.2

DISTRICT NO 30

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
8603	Austur-Landeyjahr.	19	15	23	3.4	3.8
8604	Vestur-Landeyjahr.	14	18	18	3.2	3.6
8605	Fljótshlíðarhreppur	39	27	37	6.6	6.4
8606	Hvolhreppur (+v)	55	55	70	11.0	12.5
8607	Rangárvallahreppur (+v)	70	71	57	14.1	12.8
8608	Landmannahreppur	10	6	4	1.6	1.0
8609	Holtahreppur	30	34	36	6.4	7.0
8610	Ásahreppur	19	17	20	3.6	3.7
8611	Djúpárhreppur	40	45	27	8.5	7.2
	Total	296	288	292	58.4	58.0

DISTRICT NO 31

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
8701	Gaulverjabæjarhreppur	26	23	20	4.9	4.3
8702	Stokkseyrarhreppur (+v)	67	55	47	12.2	10.2
8703	Eyrarbakkahreppur (v)	44	63	63	10.7	12.6
8704	Sandvíkurhreppur	15	16	10	3.1	2.6
8705	Selfosshreppur (v)	266	336	290	60.2	62.6
8706	Hraungerðishreppur	23	21	22	4.4	4.3
8707	Villingaholtshreppur	28	27	26	5.5	5.3
8708	Skeiðahreppur	24	34	19	5.8	5.3
8709	Gnúpverjahreppur (+v)	22	37	50	5.9	8.7
8710	Hrunamannahreppur	56	60	52	11.6	11.2
8711	Biskupstungnahreppur	52	69	52	12.1	12.1
8712	Laugardalshreppur (+v)	26	29	38	5.5	6.7
8713	Grímsneshreppur (+v)	34	32	30	6.6	6.2
8714	Þingvallahreppur	2	3	3	0.5	0.6
8715	Grafningshreppur	18	7	10	2.5	1.7
8716	Hveragerðishreppur (v)	96	96	81	19.2	17.7
8717	Ölfushreppur (+v)	130	109	100	23.9	20.9
8718	Selvogshreppur	4	3	1	0.7	0.4
	Total	933	1020	914	195.3	193.4

DISTRICT NO 32

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
8000	Vestmannaeyjar (town)	580	618	546	119.8	116.4
	Total	580	618	546	119.8	116.4

DISTRICT NO 33

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
2501	Grindavíkurhreppur (v)	154	158	189	31.2	34.7
	Total	154	158	189	31.2	34.7

DISTRICT NO 34

Commune		Total Birthrate			Mean Nr in Yeargroup	
		57-61	62-66	67-71	57-66	62-71
2502	Hafnahreppur (+v)	18	11	12	2.9	2.3
2503	Miðneshreppur (+v)	126	129	112	25.5	24.1
2504	Gerðahreppur (v)	75	84	67	15.9	15.1
2505	Njarðvíkurhreppur (v)	205	214	174	41.9	38.8
2506	Vatnsleysustrandarhr. (+v)	37	35	44	7.2	7.9
2200	Keflavík (town)	783	724	585	150.7	130.9
	Total	1244	1197	994	244.1	219.1
Total for all the 34 districts		9,940	10,229	8,857	2,016.9	1,908.6
The Reykjavík region		11,620	11,465	10,430	2,308.5	2,189.5
Akureyri		1,135	1,246	1,221	238.1	246.7
	Total for the country	22,695	22,940	20,508	4,563.5	4,344.8

APPENDIX B

THE SCHOOL AGE POPULATION, FORECAST FOR THE PERIOD 1987-2001 ACCORDING TO SCHOOL DISTRICTS, COMMUNES AND TOWNS

DISTRICT NO 1

Commune		Total[1] population of commune 1972	Population[1] of village included in commune	Born pr 100[2] inhabitants annual mean 1962-71	Forecasted[3] total population 1987	Forecasted[4] mean number in yeargroup 1987-2001
2602	Mosfellshreppur (+v)	1,092	785	2.36	1,254	29.0
2603	Kjalarneshreppur	233		3.09	233	4.9
2604	Kjósarhreppur	255		2.43	255	5.3
	Total	1,580			1,742	39.2

[1] Population on 1 December 1972. Source: Hagstofa Íslands.

[2] Birthrate figures are from Appendix A, column 5.

[3] Total population for the country as a whole is according to a forecast made available by Framkvæmdastofnun ríkisins (the forecast has by the Framkvæmdastofnun been computed according to fertility rate as of 1970, mortality rate 1965-70 and migration 1961-70). The distribution among communes is according to that; 1) the rural communes will remain unchanged in number, and 2) that the villages and towns will grow at the rate of the national average.

[4] For description of method see pp. 59 and 60.

DISTRICT NO 2

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
3501	Hvalfjarðarstrandarhr.	179		1.90	179	3.7
3502	Skilmannahreppur	109		1.19	109	2.2
3503	Innri-Akraneshreppur	116		2.16	116	2.3
3504	Leirár- and Melahreppur	153		1.77	120	2.4
3000	Akranes (town)	4,356		2.19	5,258	115.6
	Total	4,913			5,782	126.2

DISTRICT NO 3

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
3505	Andakílshreppur	255		2.55	255	5.3
3506	Skorradalshreppur	63		1.59	63	1.1
3507	Lundarreykjadalshr.	123		2.20	123	2.5
3508	Reykholtsdalshreppur	309		1.91	309	6.5
3509	Hálsahreppur	107		2.15	107	2.1
3601	Hvítársíðuhreppur	104		1.35	104	2.0
3602	Þverárhlíðarhreppur	90		2.11	90	1.7
3603	Norðurárdalshreppur	126		2.54	126	2.5
3604	Stafholtstungnahr.	210		1.71	210	4.4
3605	Borgarhreppur	182		2.36	182	3.7
3606	Borgarneshreppur (v)	1,243		2.18	1,500	36.2
3607	Álftaneshreppur	126		1.91	126	2.5
3608	Hraunhreppur	112		1.52	112	2.2
	Total	3,050			3,307	72.7

DISTRICT NO 4

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
3701	Kolbeinsstaðahreppur	150		2.40	150	3.0
3702	Eyjahreppur	65		1.54	65	1.2
3703	Miklaholtshreppur	159		2.77	159	3.2
3704	Staðarsveit	151		2.12	151	3.1
3705	Breiðavíkurhreppur	114		1.58	114	2.3
3710	Helgafellssveit	109		1.19	109	2.2
3711	Stykkishólmshreppur (v)	1,045		2.15	1,261	30.2
3712	Skógarstrandarhreppur	89		2.14	89	1.7
	Total	1,882			2,098	46.9

DISTRICT NO 5

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
3706	Neshreppur (v)	594		2.76	717	13.4
3707	Ólafsvíkurhreppur (v)	1,057		2.47	1,276	30.6
3708	Fróðárhreppur	34		2.35	34	0.5
3709	Eyrarsveit (+v)	724	602	2.57	849	19.4
	Total	2,409			2,876	63.9

DISTRICT NO 6

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
3801	Hörðudalshreppur	59		1.02	59	1.1
3802	Miðdalahreppur	176		2.50	176	3.6
3803	Haukadalshreppur	78		2.31	78	1.5
3804	Laxárdalshreppur (+v)	365	222	2.38	411	9.1
3805	Hvammshreppur	106		1.89	106	2.1
3806	Fellsstrandarhreppur	84		1.67	84	1.6
3807	Klofningshreppur	36		1.11	36	0.6
3808	Skarðshreppur	54		2.41	54	1.0
3809	Saurbæjarhreppur	190		2.32	190	3.8
4501	Geiradalshreppur	125		2.32	125	2.5
4502	Reykhólahreppur	203		1.67	203	4.2
4503	Gufudalshreppur	70		2.43	70	1.3
4505	Flateyjarhreppur	46		2.17	46	0.8
	Total	1,592			1,638	33.2

DISTRICT NO 7

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4504	Múlahreppur	26		0.00	26	0.3
4601	Barðastrandarhreppur	194		2.78	194	4.0
4602	Rauðasandshreppur	122		2.05	122	2.4
4603	Patrekshreppur (v)	983		2.29	1,186	28.3
4604	Tálknafjarðarhreppur (+v)	258	189	2.79	297	6.4
4605	Ketildalahreppur	34		1.47	34	0.5
4606	Suðurfjarðahreppur (+v)	355	325	2.08	422	9.3
	Total	1,972			2,281	51.2

DISTRICT NO 8

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4701	Auðkúluhreppur	38		2.37	38	0.6
4702	Þingeyrarhreppur (+v)	431	368	2.39	507	11.4
4703	Mýrahreppur	167		2.22	167	3.4
4704	Mosvallahreppur	91		1.98	91	1.8
4705	Flateyrarhreppur (v)	432		1.74	521	11.6
4706	Suðureyrarhreppur (+v)	519	481	2.35	619	14.0
	Total	1,678			1,943	42.8

DISTRICT NO 9

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4801	Hólshreppur (v)	1,001		2.43	1,208	28.9
	Total	1,001			1,208	28.9

DISTRICT NO 10

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4803	Súðavíkurhreppur (+v)	259	213	2.01	303	6.5
4000	Ísafjörður (town) and Hnífsdalur (v)	3,061		2.03	3.694	80.9
	Total	3,320			3,997	87.4

DISTRICT NO 11

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4804	Ögurhreppur	69		2.03	69	1.3
4805	Reykjafjarðarhreppur	123		2.11	123	2.5
4806	Nauteyrarhreppur	81		1.98	81	1.5
4807	Snæfjallahreppur	39		1.28	39	0.6
	Total	312			312	5.9

DISTRICT NO 12

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
4901	Árneshreppur	188		1.60	188	3.9
4902	Kaldrananeshreppur (+v)	180	84	1.33	197	4.0
4903	Hrófbergshreppur	47		1.70	47	0.8
4904	Hólmavíkurhreppur (v)	330		2.00	398	8.5
4905	Kirkjubólshreppur	86		1.86	86	1.7
4906	Fellshreppur	75		2.13	75	1.4
4907	Óspakseyrarhreppur	63		3.02	63	1.1
4908	Bæjarhreppur (+v)	229	44	2.27	238	5.0
	Total	1,198			1,292	26.4

DISTRICT NO 13

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
5501	Staðarhreppur	145		2.34	145	2.9
5502	Fremri-Torfustaðahr.	108		1.30	108	2.1
5503	Ytri-Torfustaðahr.	251		1.75	251	5.3
5504	Hvammstangahreppur (v)	373		2.01	450	9.8
5505	Kirkjuhvammshreppur	165		1.46	165	3.4
5506	Þverárhreppur	164		1.83	164	3.4
5507	Þorkelshólshreppur	207		2.22	207	4.3
	Total	1,413			1,490	31.2

DISTRICT NO 14

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
5601	Áshreppur	156		1.86	156	3.2
5602	Sveinsstaðahreppur	125		1.60	125	2.5
5603	Torfalækjarhreppur	157		1.97	157	3.2
5604	Blönduóshreppur (v)	728		2.07	879	20.6
5605	Svínavatnshreppur	160		1.56	160	3.3
5606	Bólstaðarhlíðarhreppur	189		2.17	189	3.9
5607	Engihlíðarhreppur	120		2.67	120	2.4
5608	Vindhælishreppur	79		1.52	79	1.5
5609	Höfðahreppur (v)	543		2.17	655	15.0
5610	Skagahreppur	100		2.00	100	2.0
	Total	2,357			2,620	57.6

DISTRICT NO 15

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
5701	Skefilsstaðahreppur	67		1.94	67	1.2
5702	Skarðshreppur	110		2.09	110	2.2
5703	Staðarhreppur	150		1.93	150	3.0
5704	Seyluhreppur (+v)	243	61	2.26	256	5.4
5705	Lýtingsstaðahreppur	326		1.78	326	6.9
5706	Akrahreppur	346		1.99	346	7.3
5707	Rípurhreppur	116		2.67	116	2.3
5708	Viðvíkurhreppur	102		2.55	102	2.0
5709	Hólahreppur	165		2.79	165	3.4
5710	Hofshreppur	224		2.54	224	4.7
5711	Hofsóshreppur (v)	272		2.17	328	6.8
5712	Fellshreppur	42		1.67	42	0.7
5713	Haganeshreppur	116		2.24	116	2.3
5714	Holtshreppur	119		2.10	119	2.4
5100	Sauðárkrókur (town)	1,669		2.01	2,014	43.6
	Total	4.067			4,481	94.2

DISTRICT NO 16

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
5000	Siglufjörður (town)	2,050		1.84	2,474	53.8
	Total	2,050			2,474	53.8

DISTRICT NO 17

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
6501	Grímseyjarhreppur (v)	81		2.72	98	1.0
6200	Ólafsfjörður (town)	1,086		2.44	1,311	28.0
	Total	1,167			1.409	29.0

DISTRICT NO 18

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
6502	Svarfaðardalshreppur	317		1.55	317	6.7
6503	Dalvíkurhreppur (v)	1,093		2.23	1,319	31.6
6504	Hríseyjarhreppur (v)	288		2.53	348	7.3
6505	Árskógshreppur (+v)	330	190	2.61	369	8.1
	Total	2,028			2,353	53.7

DISTRICT NO 19

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
6505	Arnarneshreppur (+v)	248	64	2.22	261	5.5
6507	Skriðuhreppur	144		2.36	144	2.9
6508	Öxnadalshreppur	86		2.56	86	1.6
6509	Glæsibæjarhreppur	239		2.05	239	5.0
6510	Hrafnagilshreppur	291		2.58	291	6.1
6511	Saurbæjarhreppur	295		1.97	295	6.2
6512	Öngulstaðahreppur	390		1.92	390	8.3
6601	Svalbarðsstrandarhr.(+v)	232	76	2.37	248	5.2
6602	Grýtubakkahreppur (+v)	376	181	2.23	413	9.1
	Total	2,301			2,367	49.9

DISTRICT NO 20

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
6604	Hálshreppur	248		2.46	248	5.2
6605	Ljósavatnshreppur	307		2.28	307	6.5
6606	Bárðdælahreppur	192		1.46	192	4.0
6607	Skútustaðahreppur (+v)	491	149	1.89	522	11.7
6608	Reykdælahreppur	397		2.04	397	8.5
6609	Aðaldælahreppur	420		2.17	420	8.9
6610	Reykjahreppur	111		2.34	111	2.2
6611	Tjörneshreppur	116		1.55	116	2.3
6703	Fjallahreppur	26		1.54	26	0.3
6100	Húsavík (town)	2,053		2.37	2,478	53.9
	Total	4,361			4,817	103.5

DISTRICT NO 21

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
6701	Kelduneshreppur	215		1.67	215	4.5
6702	Öxarfjarðarhreppur	154		2.73	154	3.1
6704	Presthólahreppur (+v)	275	94	1.82	294	6.3
6705	Raufarhafnarhreppur (v)	432		2.22	521	11.6
6706	Svalbarðshreppur	154		1.30	154	3.1
6707	Þórshafnarhreppur (v)	432		2.08	521	11.6
6708	Sauðaneshreppur	59		1.70	59	1.1
	Total	1,721			1,918	41.3

DISTRICT NO 22

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7501	Skeggjastaðahreppur (+v)	124	51	1.13	135	2.6
7502	Vopnafjarðarhreppur (+v)	795	530	1.99	905	20.7
	Total	919			1,040	23.3

DISTRICT NO 23

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7503	Hlíðarhreppur	135		2.74	135	2.7
7504	Jökuldalshreppur	174		1.84	174	3.6
7505	Fljótsdalshreppur	186		1.77	186	3.8
7506	Fellahreppur	202		2.38	202	4.2
7507	Hróarstunguhreppur	132		2.27	132	2.7
7508	Hjaltastaðahreppur	117		2.22	117	2.3
7509	Borgarfjarðarhreppur (+v)	262	135	1.26	290	6.2
7601	Skriðdalshreppur	125		1.76	125	2.5
7602	Vallahreppur	182		1.59	182	3.7
7603	Egilsstaðahreppur (v)	796		2.46	961	22.7
7604	Eiðahreppur	162		2.04	162	3.3
	Total	2,473			2,666	57.7

DISTRICT NO 24

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7510	Loðmundarfjarðarhr.	1		0.00	0	0.0
7511	Seyðisfjarðarhreppur	40		1.95	40	0.6
7000	Seyðisfjörður (town)	906		2.27	1,094	23.2
	Total	947			1,134	23.8

DISTRICT NO 25

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7605	Mjóafjarðarhreppur	40		1.50	40	0.6
7606	Norðfjarðarhreppur	116		1.12	116	2.3
7100	Neskaupstaður (town)	1,618		2.16	1,953	42.2
	Total	1,774			2,109	45.1

DISTRICT NO 26

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7607	Helgustaðahreppur	39		1.28	39	0.6
7608	Eskifjarðarhreppur (v)	923		2.41	1,114	26.5
7609	Reyðarfjarðarhreppur (+v)	650	590	2.49	772	17.6
	Total	1,612			1,925	44.7

DISTRICT NO 27

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7610	Fáskrúðsfjarðarhreppur	154		2.01	154	3.1
7611	Búðarhreppur (v)	727		2.63	877	20.5
7612	Stöðvarhreppur (+v)	302	278	2.75	360	7.9
7613	Breiðdalshreppur (+v)	342	178	2.05	379	8.3
7614	Beruneshreppur	97		1.34	97	1.9
7615	Búlandshreppur (v)	346		2.34	418	9.0
7616	Geithellnahreppur	114		1.84	114	2.3
	Total	2,082			2,399	53.0

DISTRICT NO 28

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
7701	Bæjarhreppur	77		1.95	77	1.5
7702	Nesjahreppur	217		2.12	217	4.5
7703	Hafnarhreppur (v)	1,013		2.47	1,223	29.2
7704	Mýrahreppur	104		1.73	104	2.0
7705	Borgarhafnarhreppur	132		1.44	132	2.7
7706	Hofshreppur	122		1.15	122	2.4
	Total	1,665			1,875	42.3

DISTRICT NO 29

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
8501	Hörglandshreppur	183		1.37	183	3.8
8502	Kirkjubæjarhreppur (+v)	221	52	2.04	232	4.9
8503	Skaftártunguhreppur	93		2.37	93	1.8
8504	Leiðvallarhreppur	88		1.25	88	1.7
8505	Álftaversbreppur	66		1.21	66	1.2
8506	Hvammshreppur (+v)	528	375	1.91	606	13.7
8507	Dyrhólahreppur	178		1.80	178	3.7
8601	Austur-Eyjafjallahreppur	262		2.48	262	5.5
8602	Vestur-Eyjafjallahreppur	253		1.70	253	5.3
	Total	1,872			1,961	41.6

DISTRICT NO 30

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
8603	Austur-Landeyjahreppur	186		2.04	186	3.8
8604	Vestur-Landeyjahreppur	175		2.06	175	3.6
8605	Fljótshlíðarhreppur	308		2.08	308	6.5
8606	Hvolhreppur (+v)	501	307	2.50	565	12.7
8607	Rangárvallahreppur (+v)	589	384	2.17	668	15.1
8608	Landmannahreppur	121		0.83	121	2.4
8609	Holtahreppur	295		2.37	295	6.2
8610	Ásahreppur	167		2.22	167	3.4
8611	Djúpárhreppur	306		2.35	306	6.5
	Total	2,648			2,791	60.2

DISTRICT NO 31

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
8701	Gaulverjabæjarhreppur	213		2.02	213	4.4
8702	Stokkseyrarhreppur (+v)	506	420	2.02	593	13.4
8703	Eyrarbakkahreppur (v)	539		2.34	651	14.9
8704	Sandvíkurhreppur	129		2.02	129	2.6
8705	Selfosshreppur (v)	2,506		2.50	3,024	74.4
8706	Hraungerðishreppur	225		1.91	225	4.7
8707	Villingaholtshreppur	227		2.34	227	4.8
8708	Skeiðahreppur	257		2.06	257	5.4
8709	Gnípverjahreppur (+v)	355	77	2.45	371	8.2
8710	Hrunamannahreppur	496		2.26	496	10.6
8711	Biskupstungnahreppur	498		2.43	498	10.7
8712	Laugardalshreppur (+v)	282	184	2.38	320	6.9
8713	Grímsneshreppur (+v)	313	88	1.98	331	7.2
8714	Þingvallahreppur	54		1.11	54	0.9
8715	Grafningshreppur	76		2.24	76	1.4
8716	Hveragerðishreppur (v)	887		2.00	1,070	25.4
8717	Ölfushreppur (+v)	971	569	2.15	1,089	25.1
8718	Selvogshreppur	25		1.60	25	0.3
	Total	8,559			9,649	221.3

DISTRICT NO 32

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
8000	Vestmannaeyjar (town)	5,303		2.19	6.398	140.9
	Total	5.303			6.398	140.9

DISTRICT NO 33

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
2501	Grindavíkurhreppur (v)	1,353		2.56	1,633	39.5
	Total	1,353			1,633	39.5

DISTRICT NO 34

Commune		Total population of commune 1972	Population of village included in commune	Born pr 100 inhabitants annual mean 1962-71	Forecasted total population 1987	Forecasted mean number in yeargroup 1987-2001
2502	Hafnahreppur (+v)	161	145	1.43	191	3.9
2503	Miðneshreppur (+v)	1,076	967	2.24	1,276	29.5
2504	Gerðahreppur (v)	680		2.22	821	19.2
2505	Njarðvíkurhreppur (v)	1,644		2.36	1,984	48.4
2506	Vatnsleysustrandarhr.(+v)	407	282	1.94	465	10.4
2200	Keflavík (town)	5,862		2.23	7,072	155.9
	Total	9,830			11,809	267.3
Total for all the 34 districts		87,409	9,740	2.184[1]	99,794	2,199.6
The Reykjavík region		112,184		1.952	140,792	2,748.0
Akureyri		11,182		2.206	14,034	309.6
	Total for the country	210,775		2.061	254,620	5,257.2

[1] This average is only for explanatory purpose and not used in calculations.

APPENDIX C

THE PLANNING MAPS

KEY TO SYMBOLS ON THE PLANNING MAPS

 Coast line, rivers and lakes.

 Glacier.

 Communal division line.

 School district division line.

 Fully built road, in adequate condition.

 Built road which can be improved to adequate condition.

 Road which need rebuilding. In this class are local roads on which data on condition were not available.

 Village or town.

 School in village or town, number indicates grades offered.

 School in rural area, number indicates grades offered.

 Farm, family unit employed in agriculture, services, utility, etc.

 Number of commune or town. See Appendix A. The number is followed by the name of commune or town.

 Number of school district.

 Transport direction.

 Limit of transport.

The following 75 planning maps are here produced to the scale 1 : 250,000.

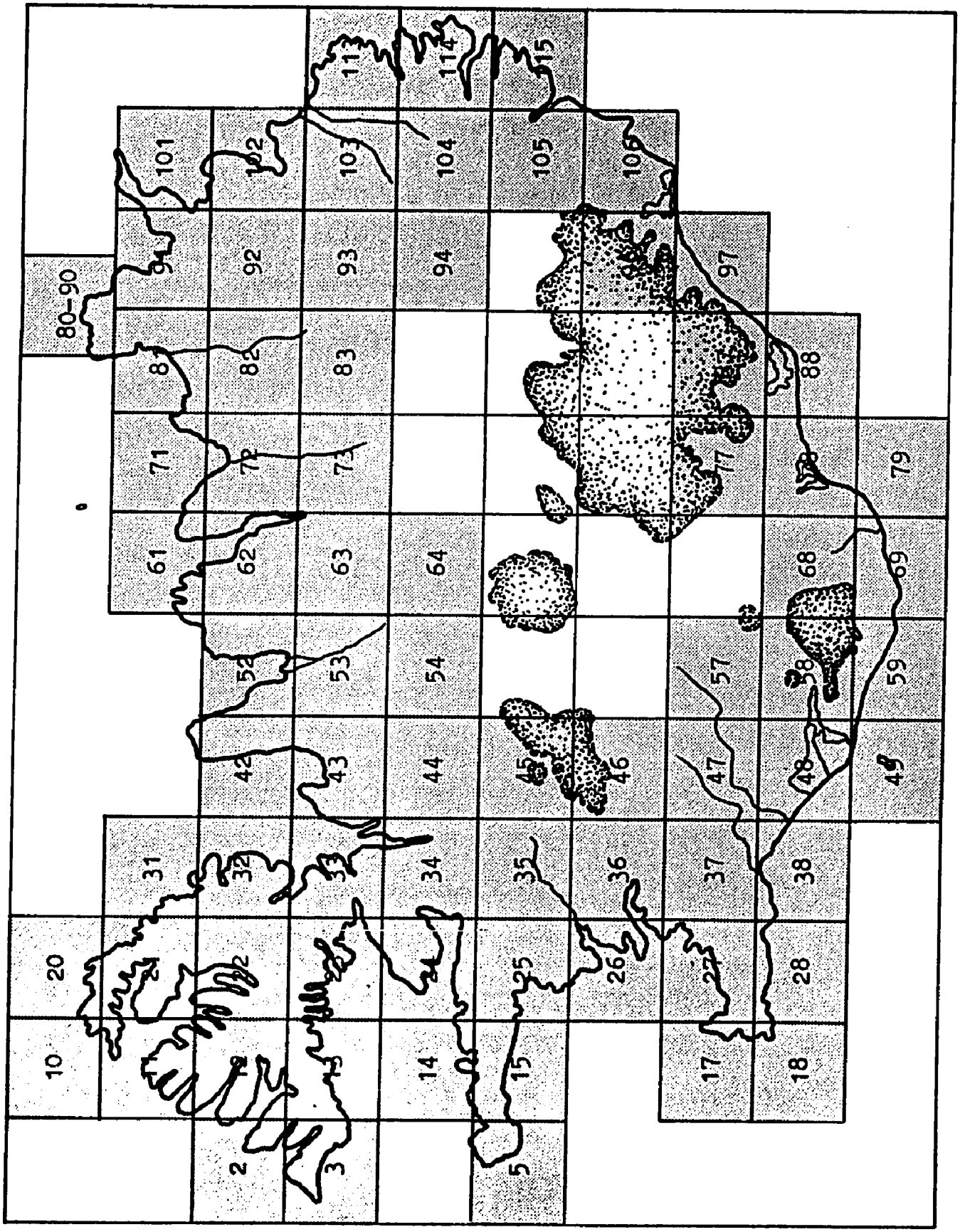
Notes and sources:

These drawings are based on the so-called atlasblöð some of which are published by the Landmælingar Islands (Icelandic Survey Department), and some by the Geodedic Institute, Copenhagen. As some of the maps date back several years modifications were necessary, especially with regard to the location of farms, communal division, and roads. These modifications were made according to more recent maps in a smaller scale published by the Landmælingar Íslands, information from the Vegagerð ríkisins (Public Road Administration), and other sources in particular cases.

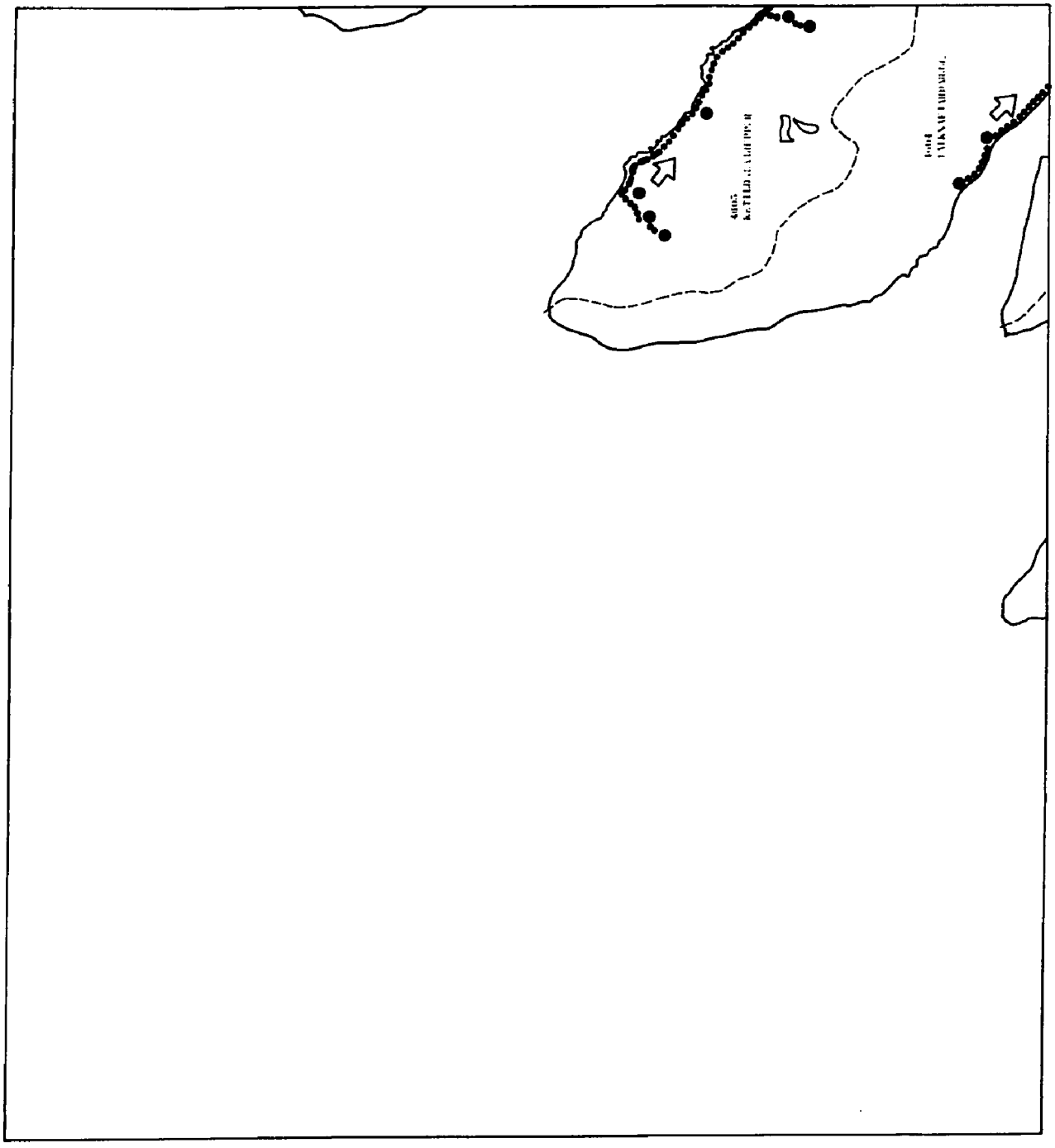
The road classification (three groups) rests on information from the Vegagerð ríkisins, and has ben recorded with the aid of its districts engineers.

The source of information regarding occupied farms and number of farmers is the Farm Register, Jarðaskrá, prepared by Landnám ríkisins (The State Agricultural Development Office), for the year 1971 which in turn is based on yearly declarations from the Communal State Administrative Officers, hreppsstjórar, in each commune. In recording the rural settlements each family unit has been recorded as a separate one, even in cases where two or more farmers working the same farm live in practically the same location. The livestock indicator of kúgildi was applied to evaluate the number of families in the Jarðaskrá in the light of employment possibilities. This eliminated double recording caused by the overlapping of parents and children during the generation shift. Information regarding families living at the power plants were gathered from Rafmagnsveitur ríkisins (The State Electric Power Work). Furthermore, persons familiar with the different localities were interviewed in order to locate families, occupied with services and the like, living outside the towns and villages.

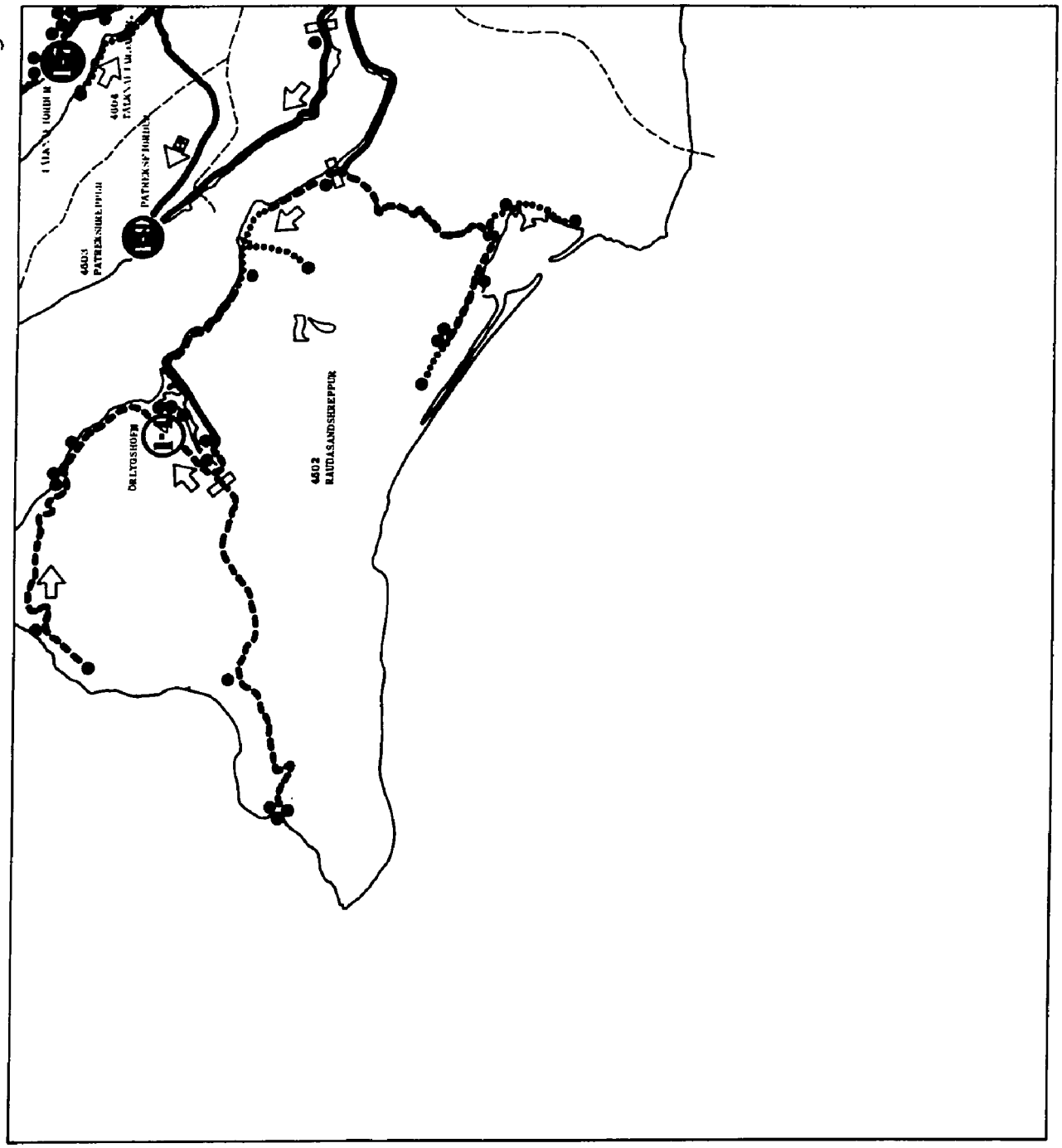
KEY TO THE PLANNING MAP NUMBER



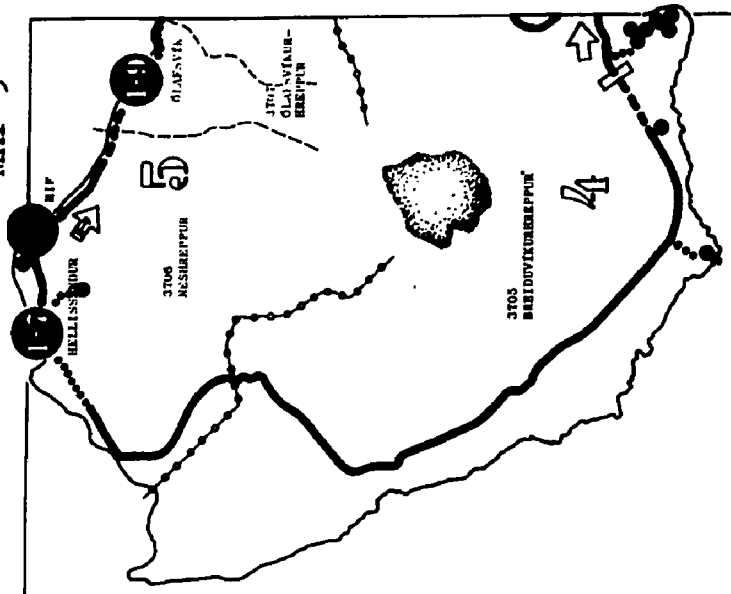
MAP 2



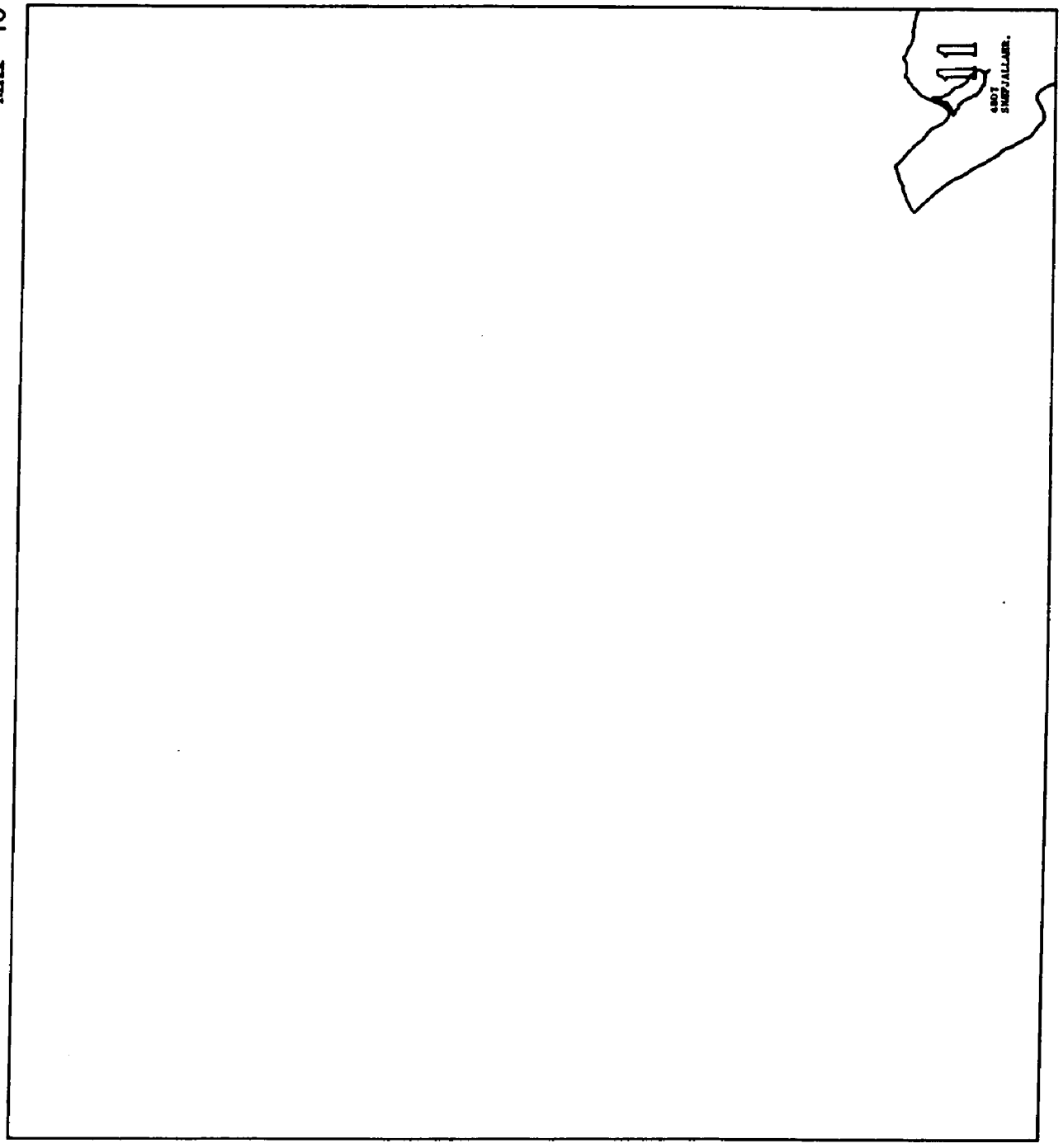
MAP 3



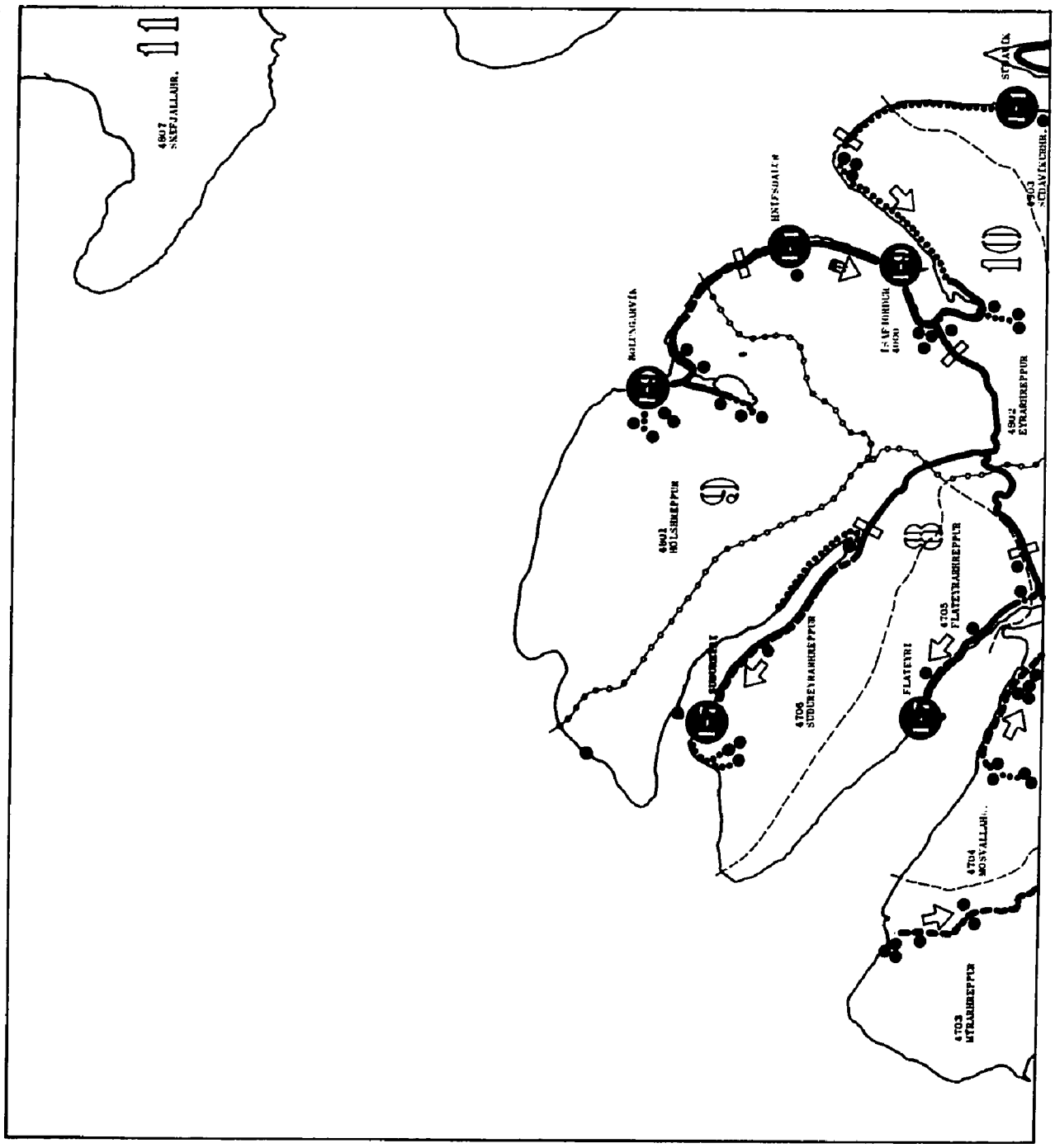
MAP 5



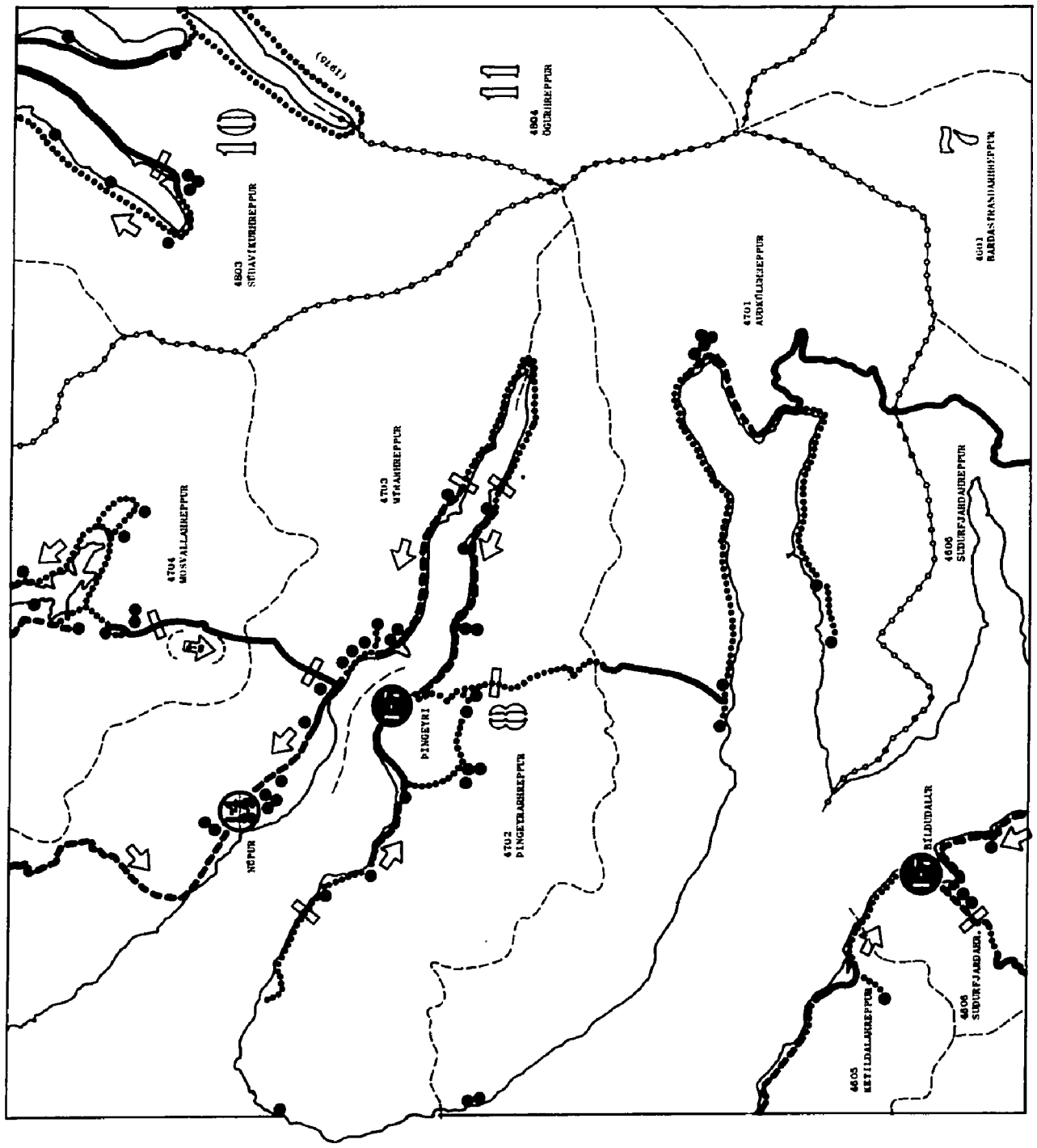
MAP 10



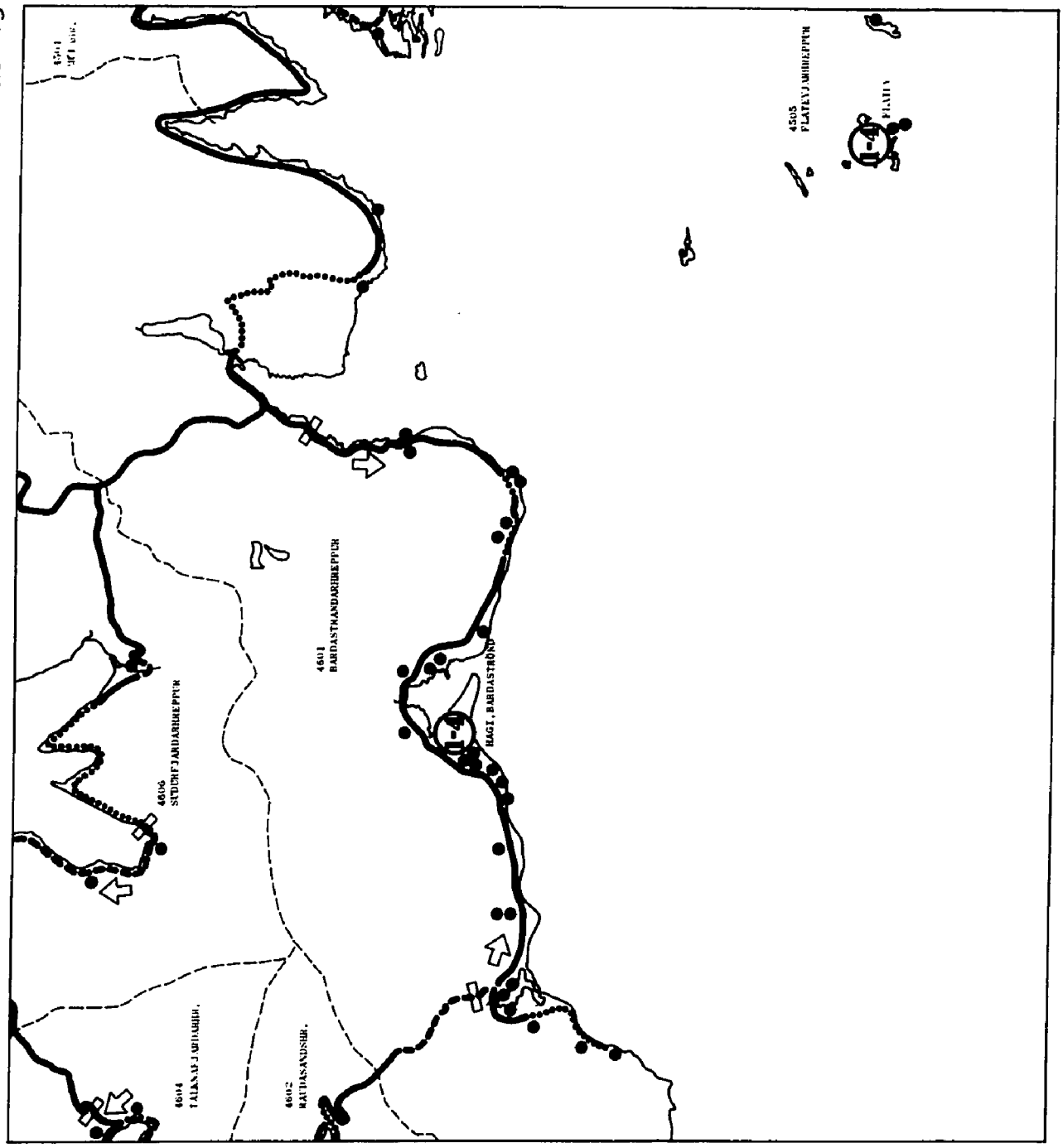
MAP 11


11
4607
SKEFJALLUR.
10
4703
MTRARHREPPUR
4704
MOSVALLAH.
4705
FLATEYJARHREPPUR
FLATEYRI
4706
SUDUREYRARHREPPUR
SUDUREYRI
4801
HOLSHREPPUR
9
4802
EYRARHREPPUR
8

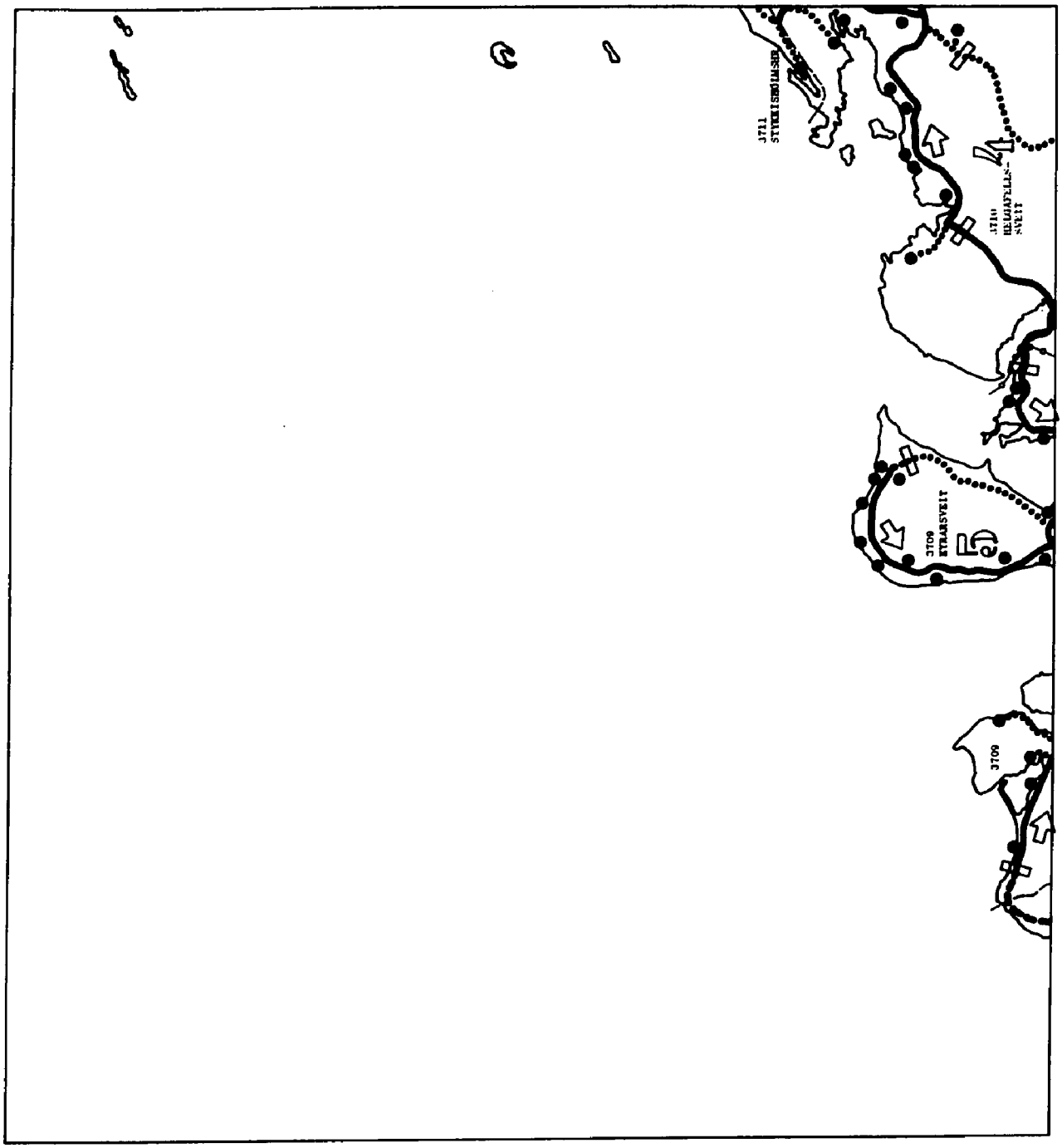
MAP 12

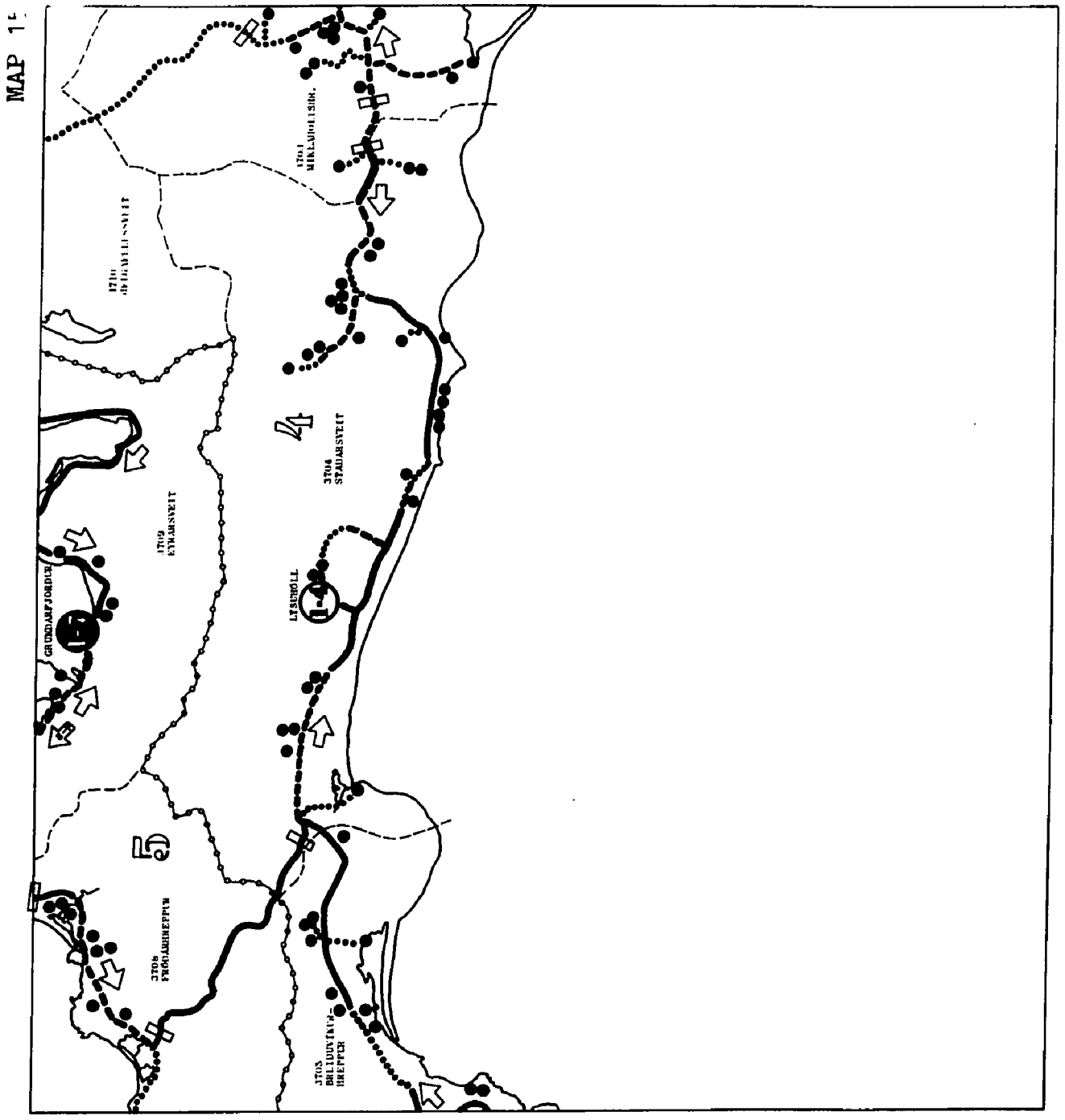

10
11
7
8
(1976)
4704
MOSFELLSHREPPUR
4703
VTAHREPPUR
4702
PINGEYRARSHREPPUR
4701
AUDKÚLUHREPPUR
4606
SIGLUFJARDARKAUPSTADUR
4605
KEFLAVIKURFLUGVÖLLUR
4606
SIGLUFJARDARSÝSLA

MAP 13

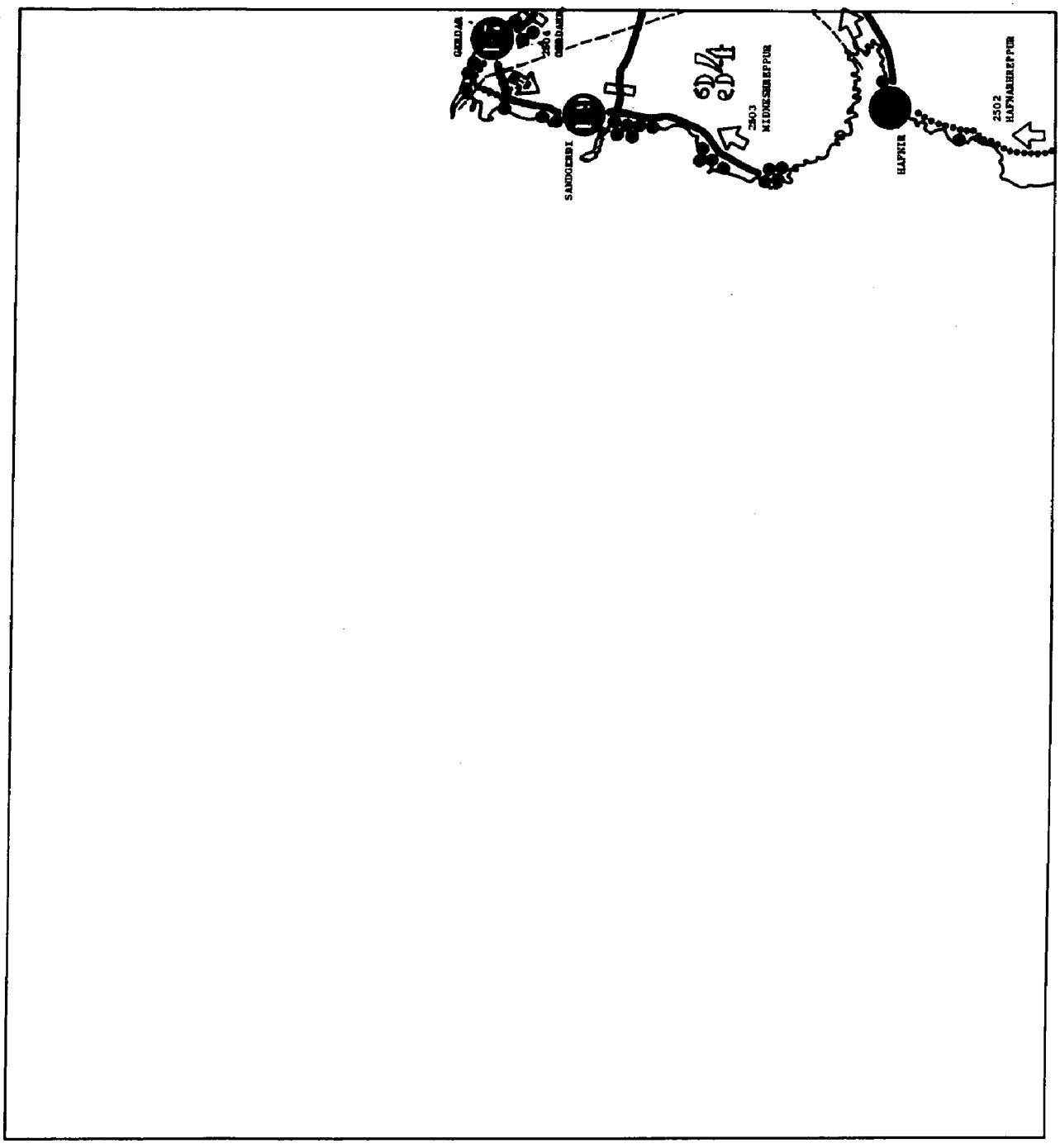

4505
4601
BARDASTRANDARHREPPUR
4606
STRANDABYGGD
4614
4612
RAUDASANDSHR.
HAGI, BARDASTRÖND

MAP 14

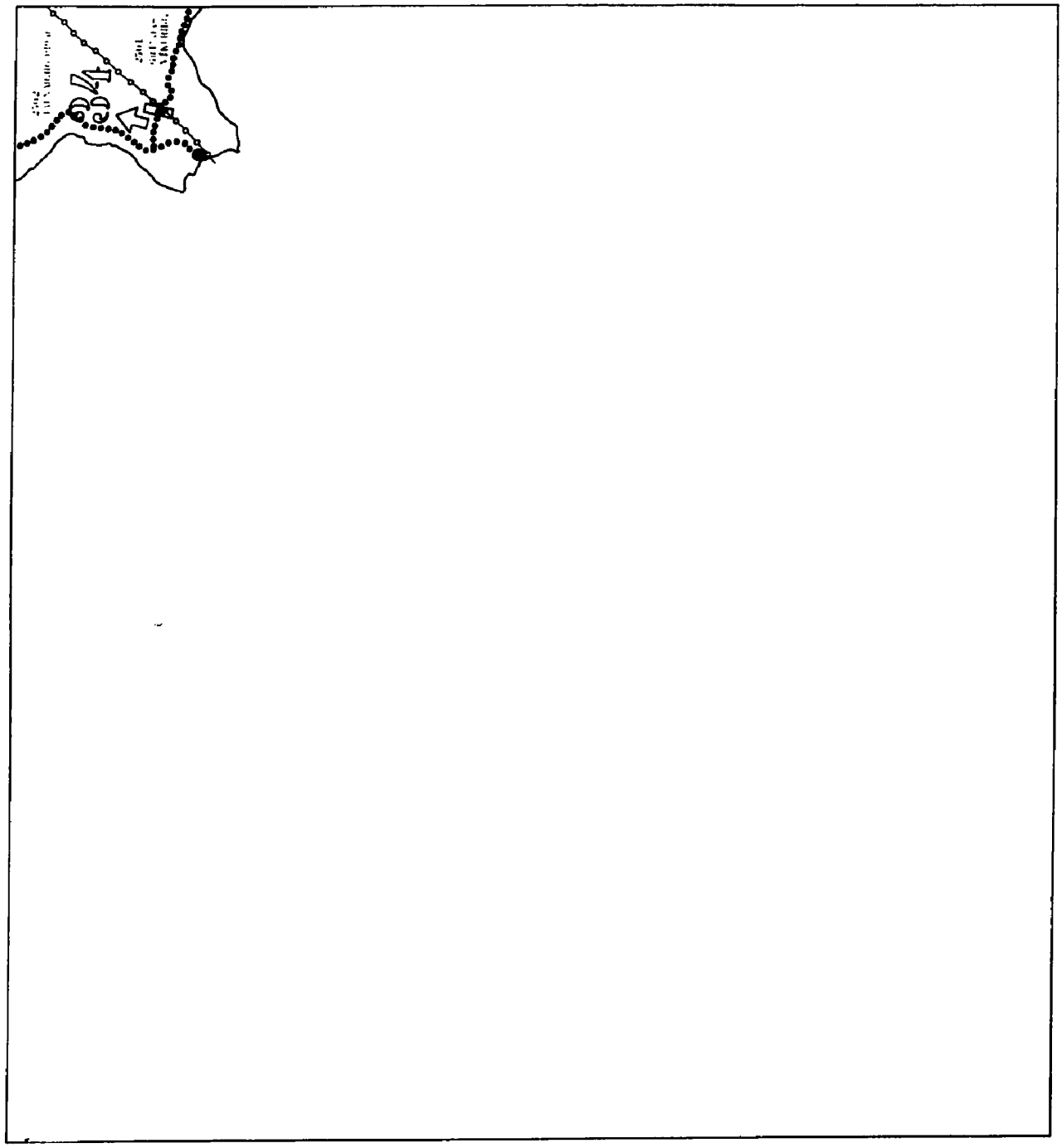



MAP 1
3708
STADARSTAÐIR
3709
HÓLAKOTSFJALL
3705
BREIÐUVÍKUR-
HREPPUR

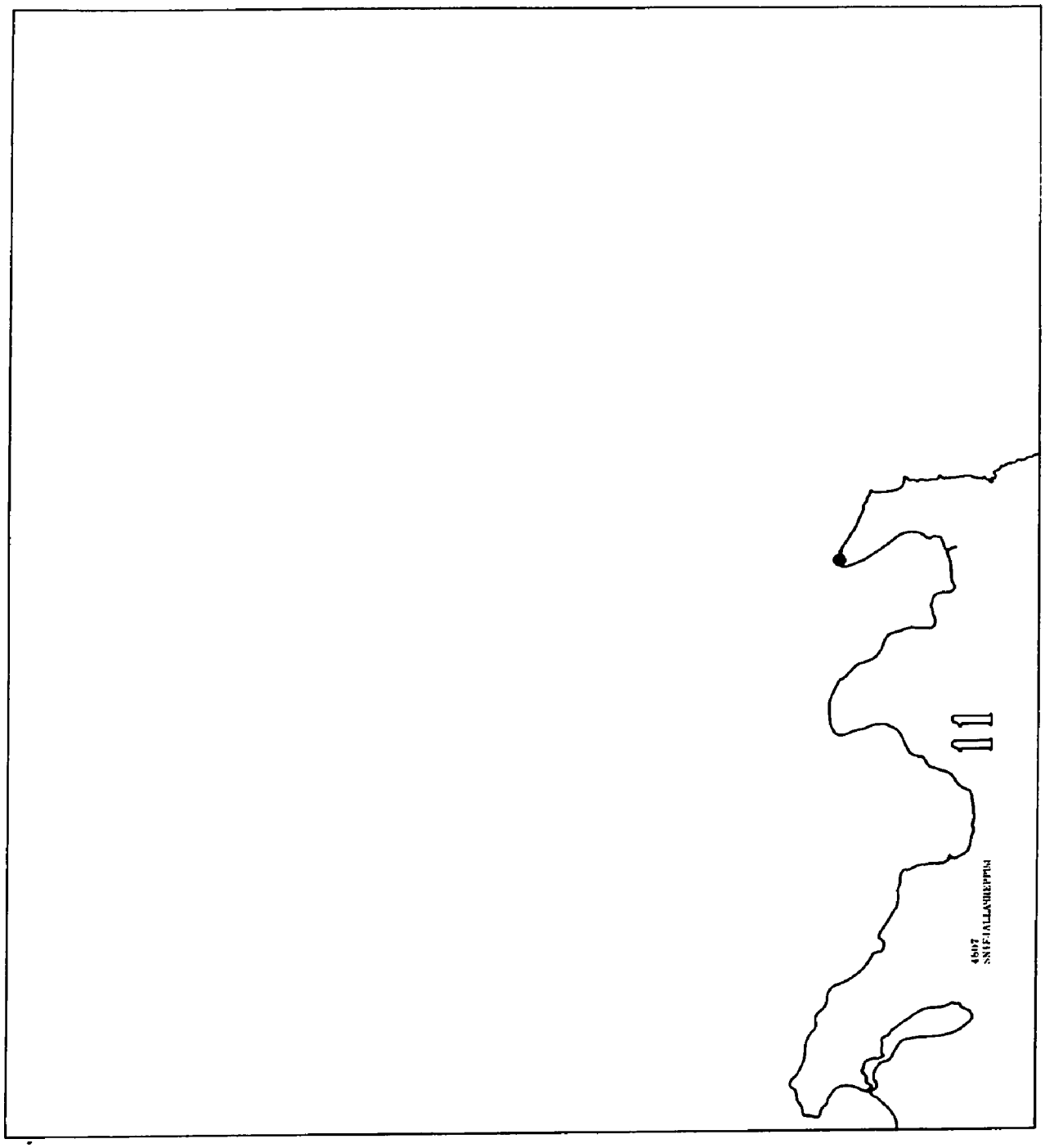
MAP 17


SANDOMIERZ
2503
NIDZICA-MIELAWA
HAPSKIE
2502
HAPSKIE-MIELAWA

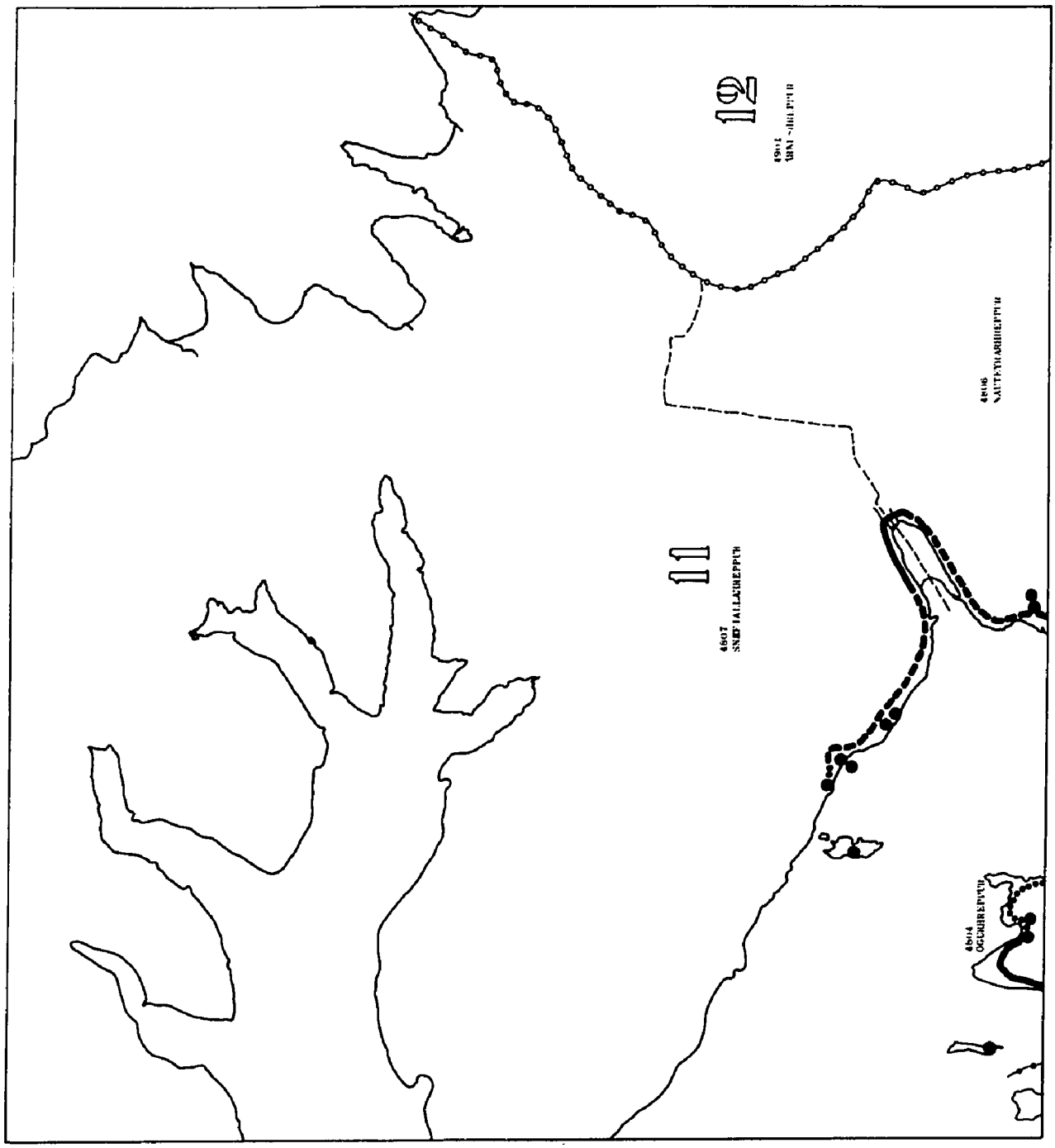
MAP 18



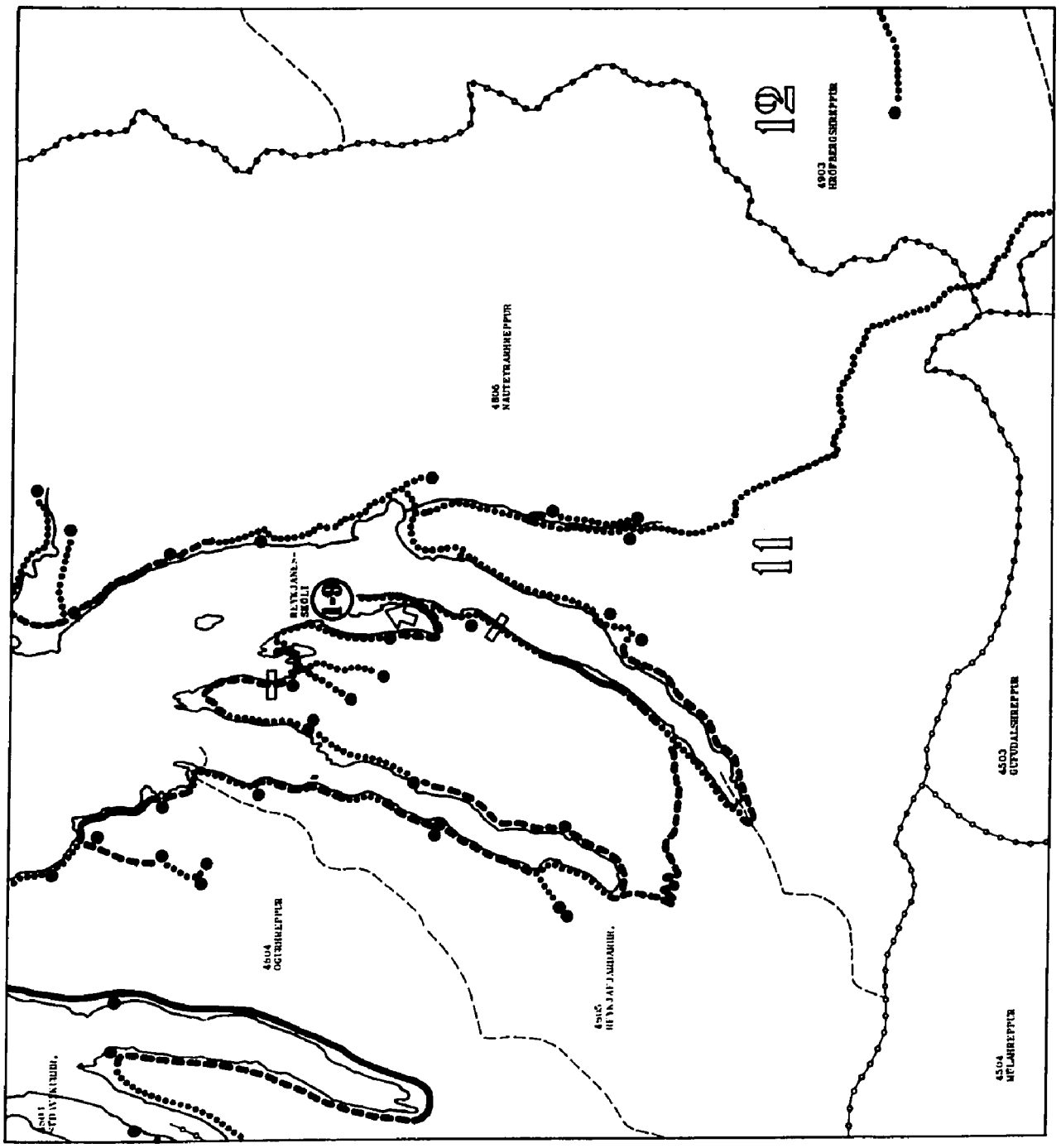
MAP 20



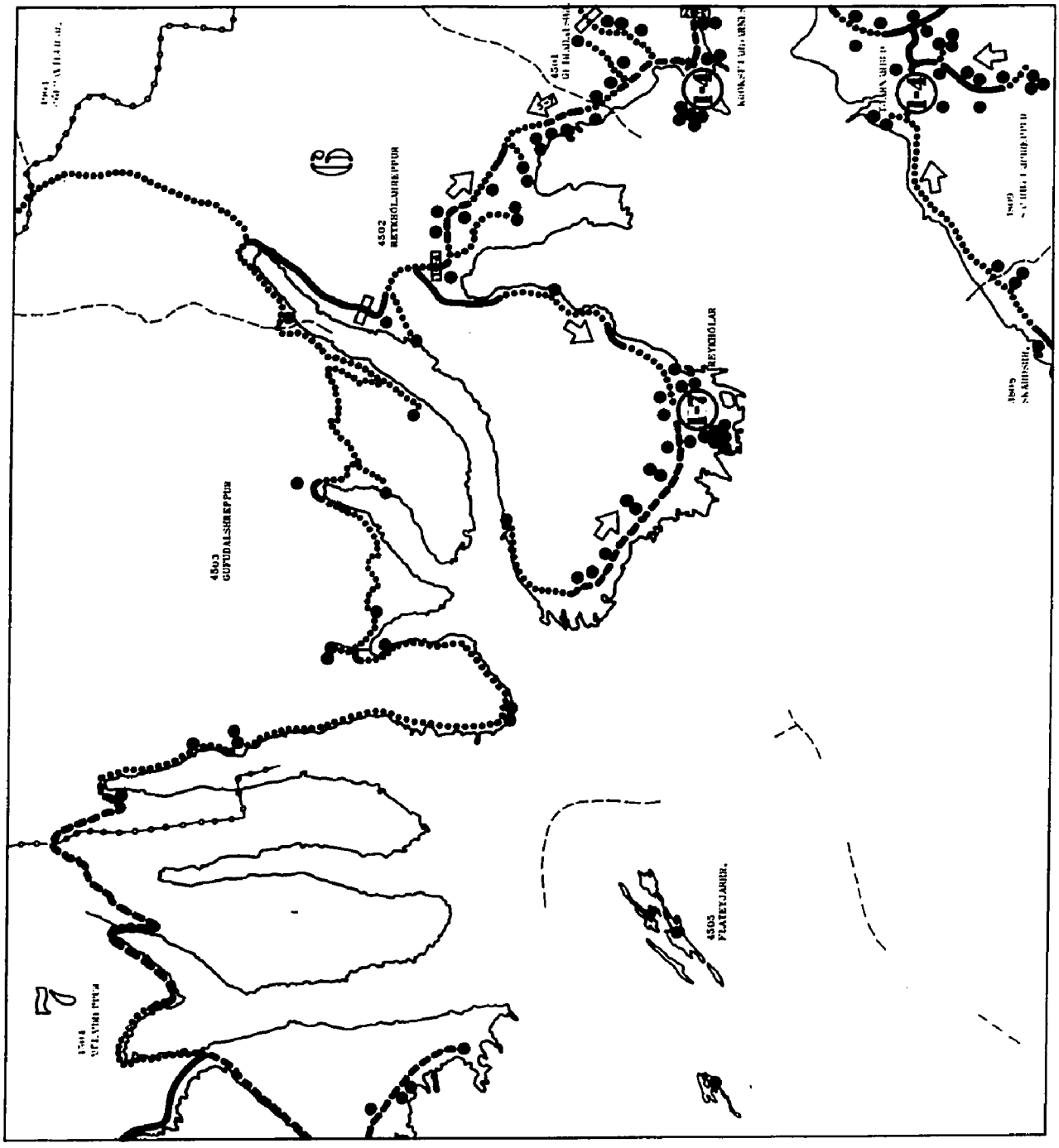
MAP 21



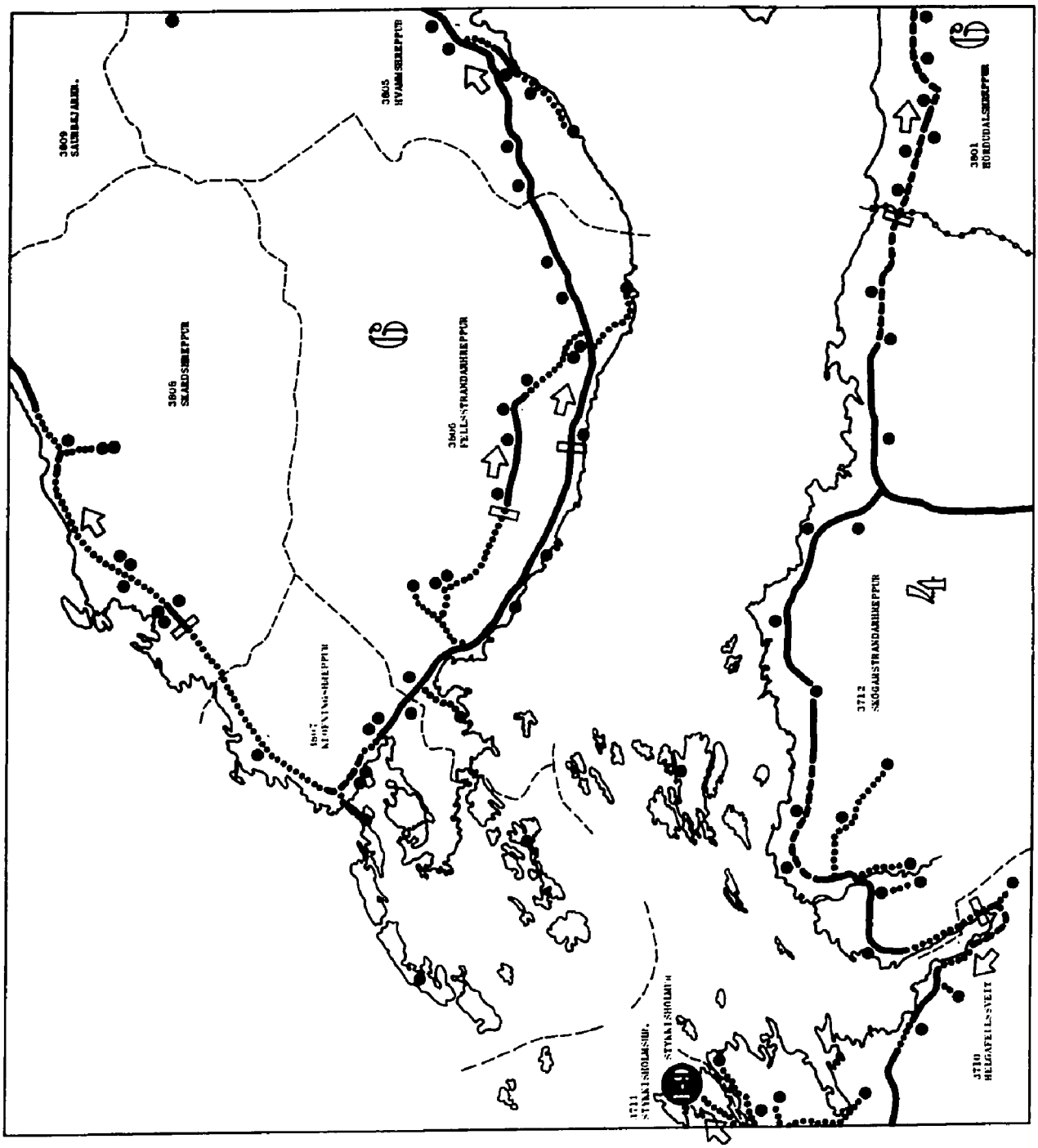
MAP 22



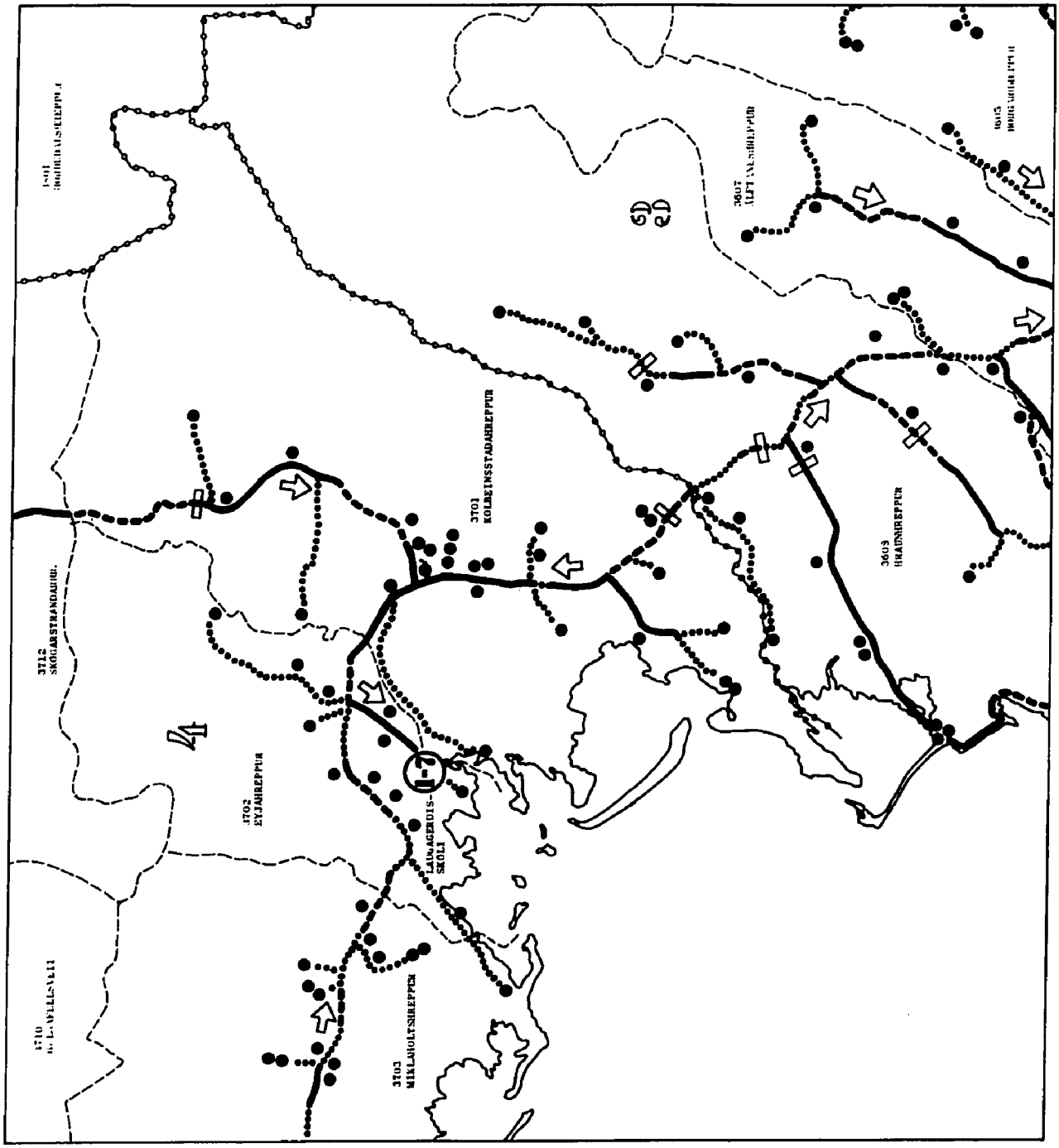
MAP 23



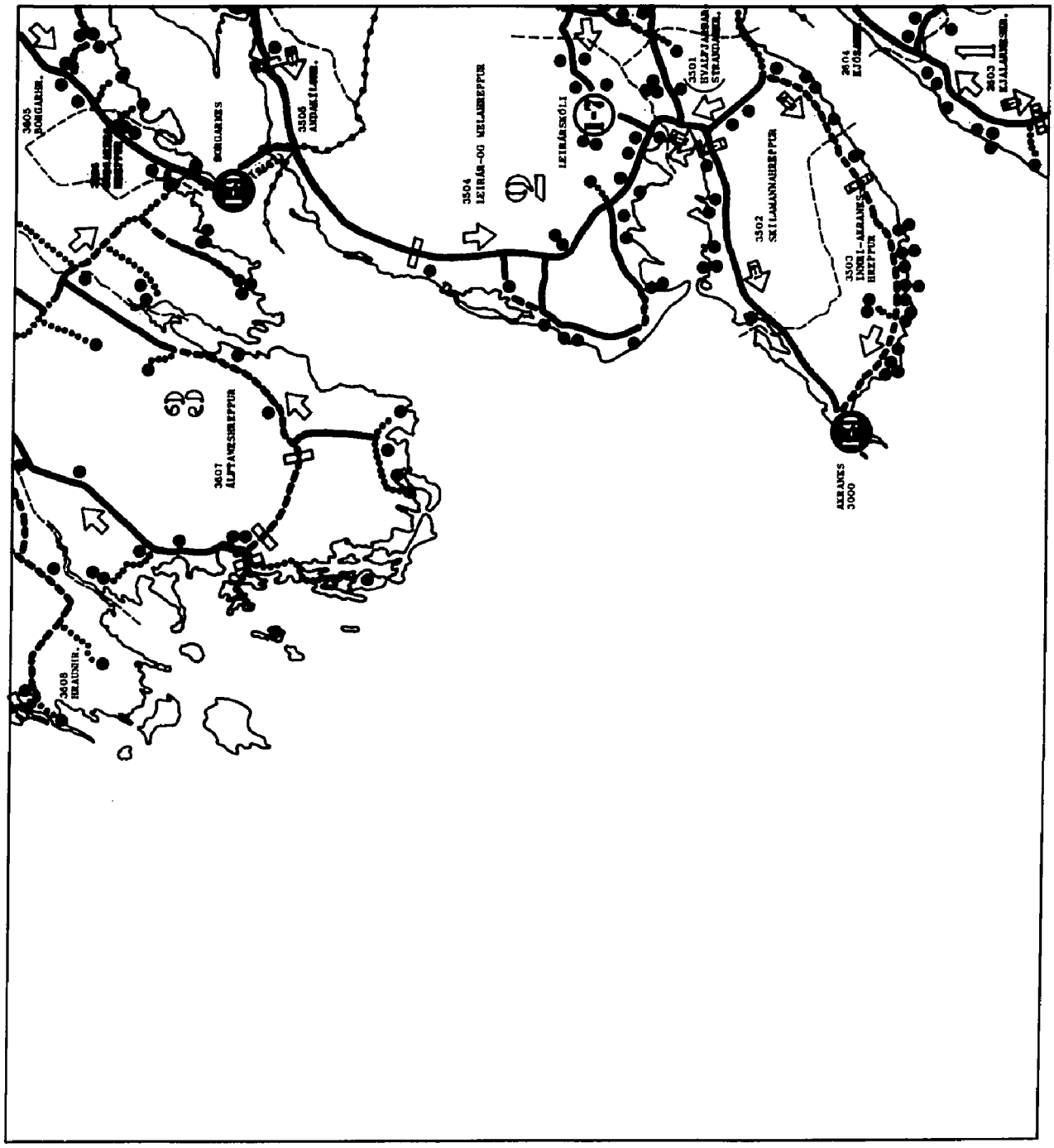
MAP 24



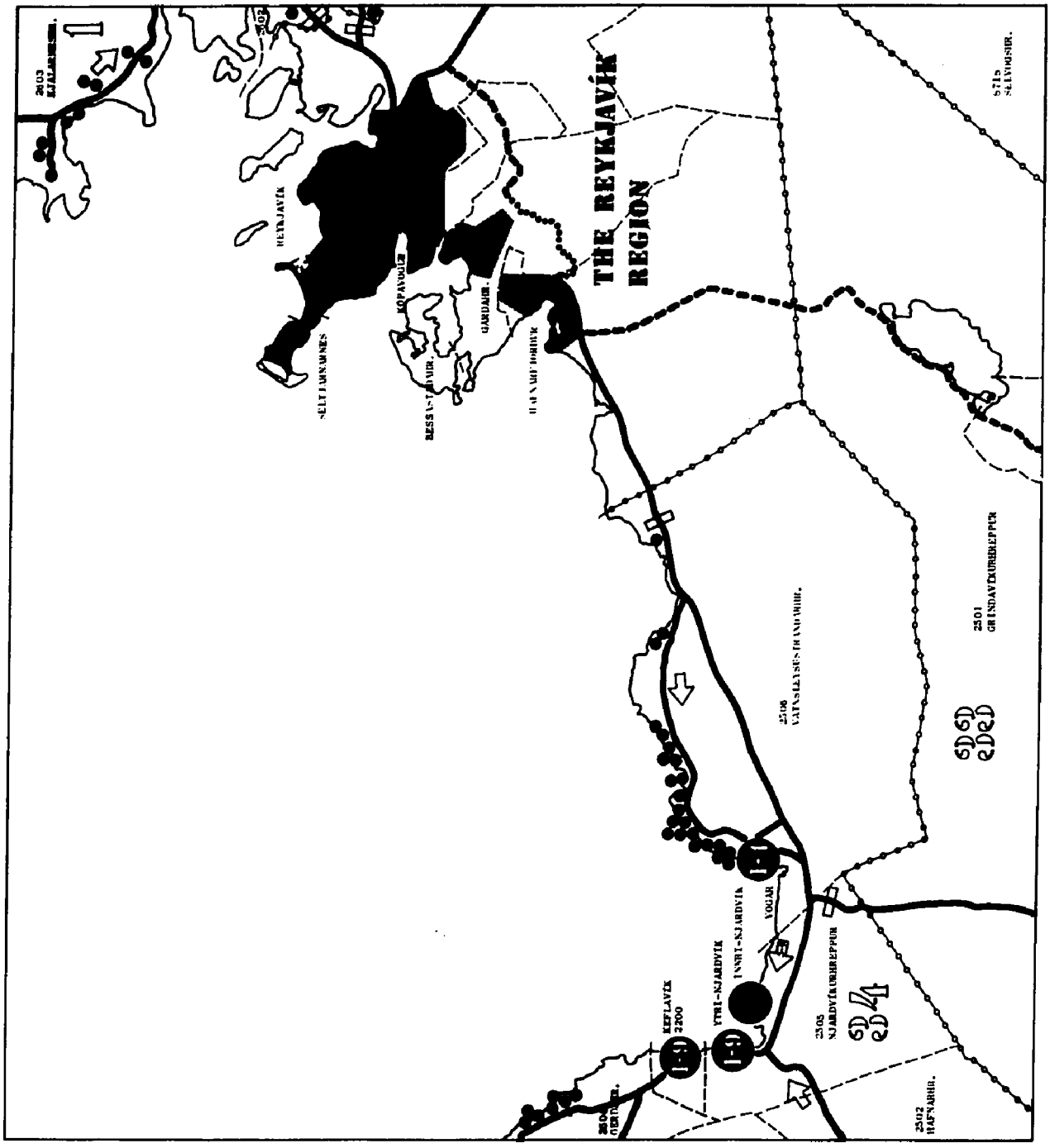
MAP 25


3712
SKOGARSTRANDARHR.
3702
EYJAHREPPUR
3703
MIKLAHOLTSHREPPUR
LAUGAGERÐIS-
SKÓLI
3701
KOLBEINSSTAÐAHREPPUR
3603
HRAUNHREPPUR
6D
2D
4

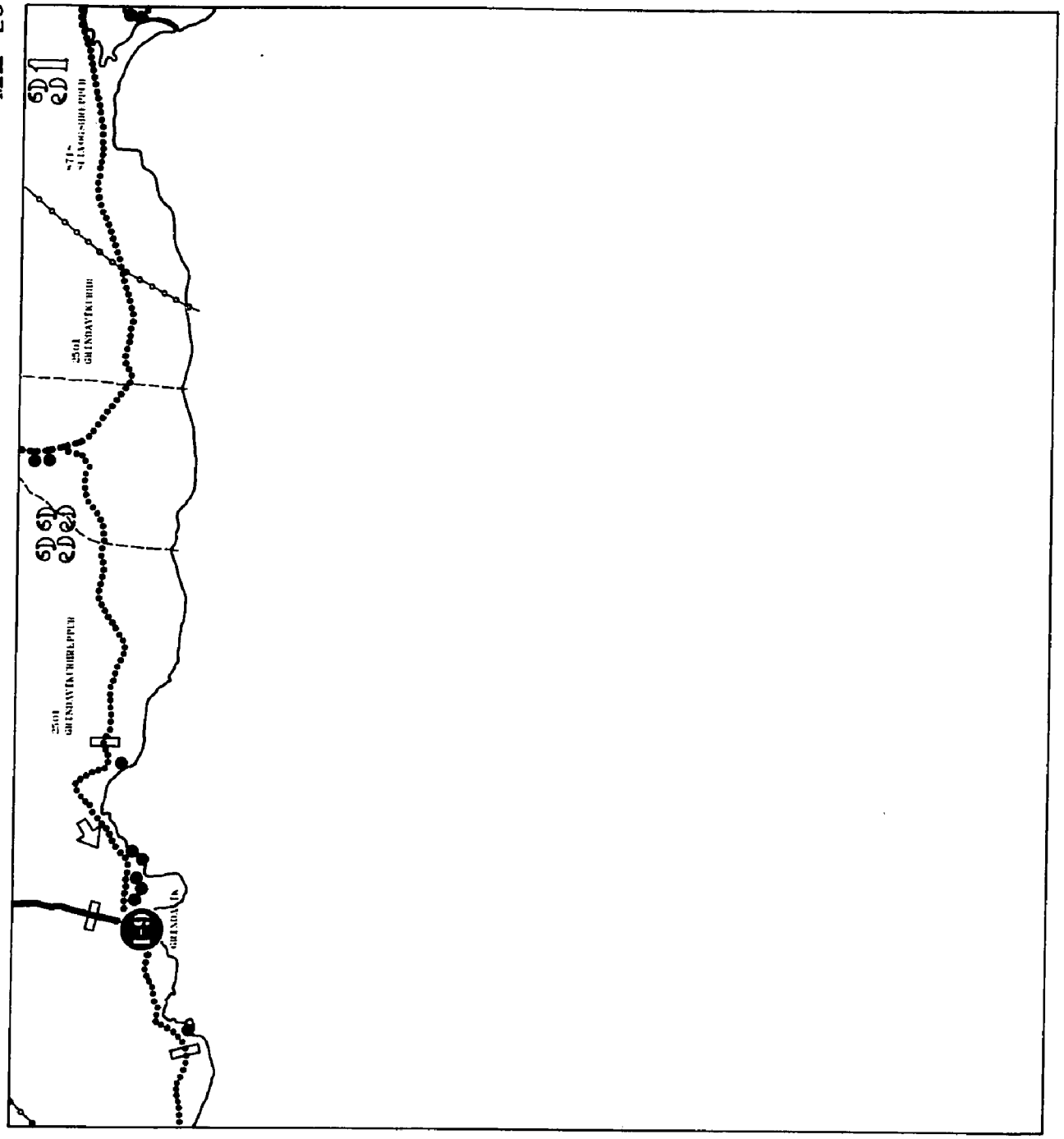
MAP 26


3605
BORGARBR.
BORGARNES
3506
ANDAKÍLSBR.
3504
LEIRÁR- OG MELASKEIÐAHR.
LEIRÁRSKÓLI
3501
HVALFJARÐAR-
STRANDARHR.
3502
SKILMANNAHREPPUR
3503
INNRI-AKRANESHREPPUR
AKRANES
3000
2604
KJALARNESÞ.
2603
KJALARNESÞ.
3607
ALFTANESHREPPUR
3606
HRAUNHR.

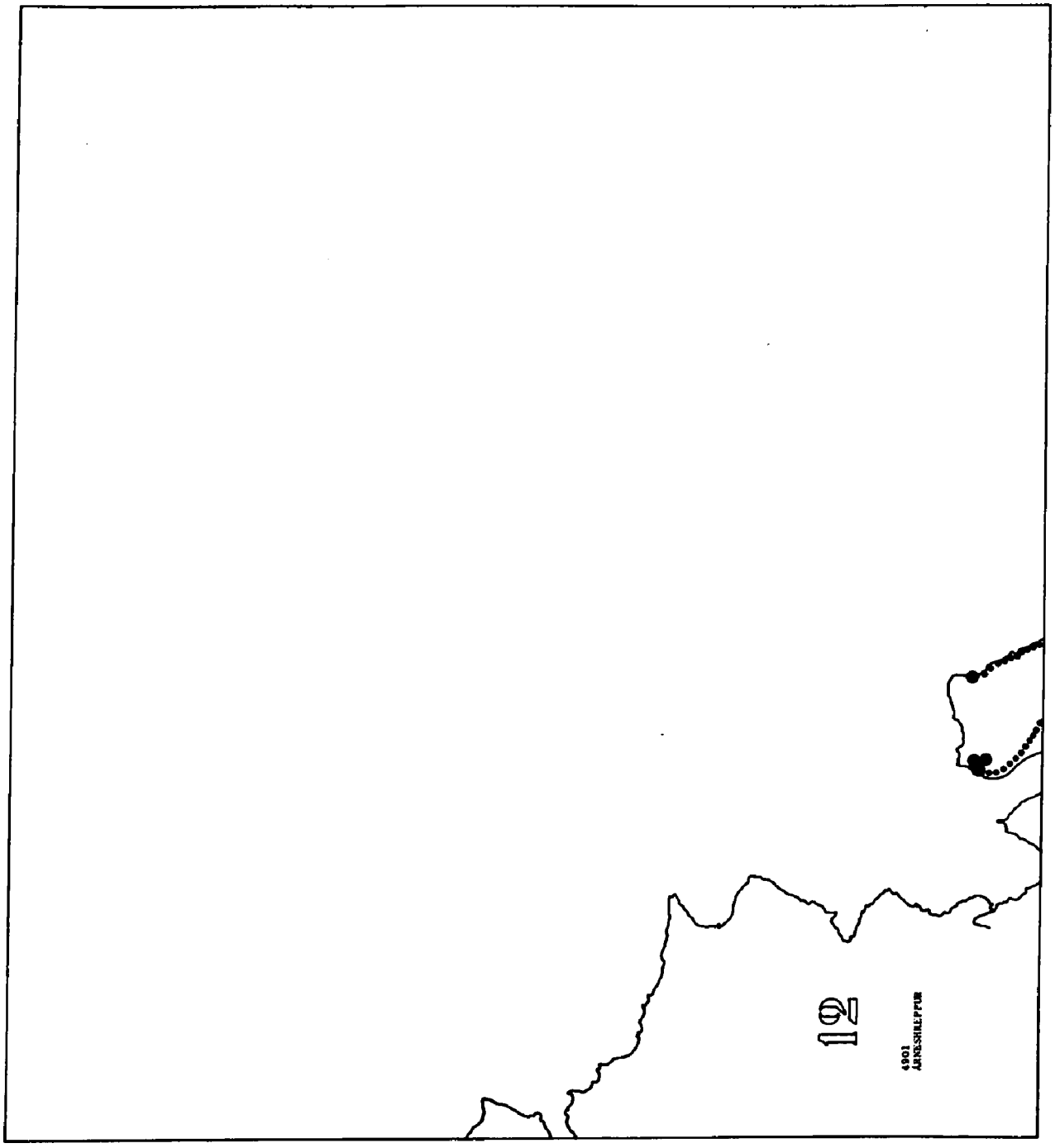
MAP 27


THE REYKJAVÍK REGION
REYKJAVÍK
KÓPAVOGUR
GARÐABÆR
SELTJARNARNES
2603 KJALARNES.
2501 GRINDAVÍKURBÆIRINN
2506 VATNSLEYSTRANDARHR.
2505 NJARÐVÍKURBÆIRINN
2502 HAFNARHR.
KEFLAVÍK 2200
YTRI-NJARÐVÍK
INNRI-NJARÐVÍK
KÓGAR
1
41

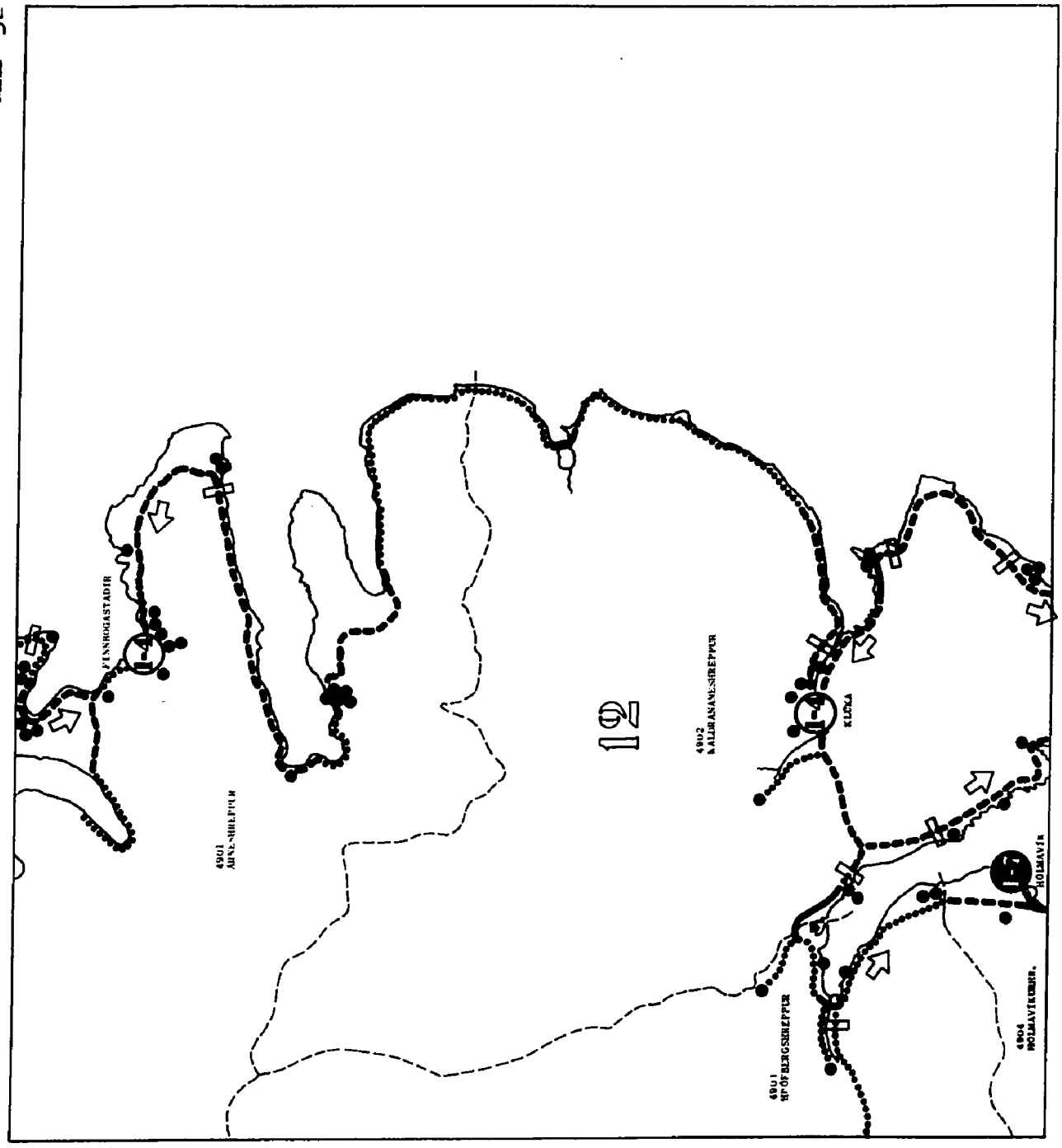
MAP 28



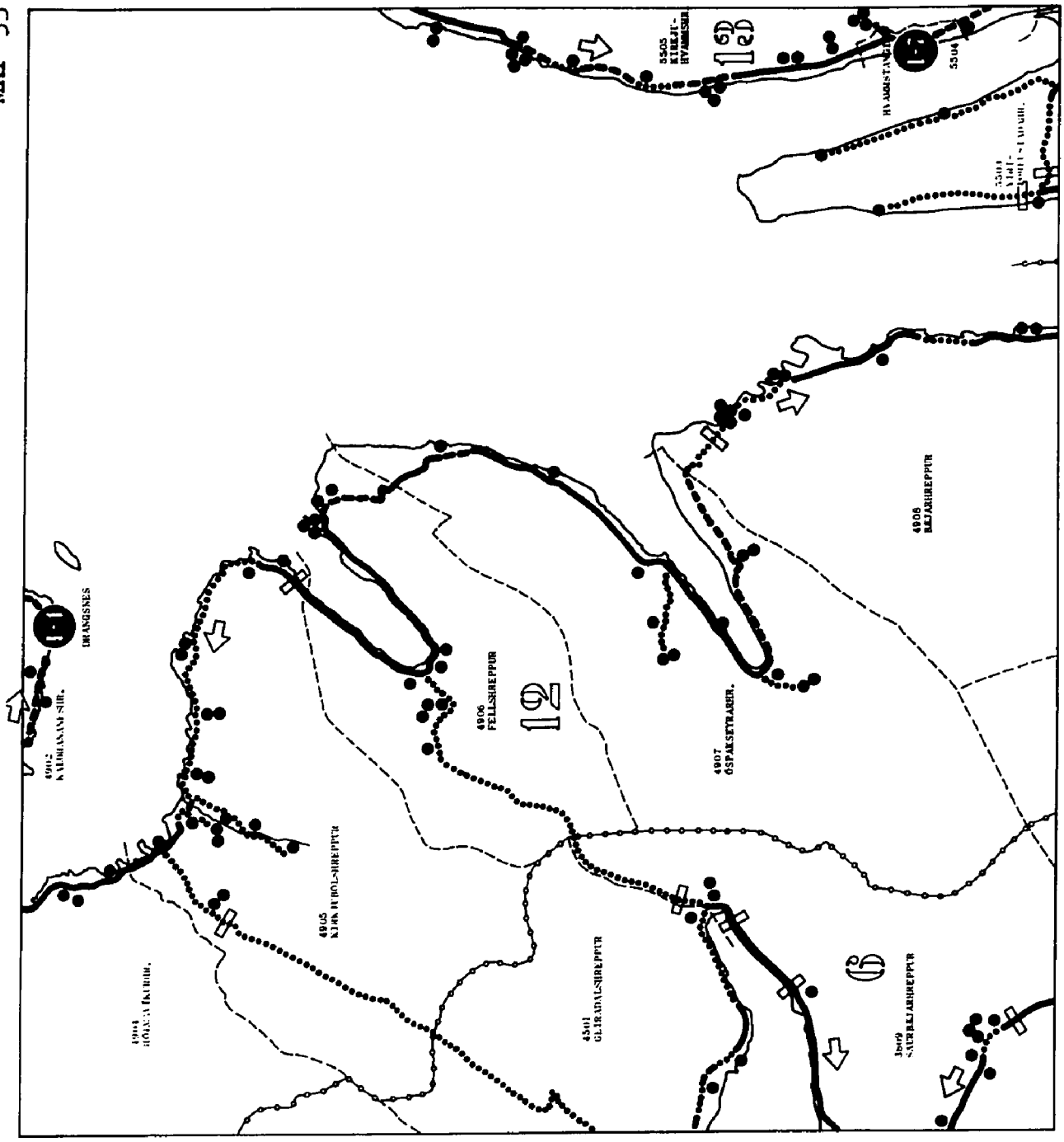
MAP 31



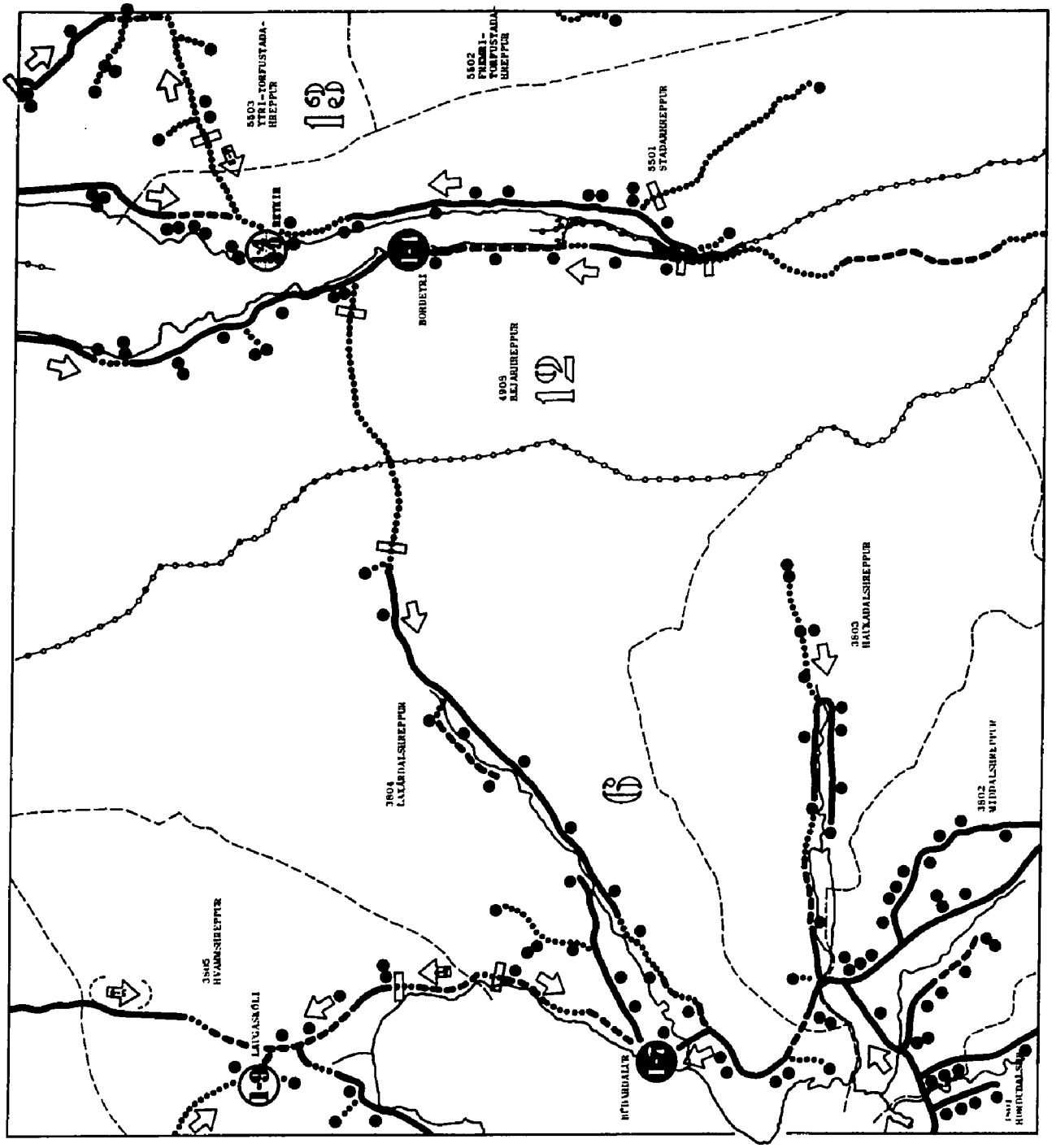
MAP 32



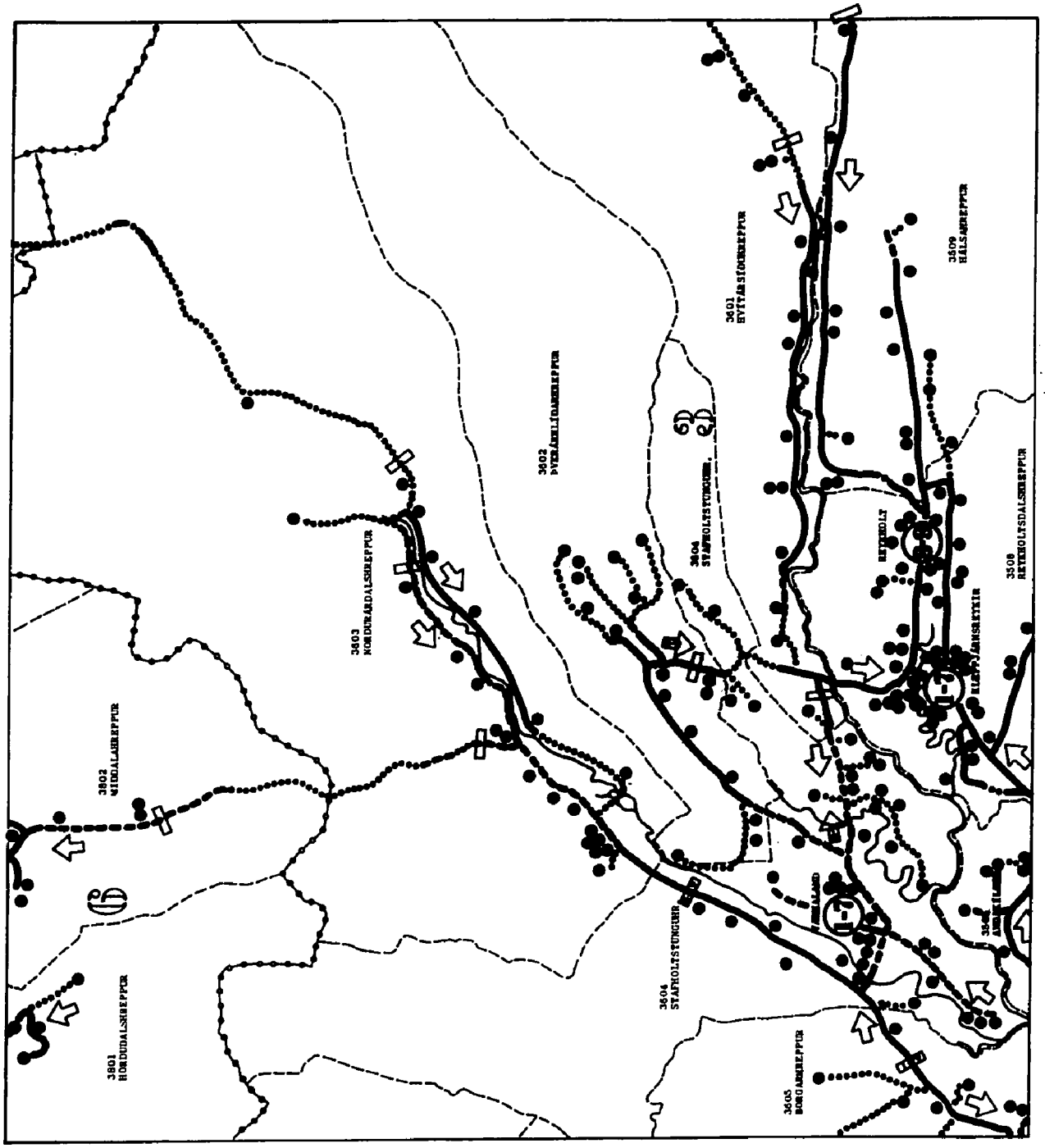
MAP 33


12
16
4906
FELLSHREPPUR
4907
ÓSPAKSSTRAÐAR.
4908
BÆJARHREPPUR
4905
KIRKJUBÓLSHREPPUR
4501
GLÆSIBÆJARHREPPUR
3809
SAURBÆJARHREPPUR
5503
BÆJARHREPPUR
5504

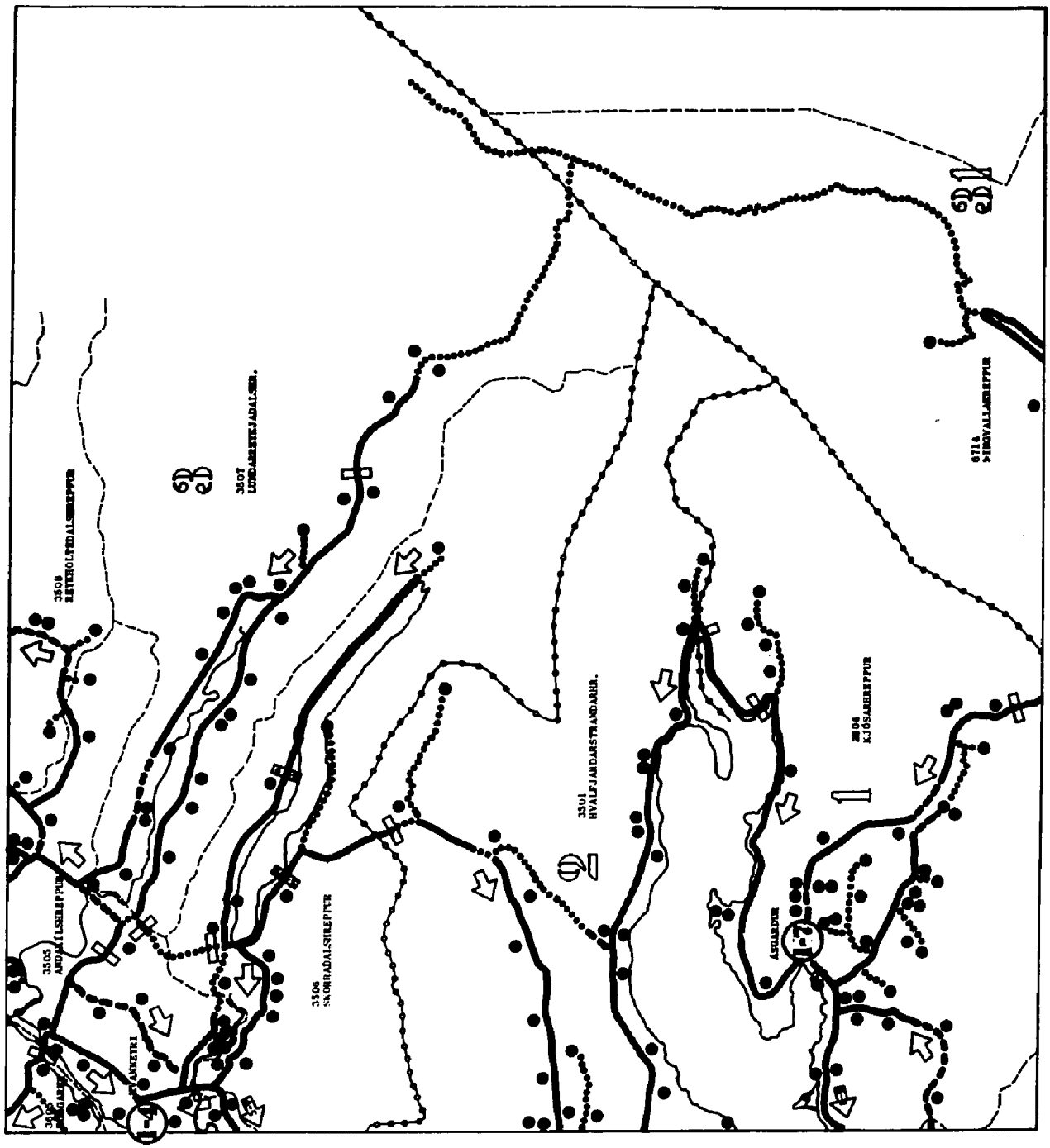
MAP 34


18
12
6
5503 ÝTRI-TORFUSTAÐA-HREPPUR
5502 FRÁMRI-TORFUSTAÐA-HREPPUR
5501 STAÐARHREPPUR
BORÐEYRI
4905 KIRKJUHVAMMSHREPPUR
3804 LAXÁRDALSHREPPUR
3803 HAUKADALSHREPPUR
3802 BÚÐARDALSHREPPUR
3805 HVAMMSHREPPUR
LAUGASKÓLI
HÓLMAVÍK

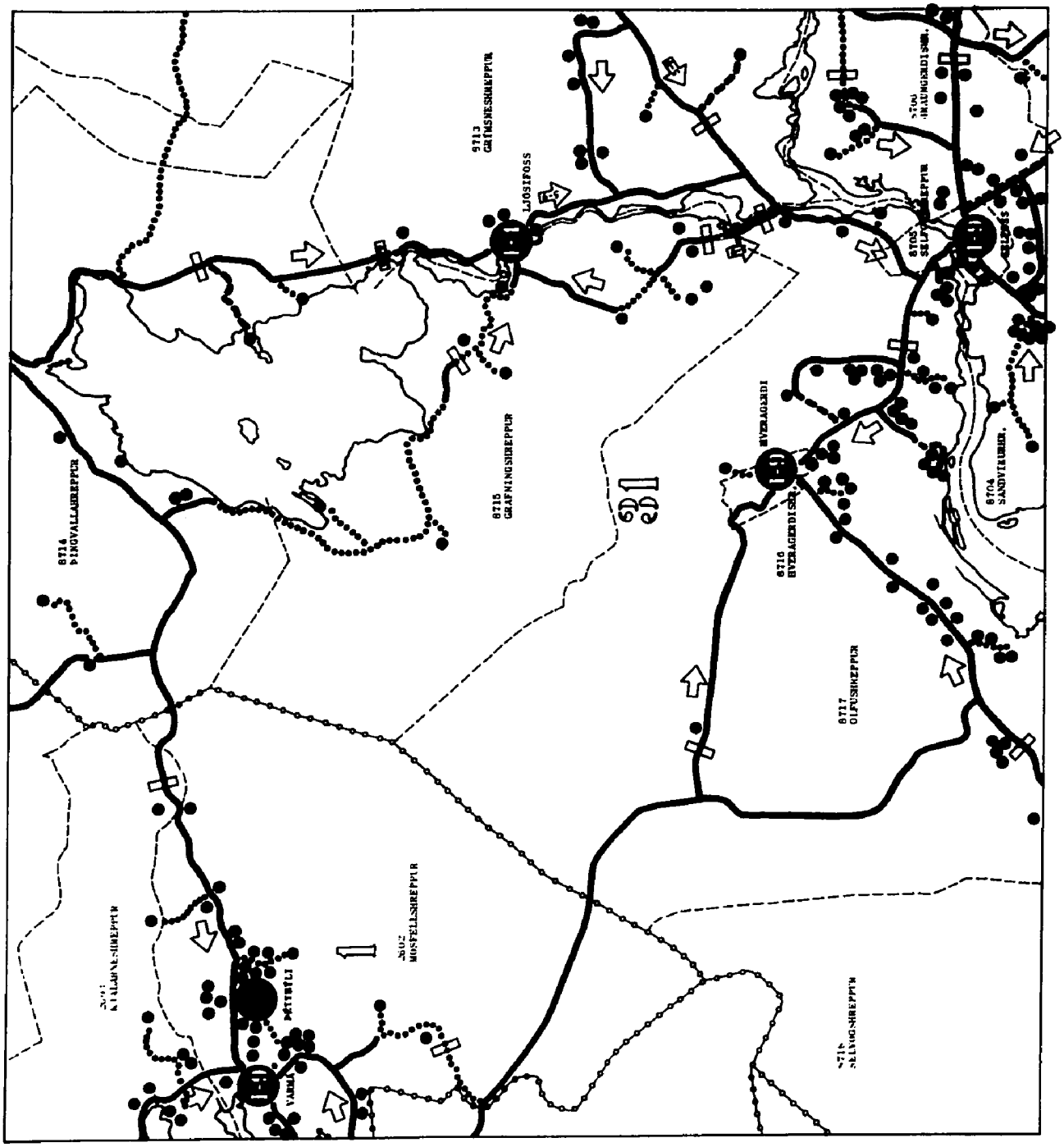
MAP 35


3801
HORDUDALSHERRER
3802
MIDDALSHERRER
3803
NORDMØRDALSHERRER
3804
STAFHOLTSTUNGENE
3501
EVTTARSTOKKHERRER
3509
HÅLSAHERRER
3509
RENNEBUSDALSHERRER
3505
BØRGARHERRER

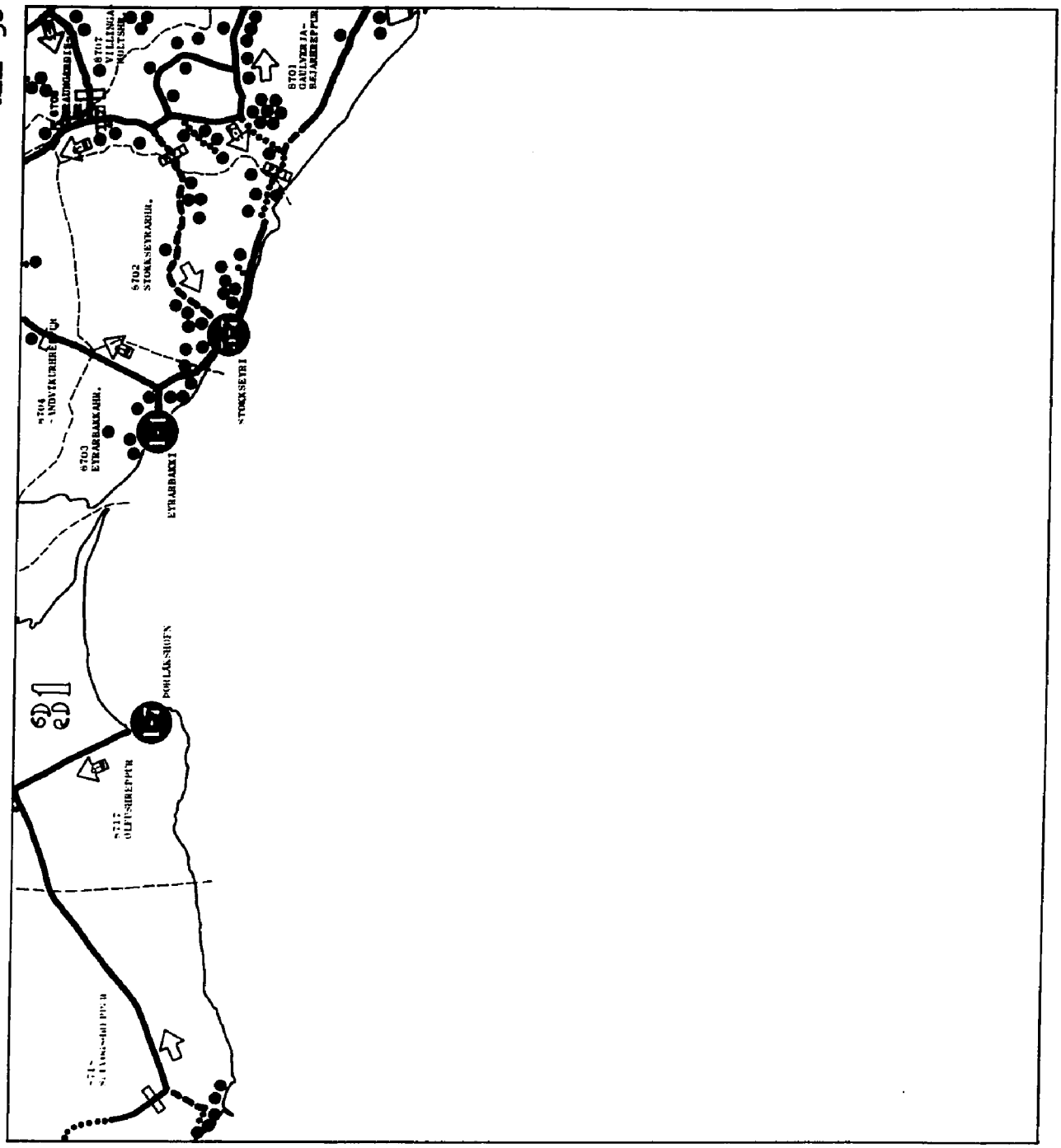
MAP 36



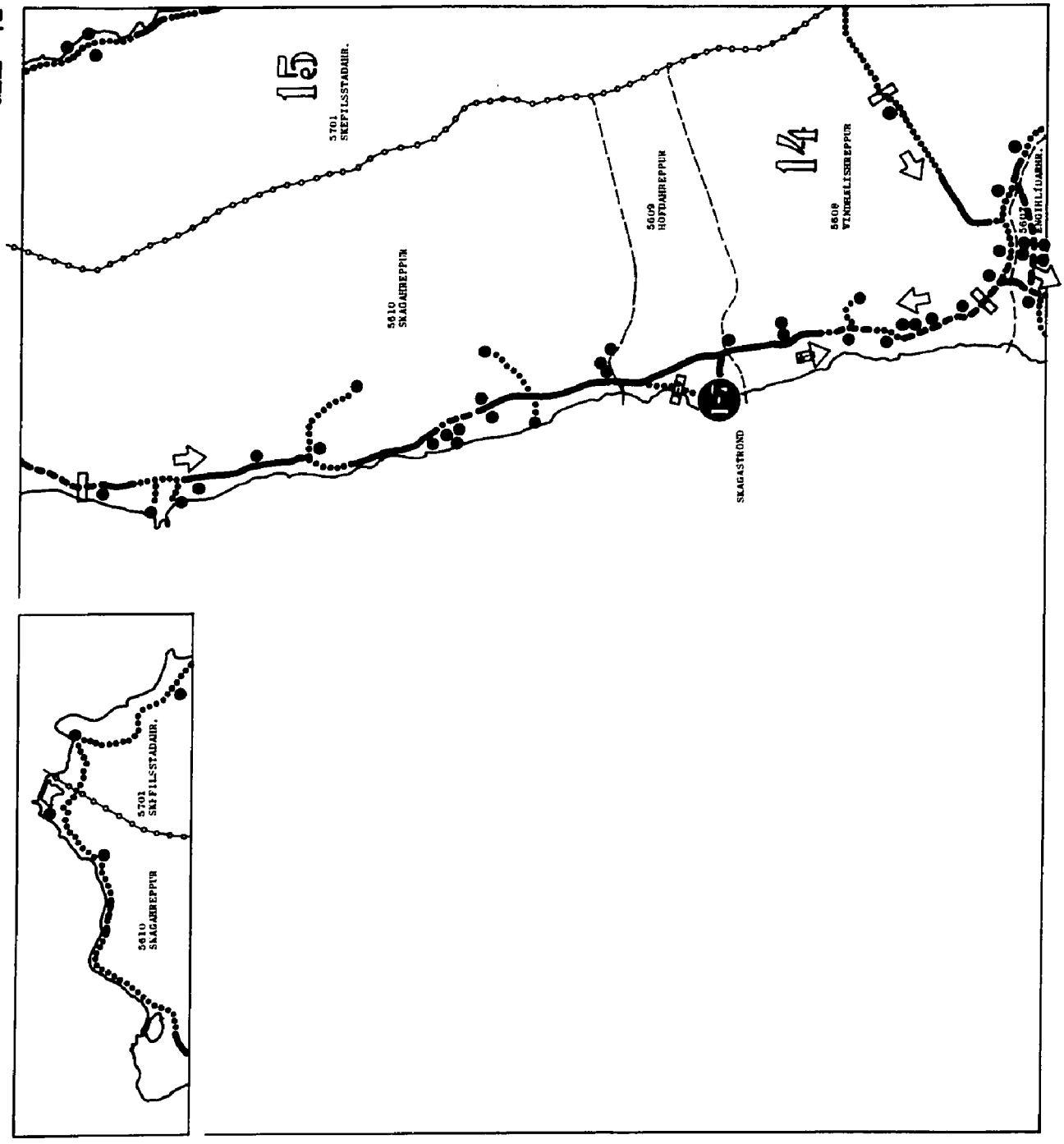
MAP 37


8713
GRÍMSNESHREPPUR
LJÓSIFOSS
8715
GRAFNINGSHREPPUR
8716
HVERAGERÐI
8717
ÖLFUSHREPPUR
8704
SANDVÍKURHR.
8714
ÞINGVALLAHREPPUR
8702
MOSFELLSHREPPUR
1

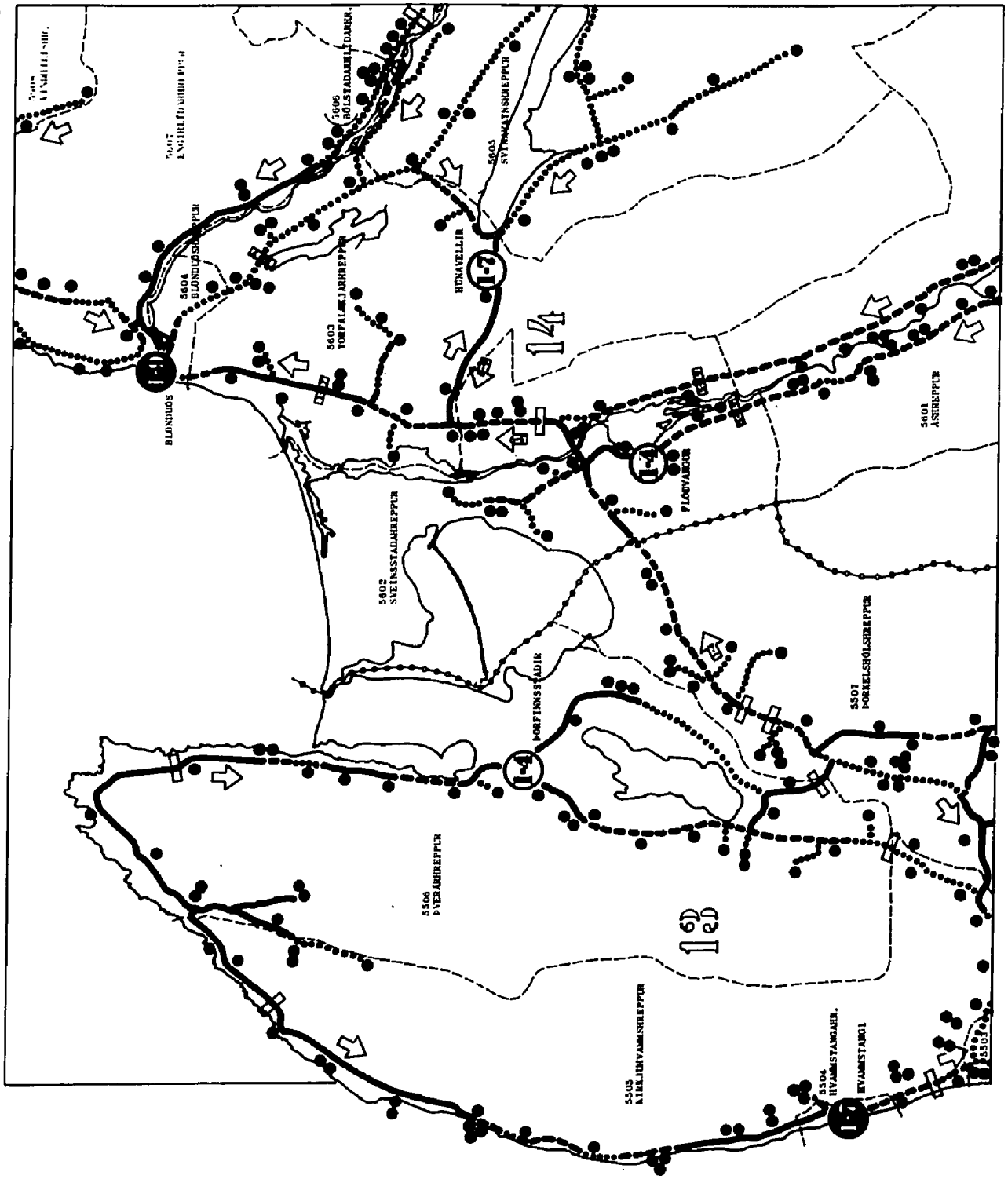
MAP 38



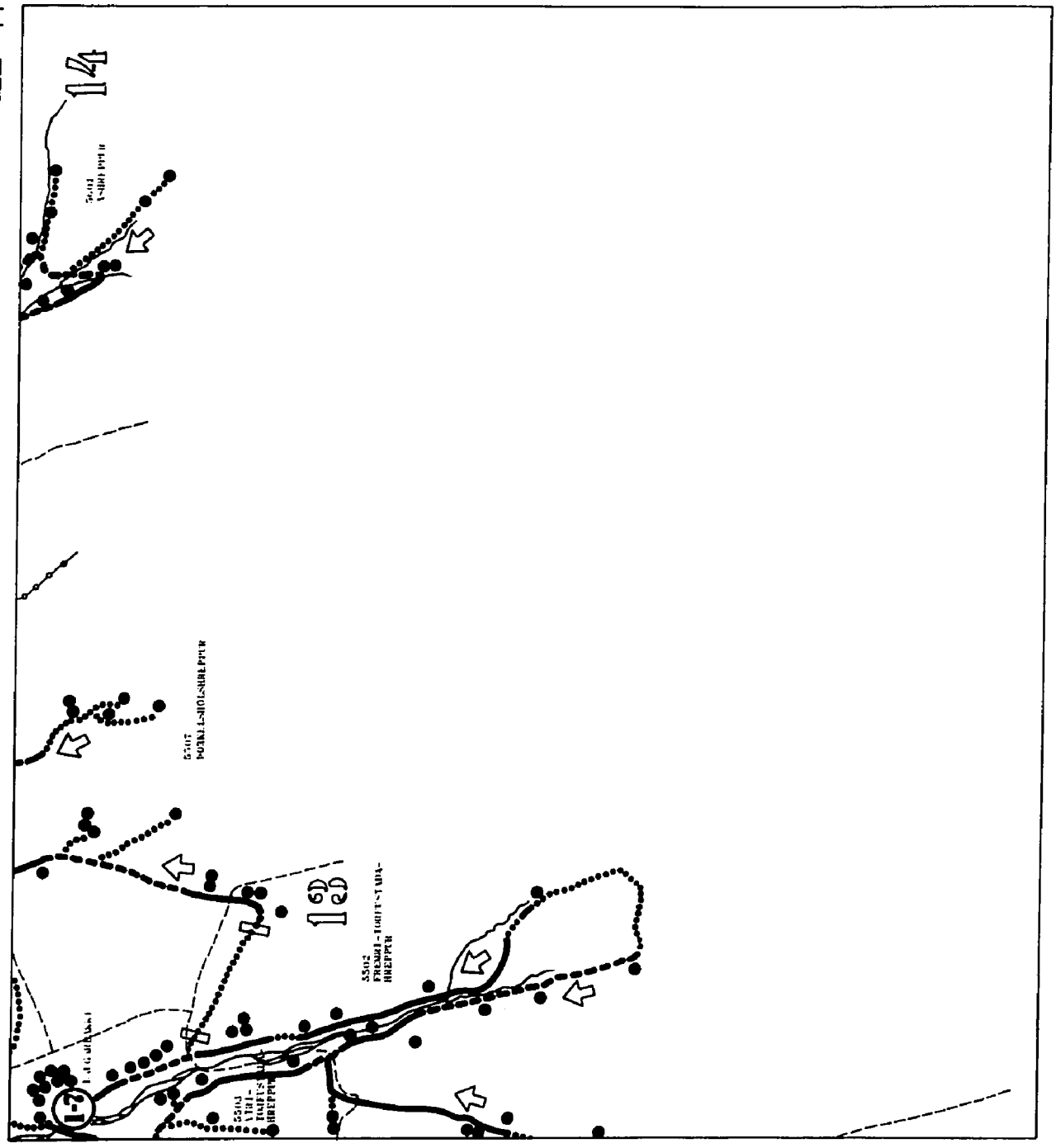
MAP 42


15
5701
SKEFILSSTADAHR.
5610
SKAGAHREPPUR
5609
HOFSAHREPPUR
14
5608
VINDHÆLISHREPPUR
5607
ÆSTHLÍÐARHR.
SKAGASTRÖND
5701
SKEFILSSTADAHR.
5610
SKAGAHREPPUR

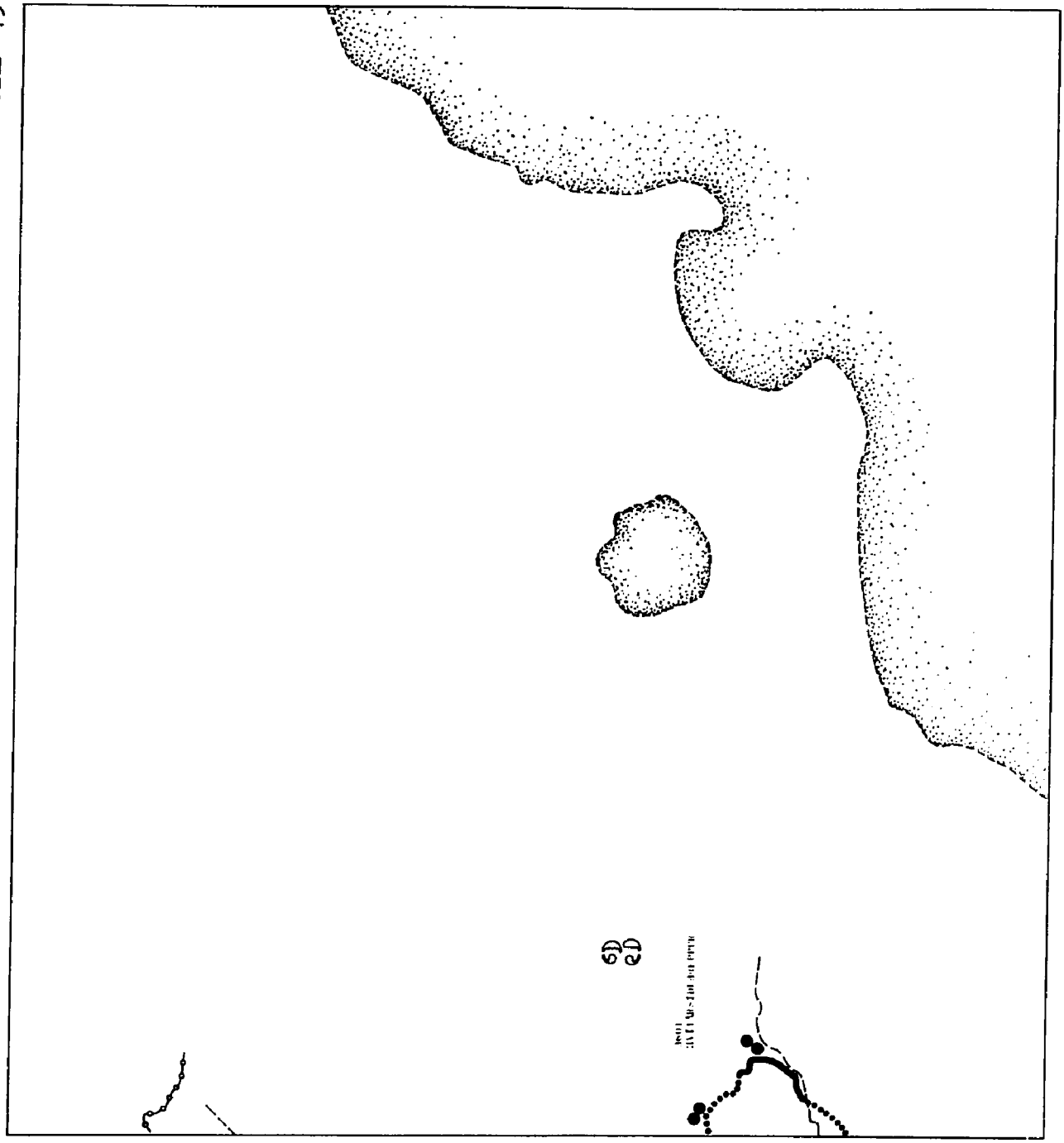
MAP 43


14
16
BLÖNDUÓS
HÚNAVELLIR
FLÓGVALLAR
ÞORFINNSSTAÐIR
HVAMMSTANGI
5601 ÁSHREPPUR
5502 SVEINSSTAÐAHREPPUR
5503 KIRKJUHVAMMSHREPPUR
5504 HVAMMSTANGAHR.
5505 SYÐRIÁRDALSHREPPUR
5506 ÞVERÁRHREPPUR
5507 ÞORKELSHÓLSHREPPUR
5603 TORFALÆKJARHREPPUR

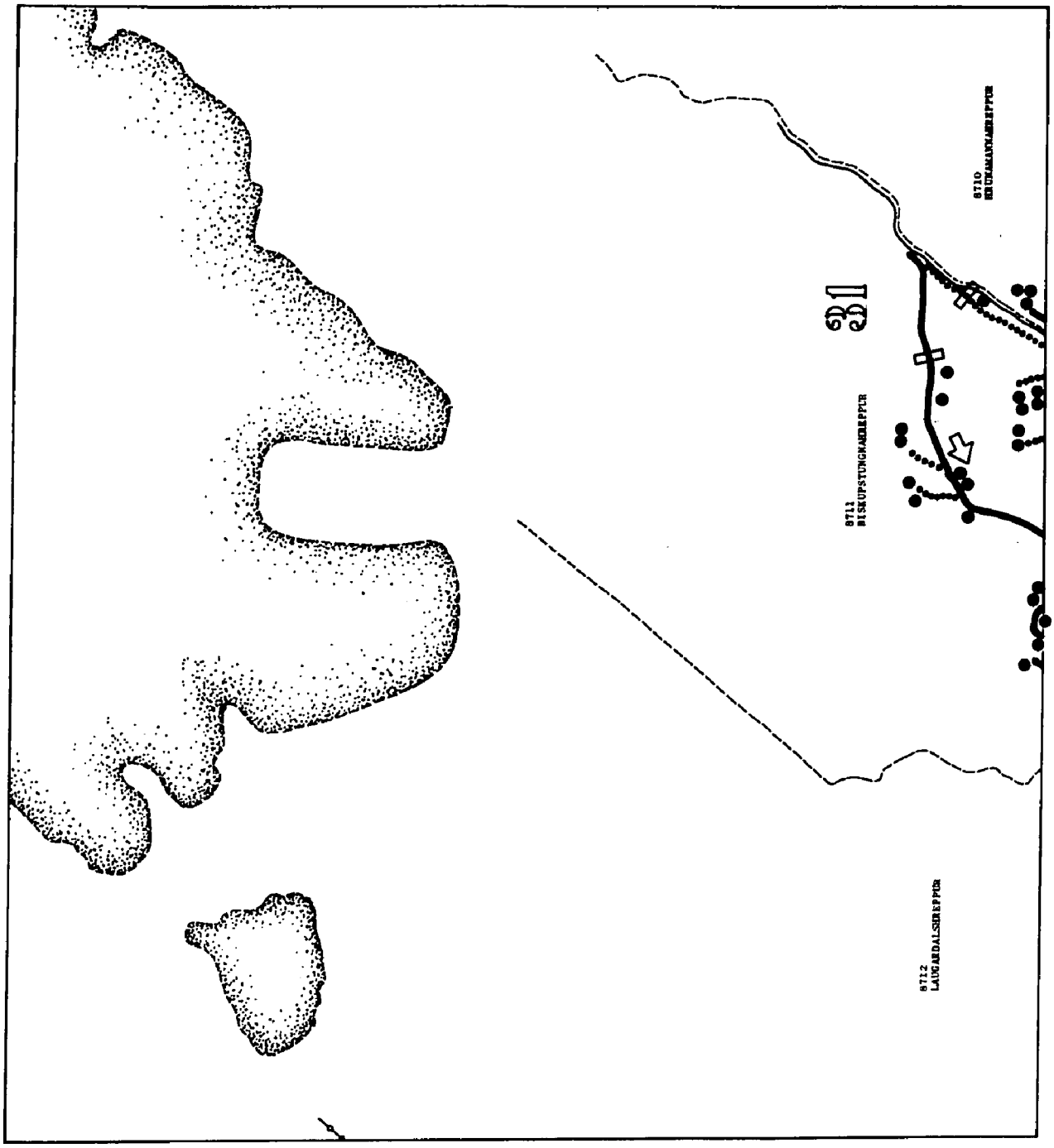
MAP 44



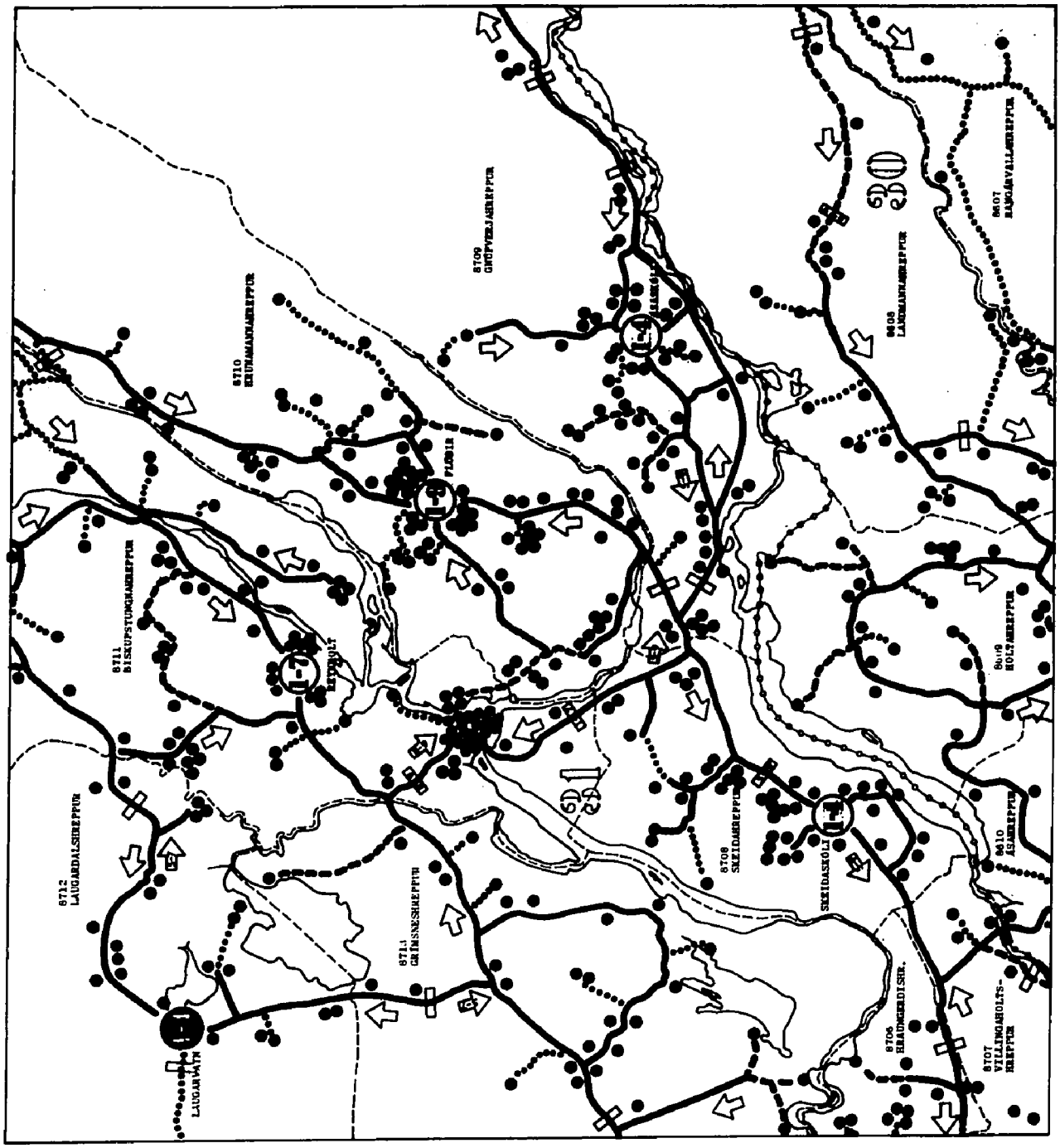
MAP 45



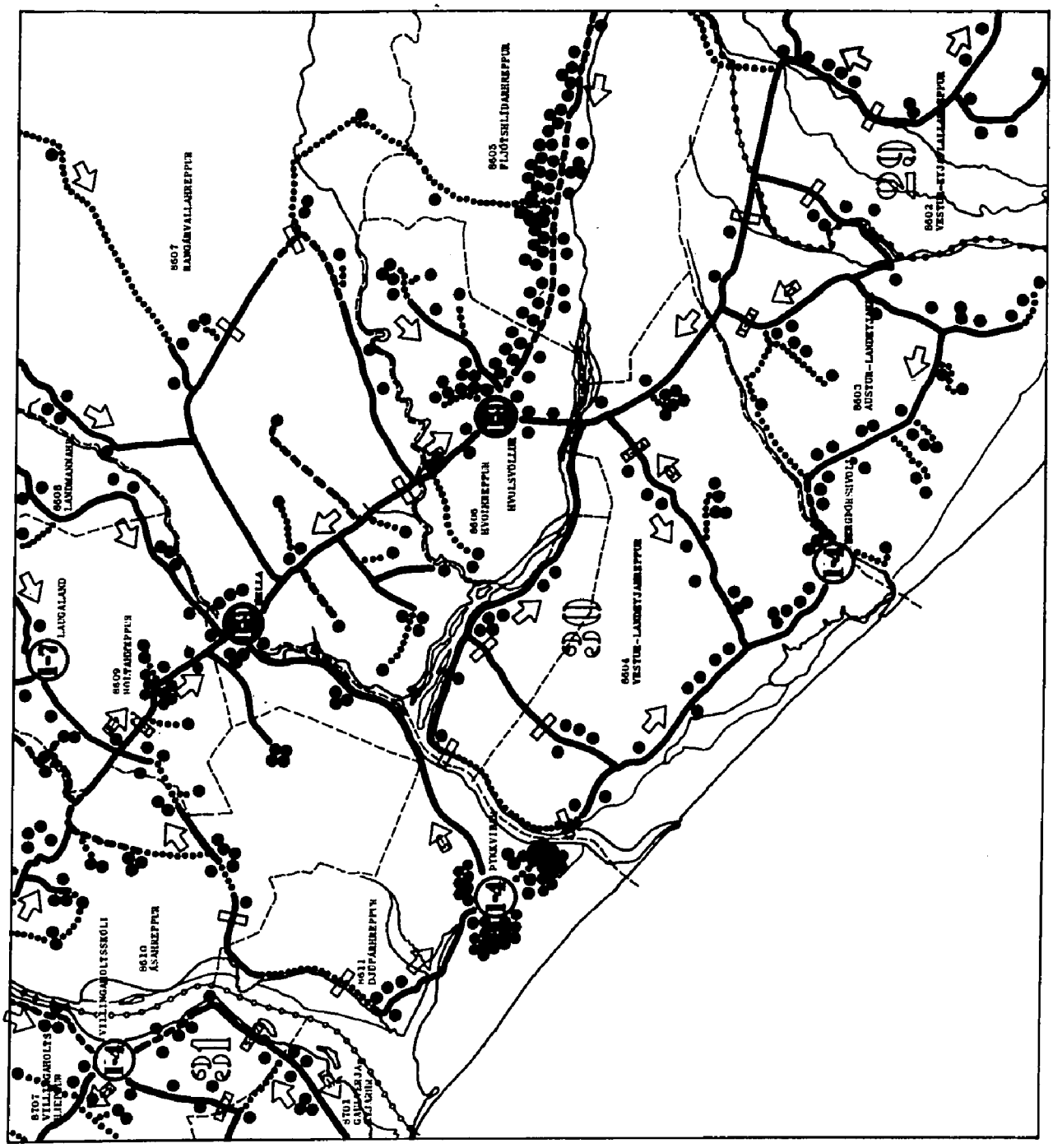
MAP 46



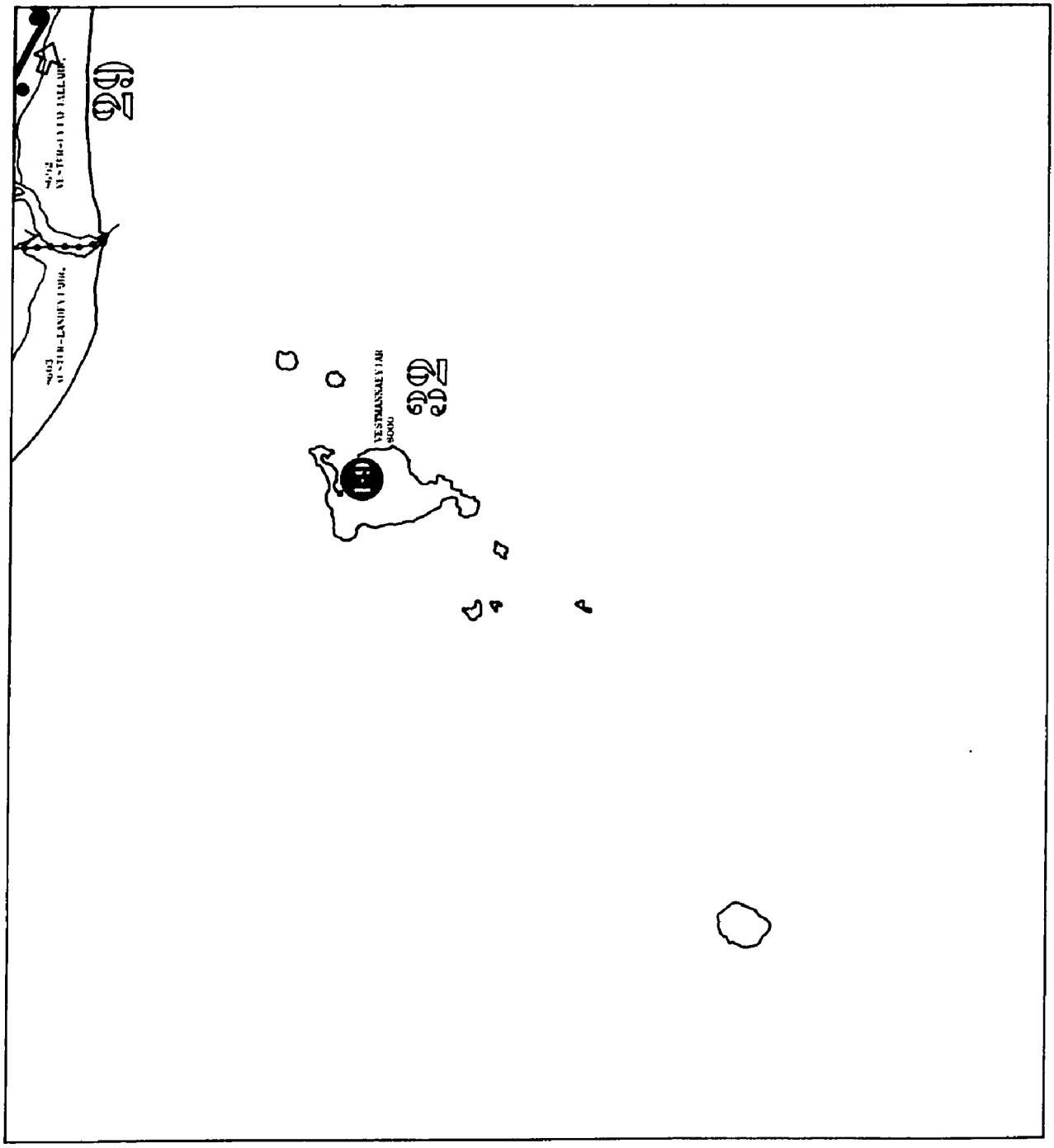
MAP 47

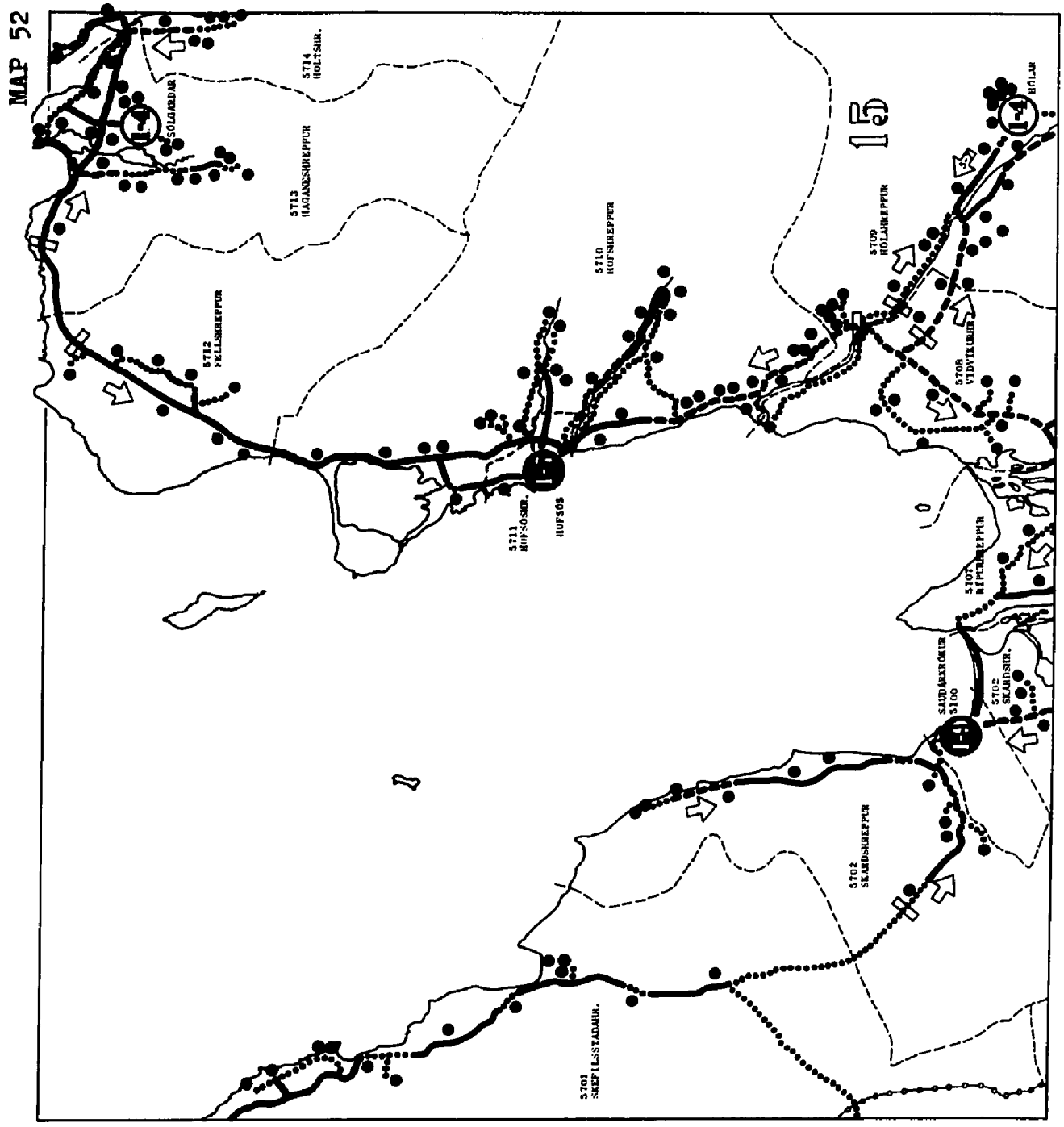

LAUGARVATN
8712 LAUGARDALSHREPPUR
8711 BISKUPSTUNGNAHREPPUR
8711 GRIMSNESHREPPUR
8710 HRUNAMANNAHREPPUR
8709 GNÚPVERJAHREPPUR
8708 SKEIÐAHREPPUR
SKEIÐASÓLAR
8705 HRAUNGERÐISHR.
8707 VILLINGAHOLTS-HREPPUR
8410 ÁSAHREPPUR
8609 LANDMANNAHREPPUR
8607 RANGÁRVALLAHREPPUR
30
281

MAP 48

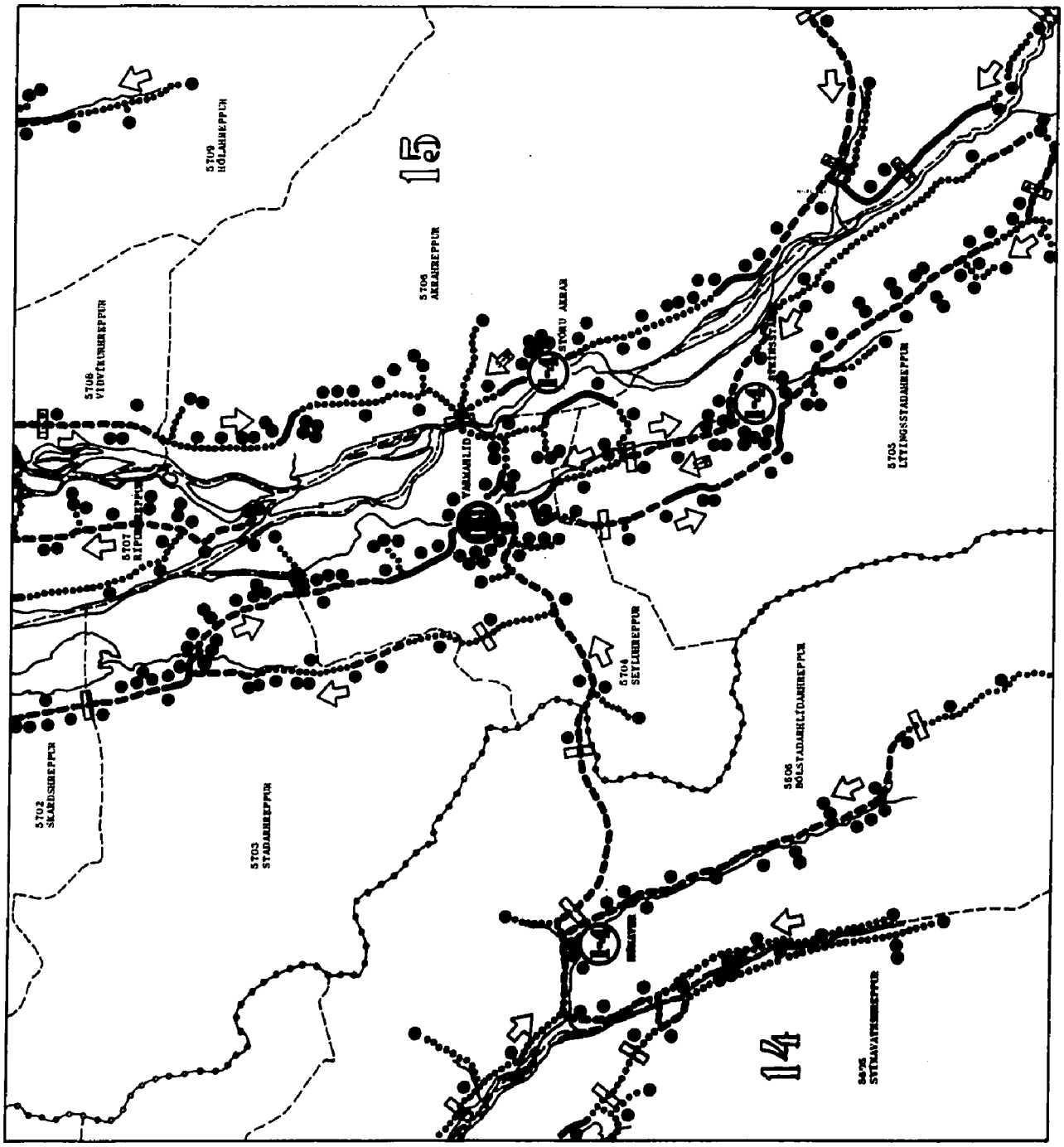

9607
9605
9606
9608
9609
9610
9611
9701
9602
9603
9604
E 134
E 80
E 18

MAP 49

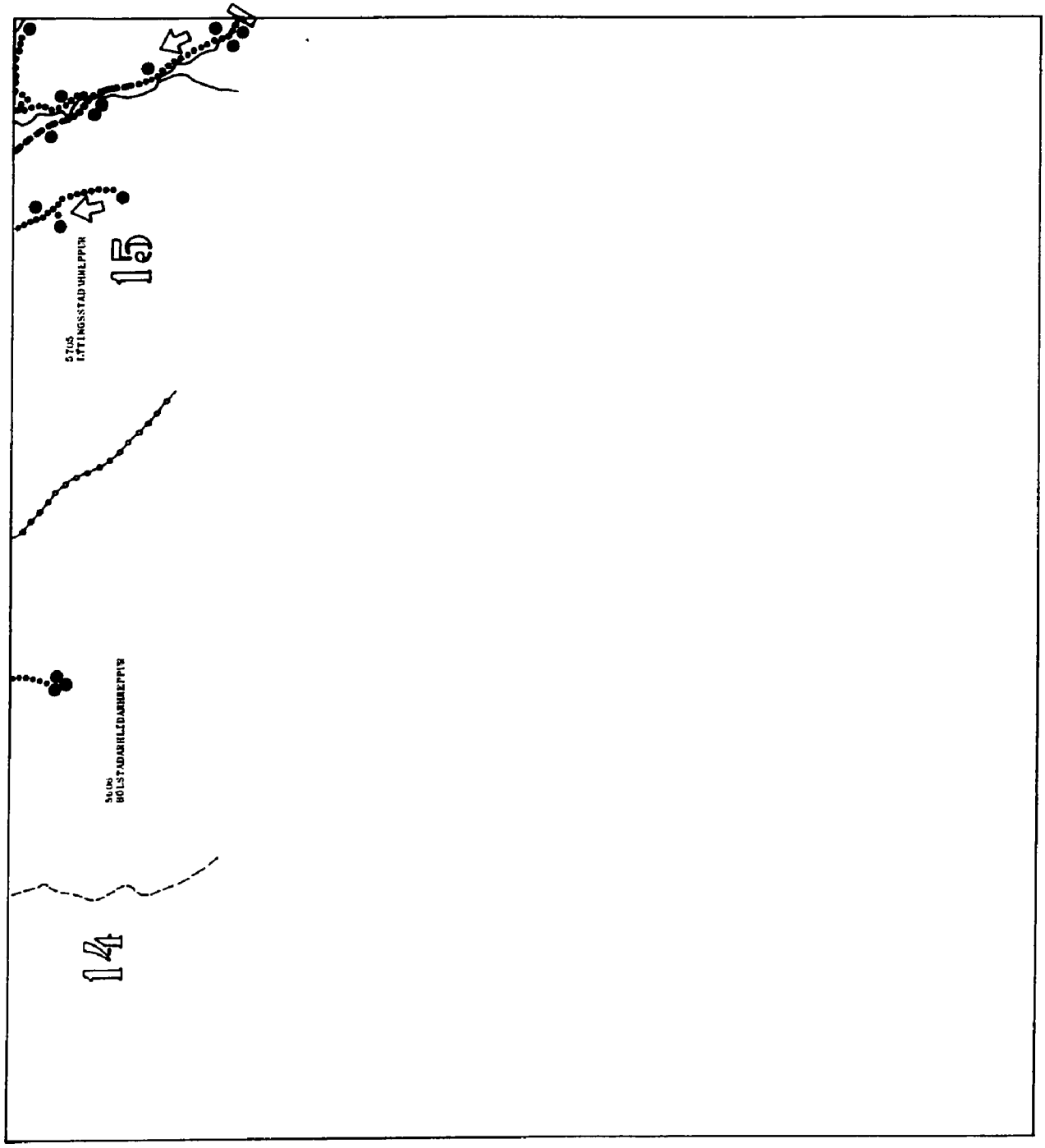



MAP 52
1D
SOLVARDAR
5714 HOLTSHR.
5713 HAGANESHREPPUR
5712 FELLSHREPPUR
5710 HOFSHREPPUR
5711 HOFSOSHR.
HOFSOS
5709 HOLARHREPPUR
5708 VIDVIKURHR.
HOLAR
5701 RIFSHREPPUR
SAUDARKROKUR
5100
5702 SKARDSHR.
5702 SKARDSHREPPUR
5701 SKEFILSSTADAHR.

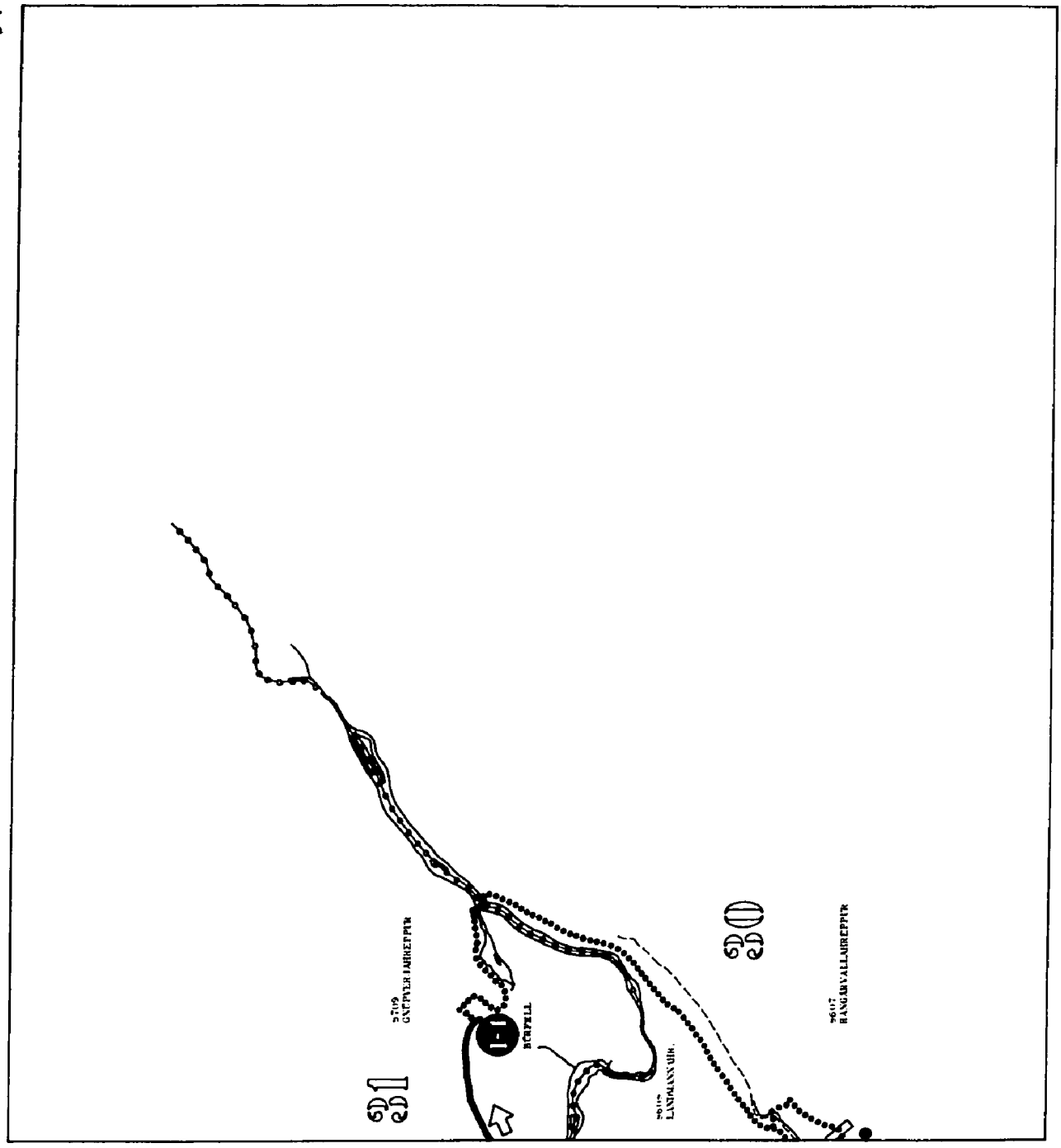
MAP 53


15
14
5709
HÓLAHREPPUR
5706
AKRAHREPPUR
STÓRU AKRAR
5708
VÍÐVÍKURHREPPUR
5707
RÍPURHREPPUR
VARMAHLÍÐ
5703
LÝTINGSSTAÐAHREPPUR
5704
SETLUNGSHREPPUR
5702
SKARÐSHREPPUR
5703
STAÐARHREPPUR
5806
BÓLSTAÐARHLÍÐARHREPPUR
5705
SVEINSSTAÐAHREPPUR

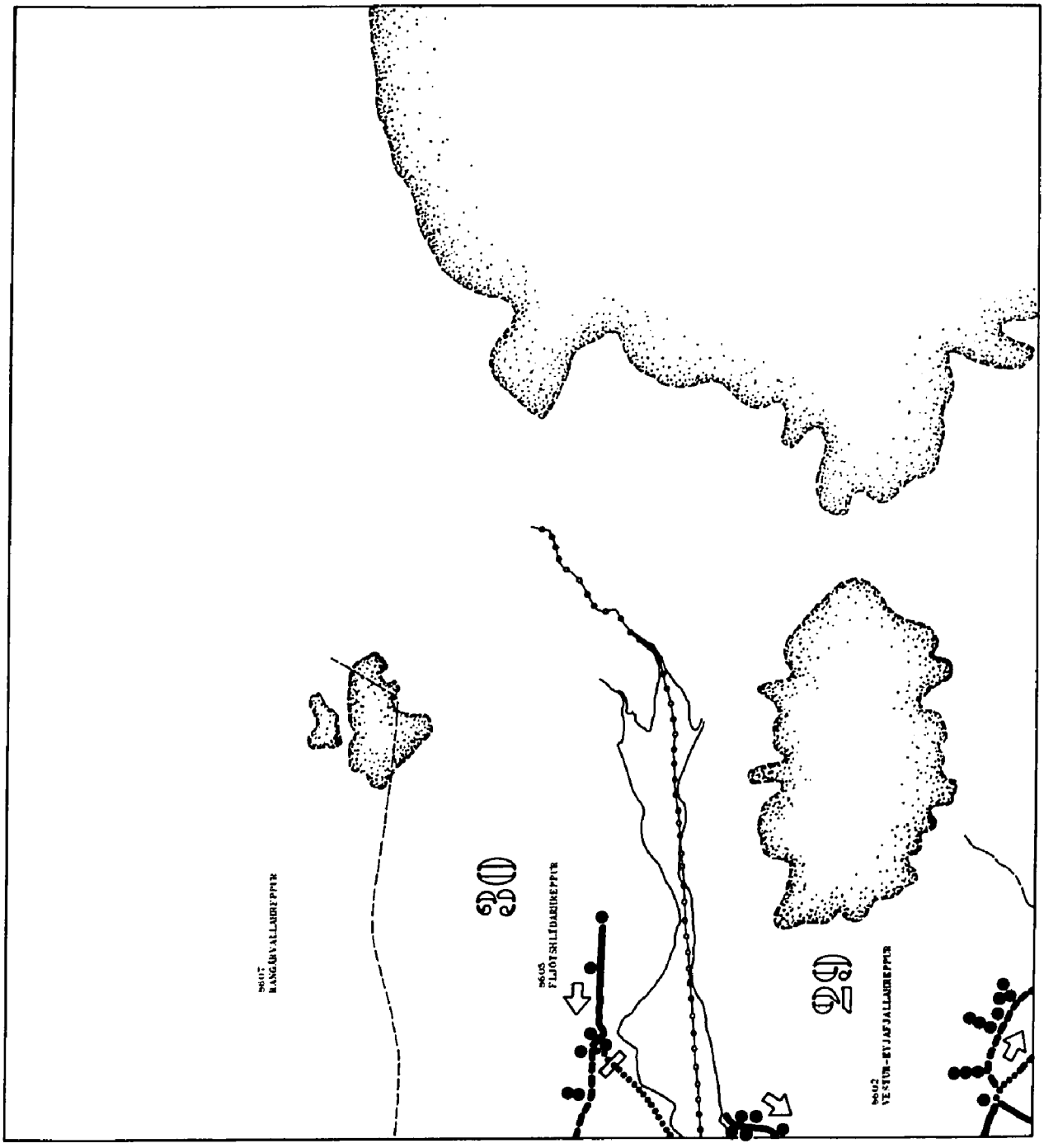
MAP 54



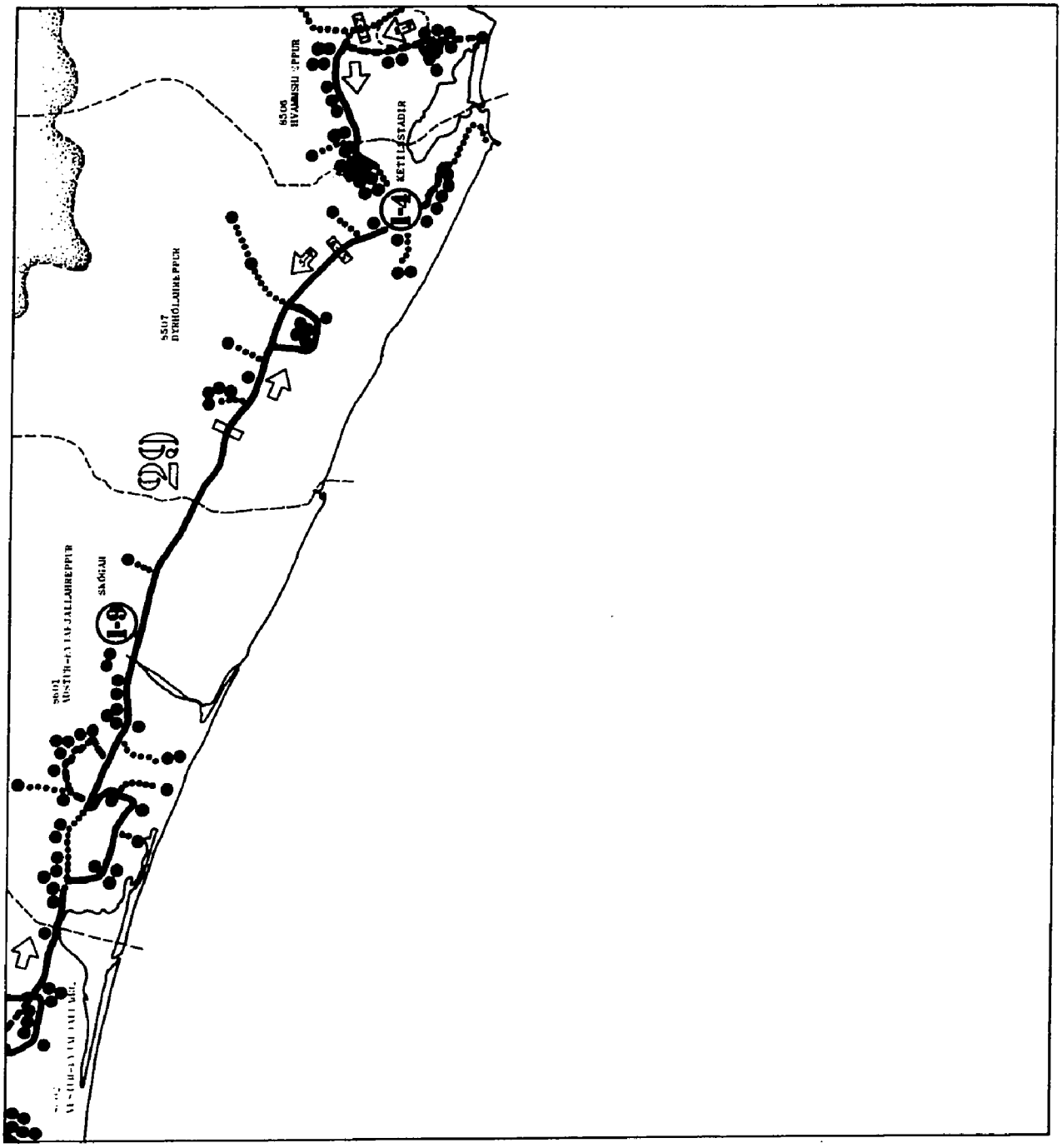
MAP 57



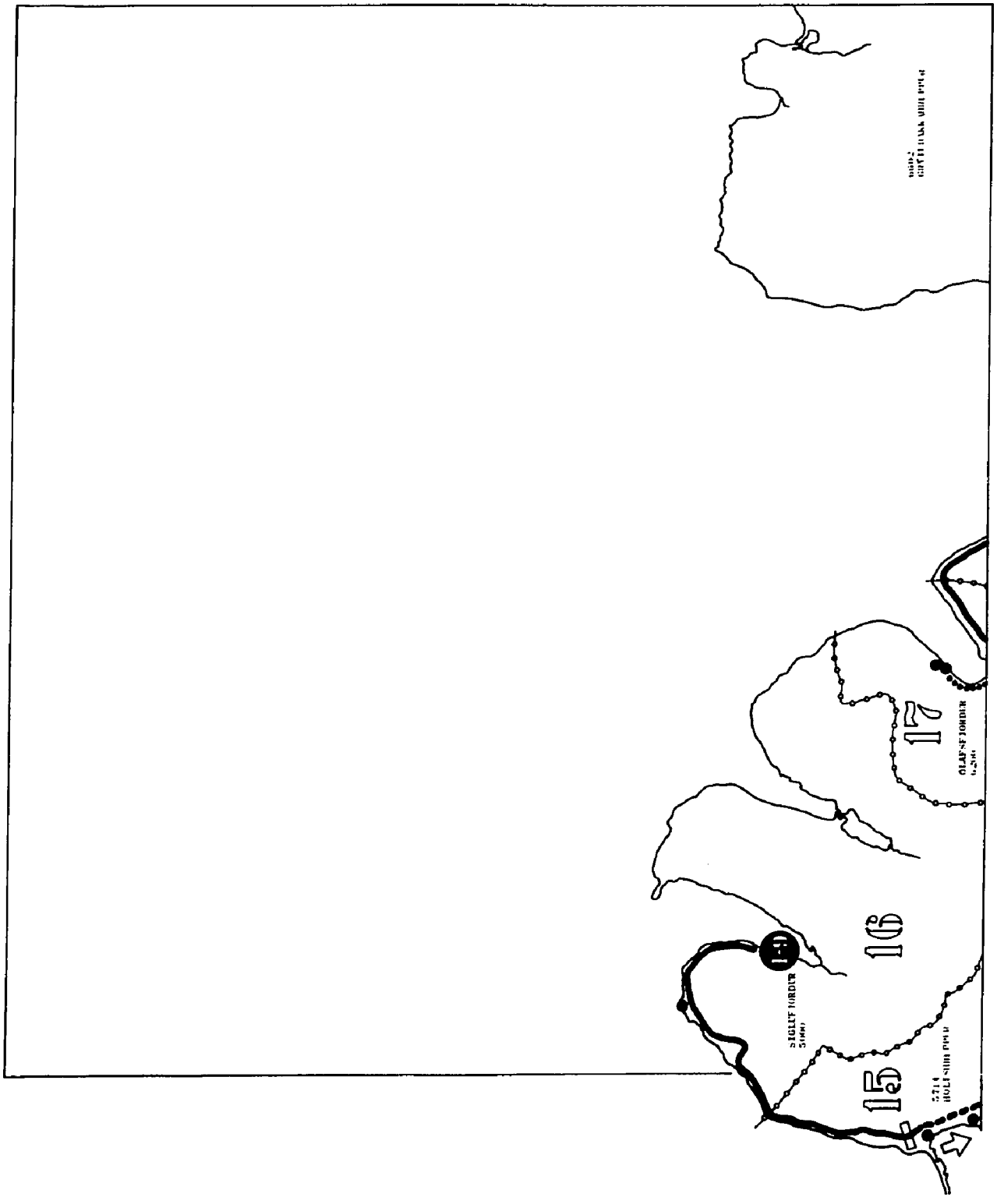
MAP 58



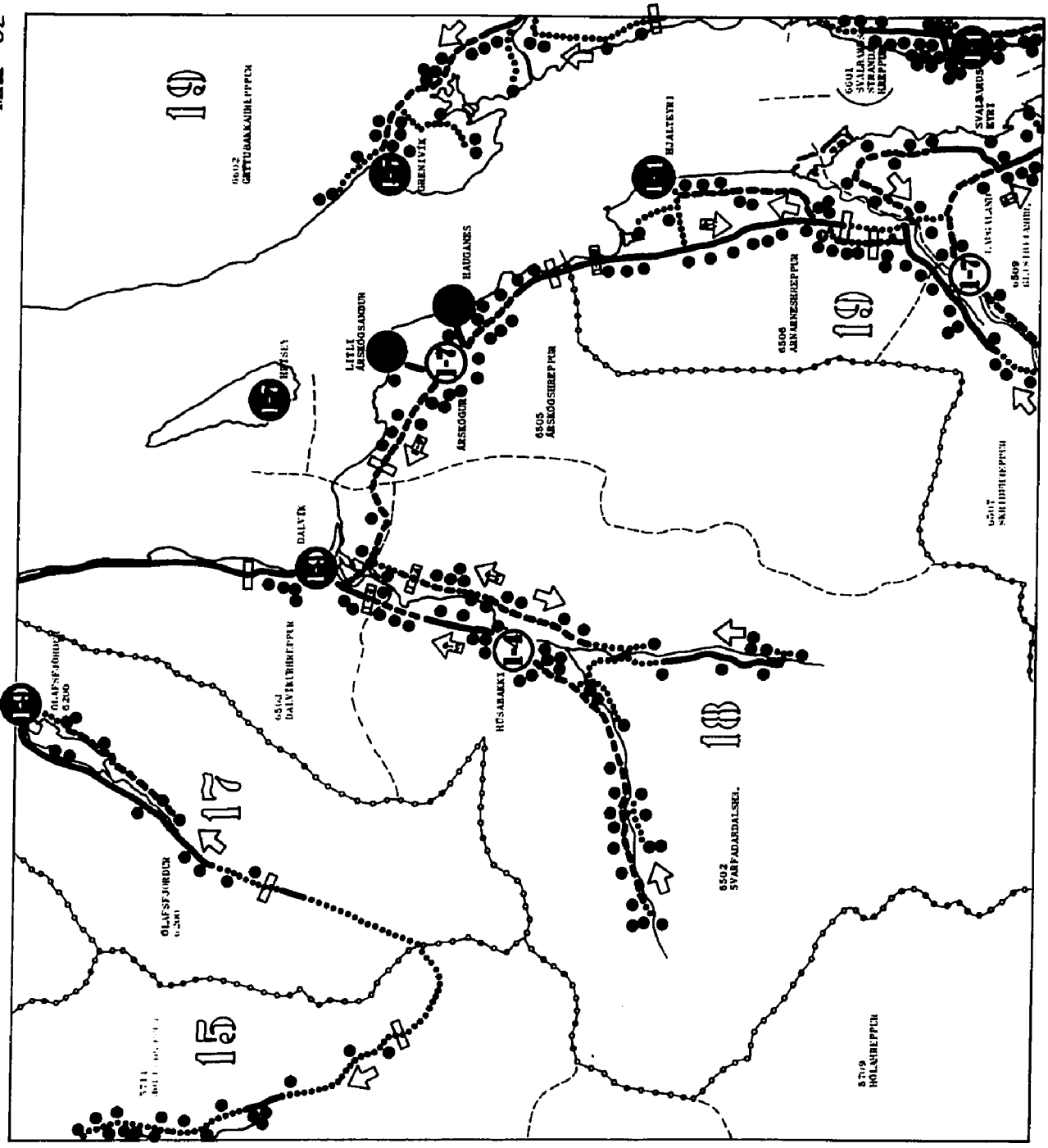
MAP 59



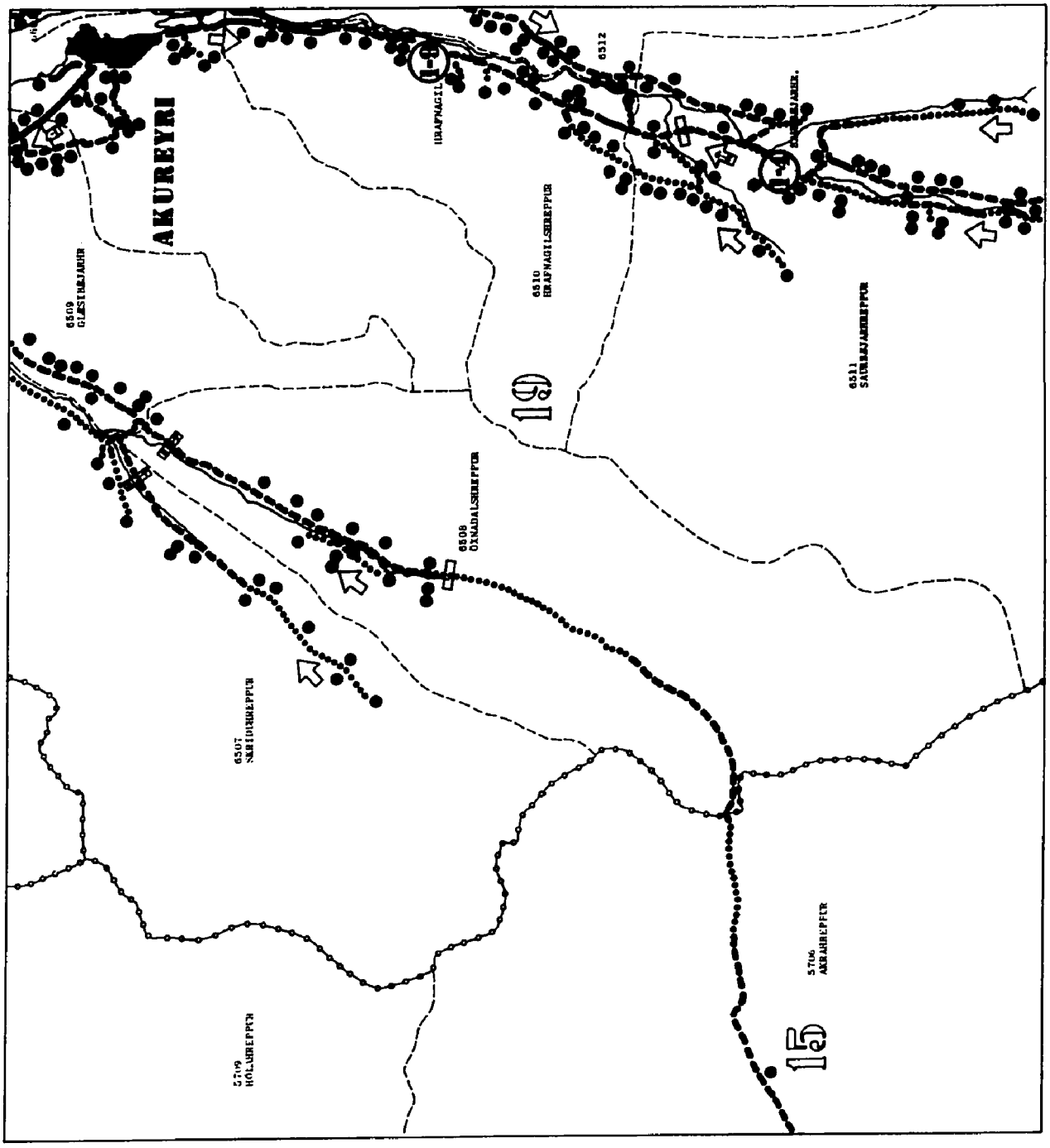
MAP 61



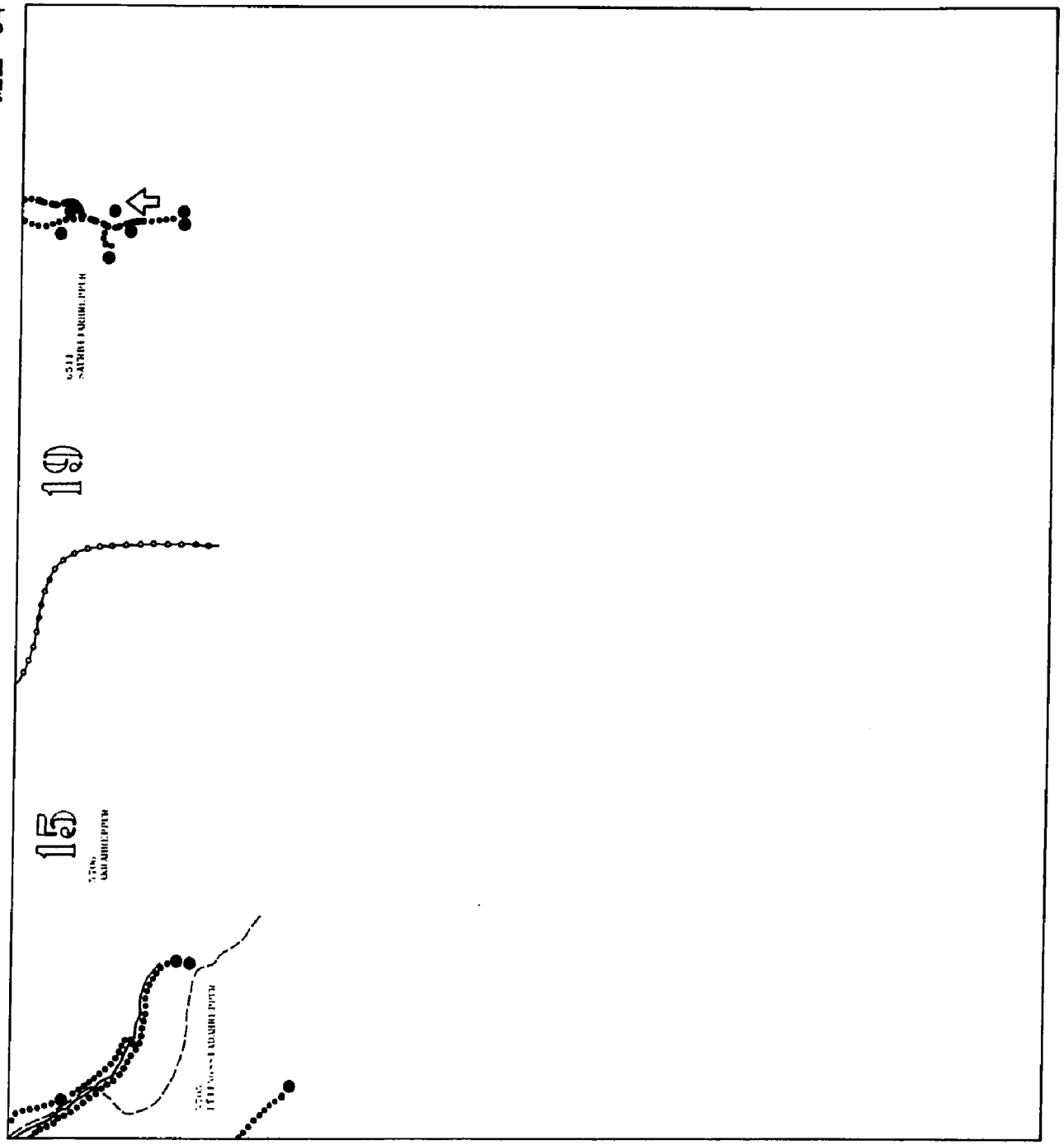
MAP 62


19
17
15
18
19
HAUGANES
ÁRSKÓGUR
DALVÍK
HÚSABAKKI
HJALTEYRI
GRENIVÍK
ÓLAFSFJÖRÐUR
SVARFAÐARDALSHR.
ÁRSKÓGSHREPPUR
ÁRSKÓGSSANDUR
HÚSAVÍKURHREPPUR
ÓLAFSFJARÐARHR.
HÓLSHREPPUR
ÁRNESHREPPUR
SVALBARÐSEYRI
SVALBARÐSSTRANDARHREPPUR
GRÝTUBAKKAHREPPUR
SKRIÐUHREPPUR
LITLI ÁRSKÓGSSANDUR
HRÍSEY
1-1
1-2
1-3
1-4
1-5
1-6
1-7
1-8
1-9
1-10

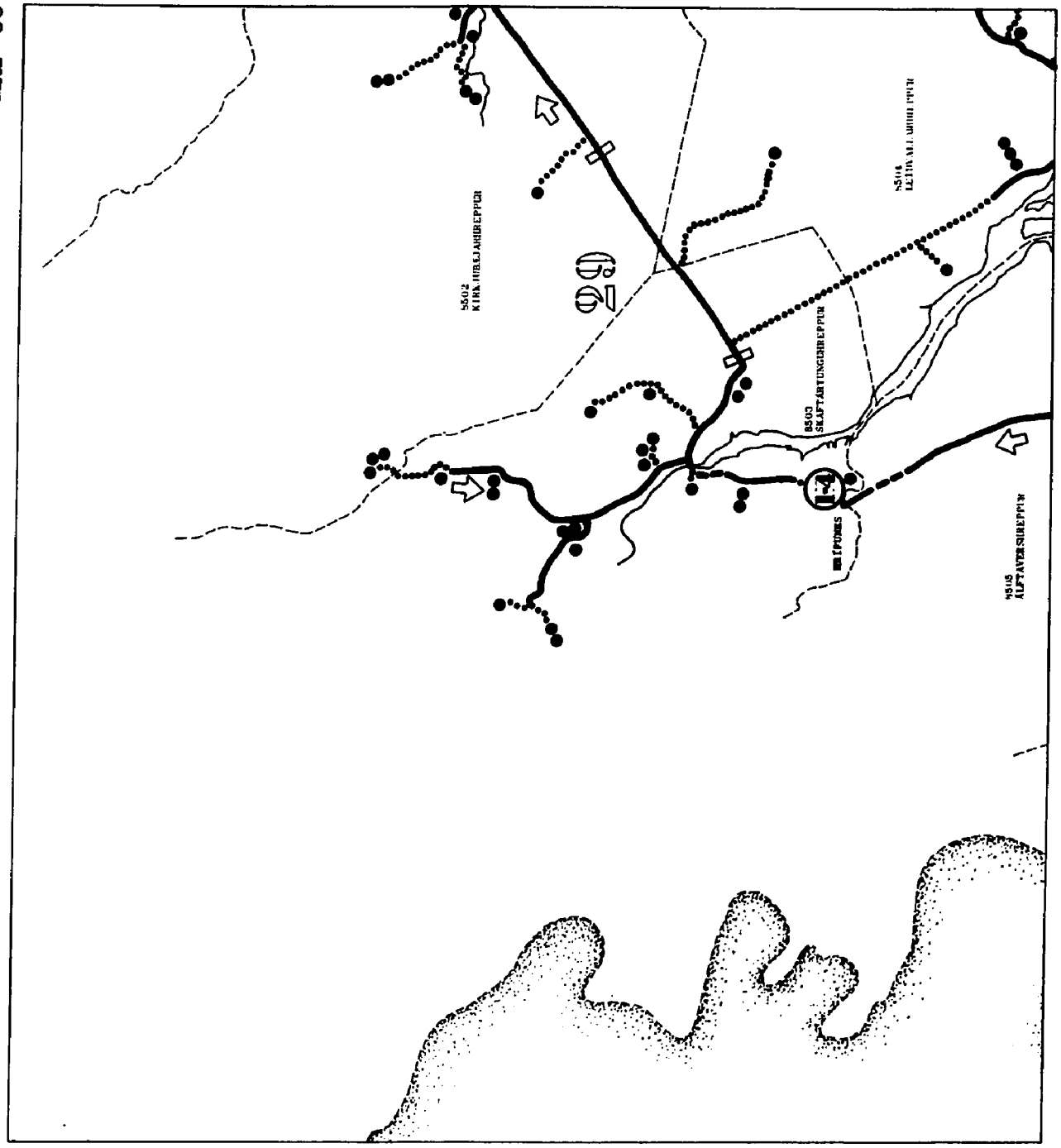
MAP 63


AKUREYRI
1-8
1-9
1-5
6512
6510
6511
6509
6508
6507
5709
5706
1-9
1-5

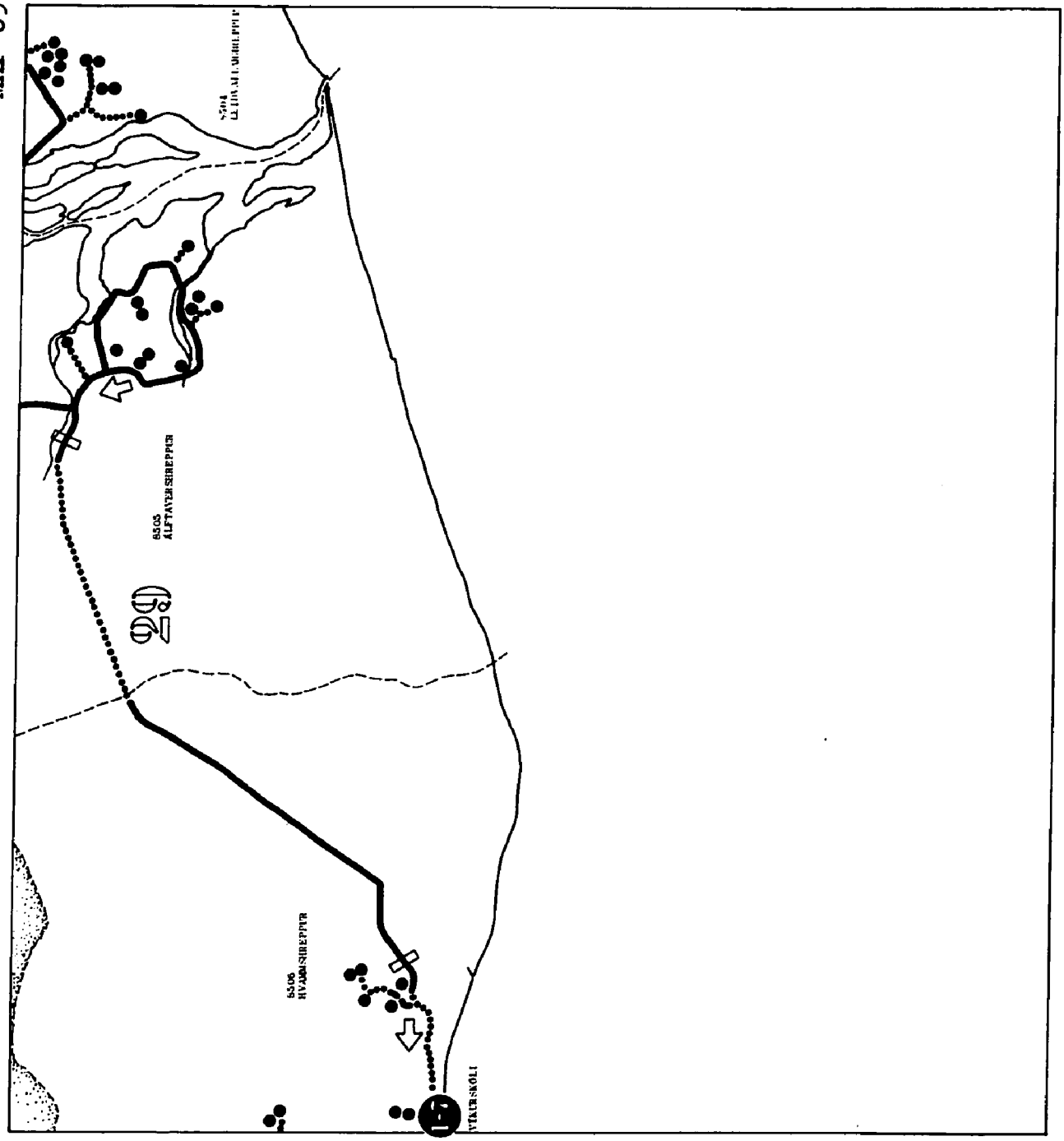
MAP 64



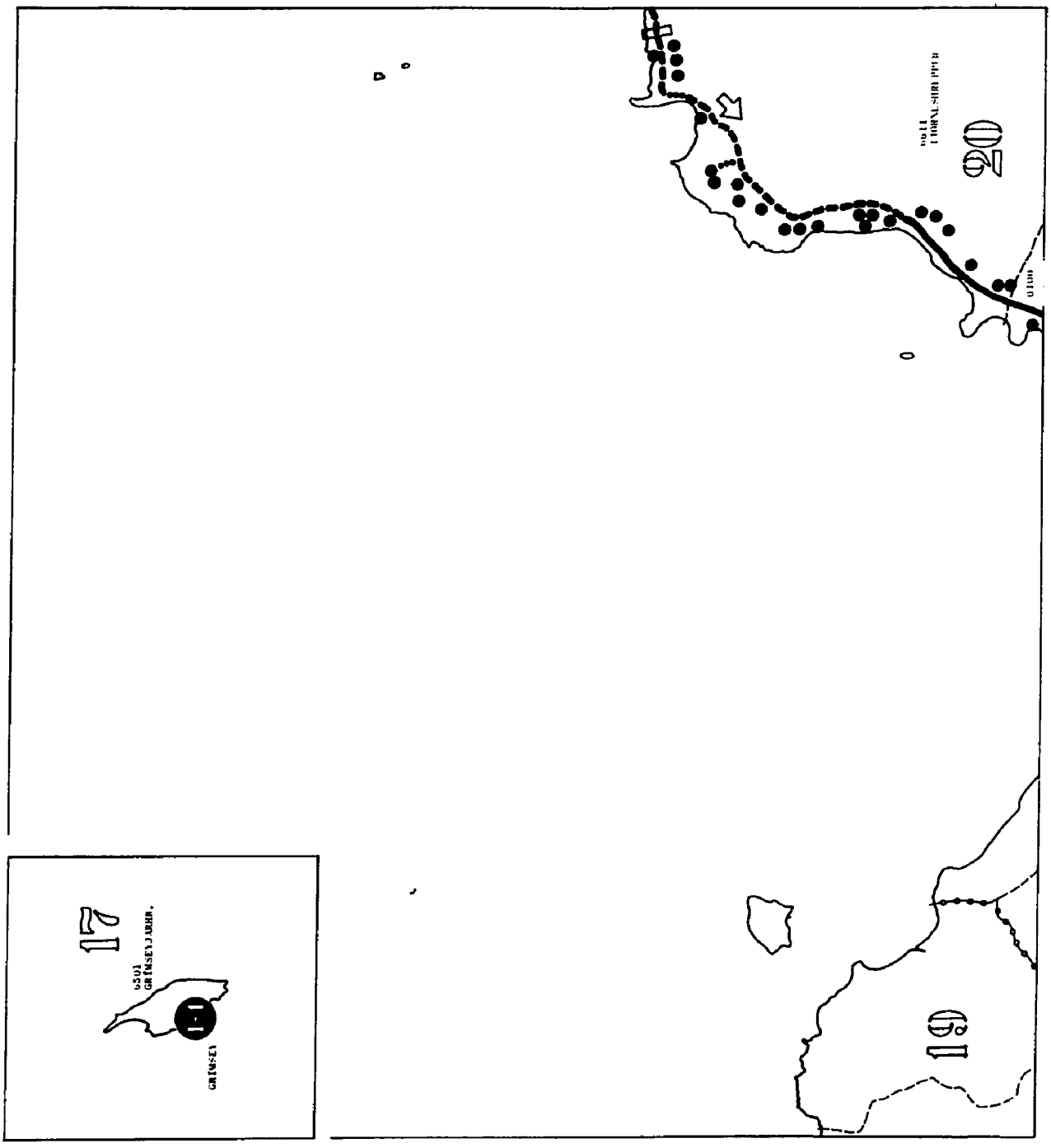
MAP 68


8502
8503
8505
8506
8503 SKAFTÁRTUNGSHREPPUR
8505 ÁLFTAVERSHREPPUR
1-4

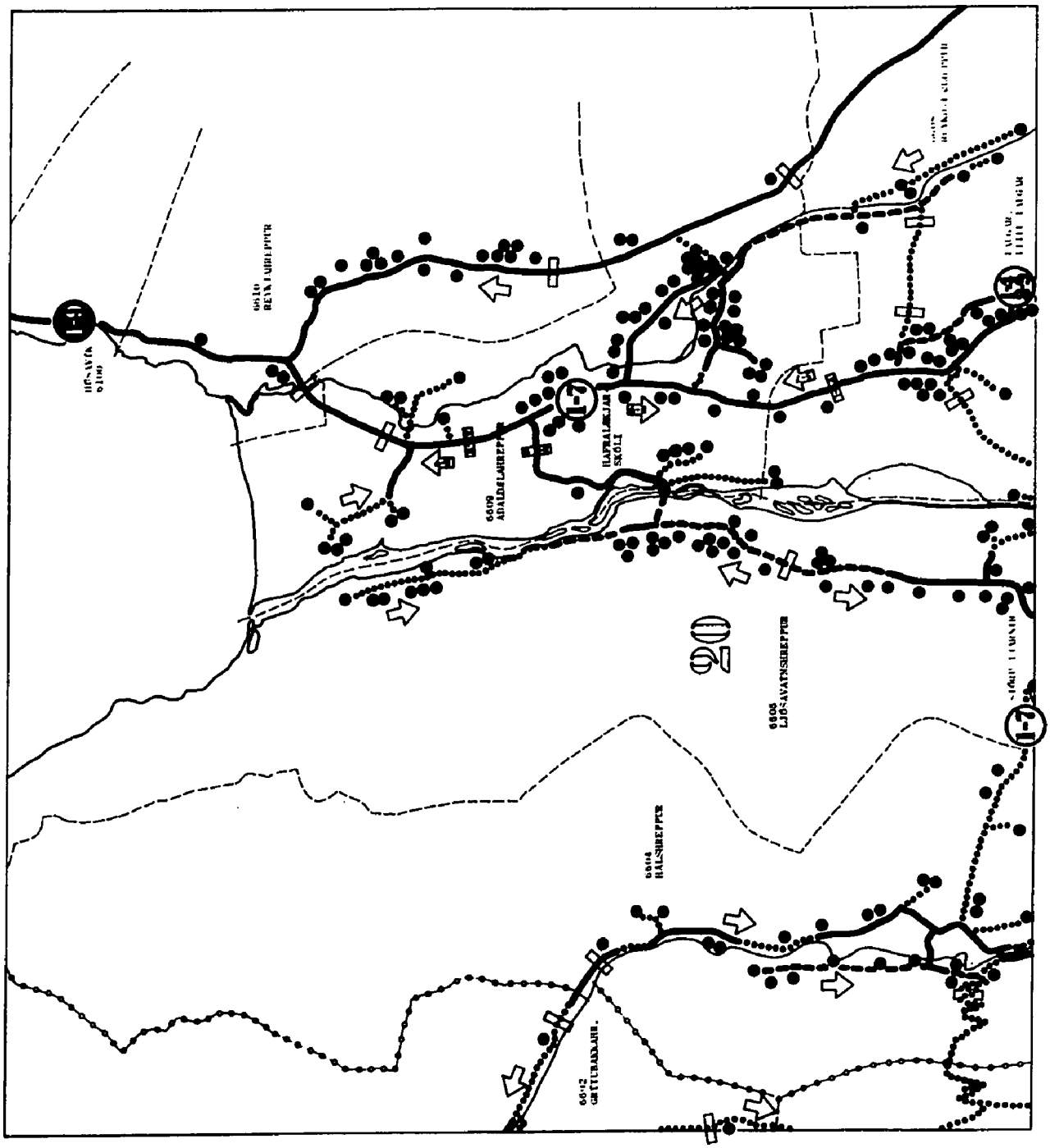
MAP 69



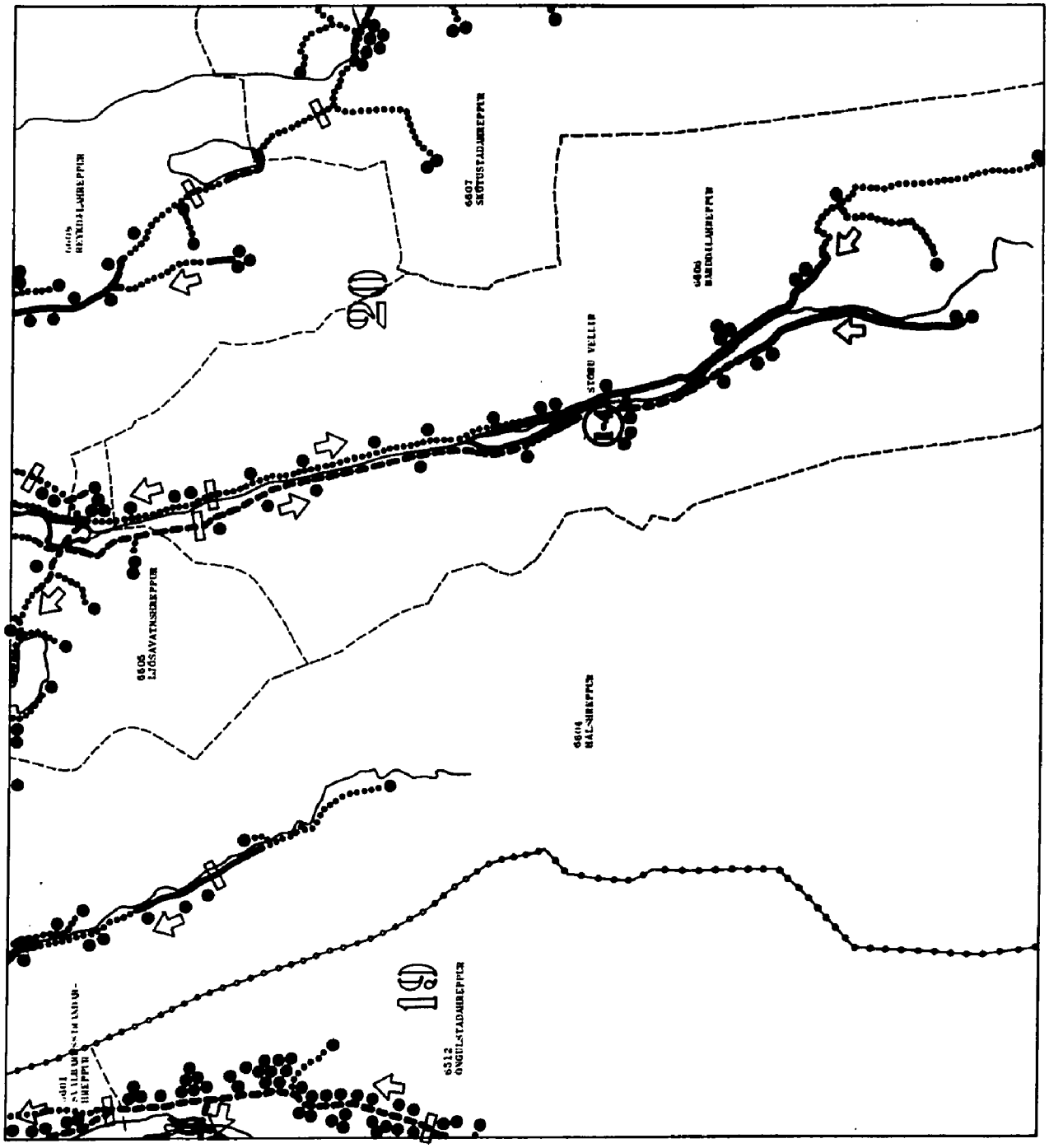
MAP 71



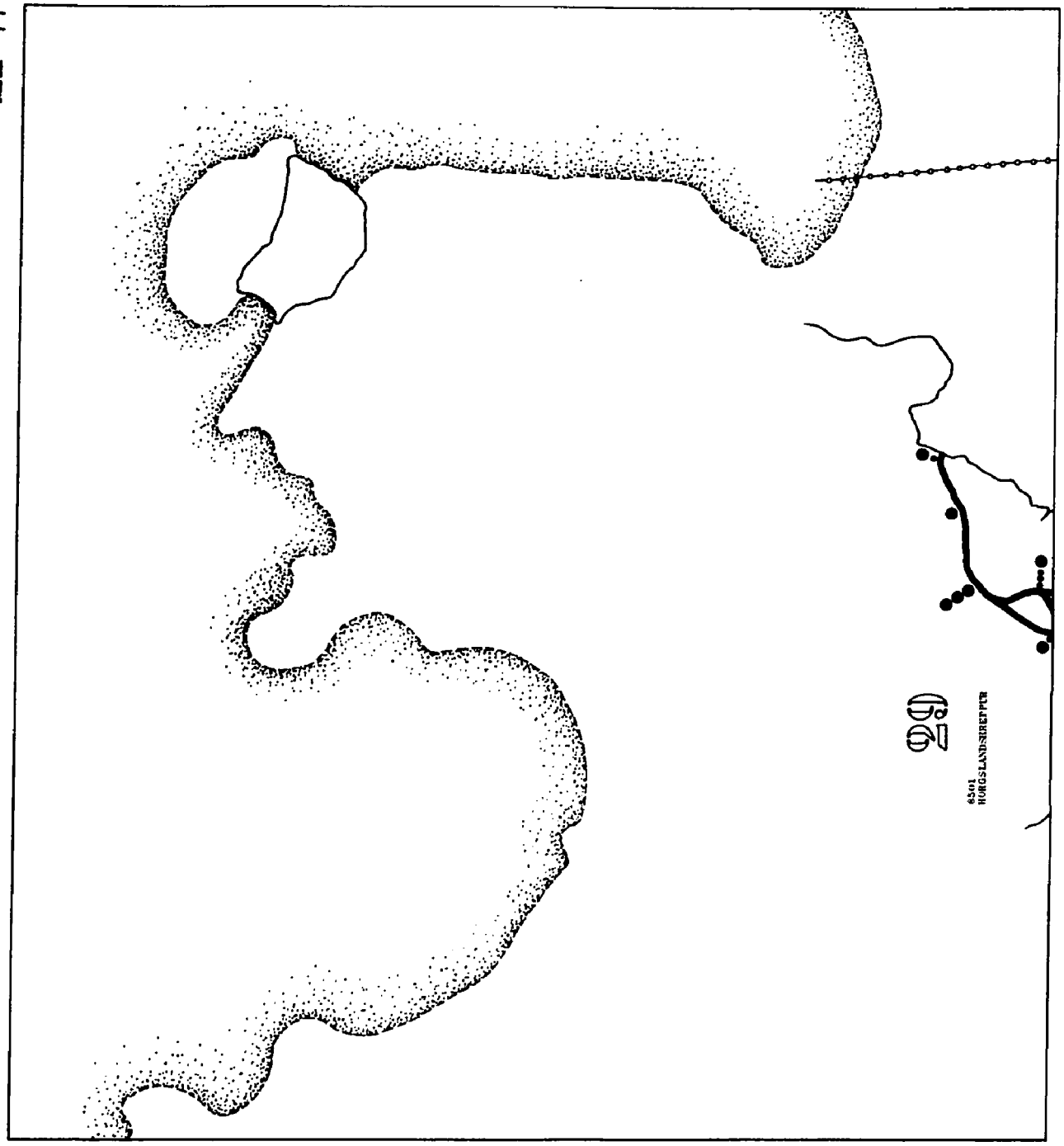
MAP 72



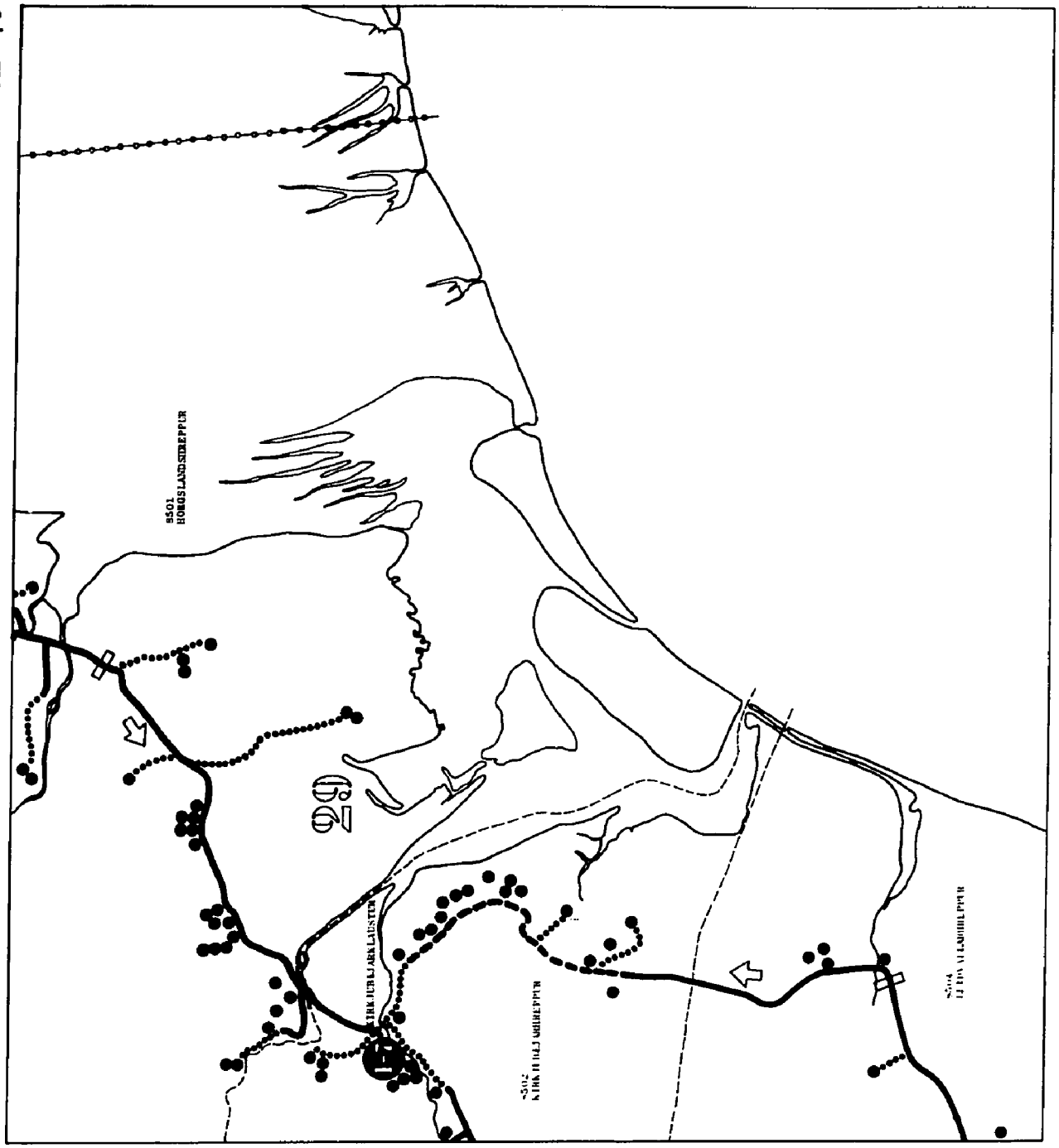
MAP 73



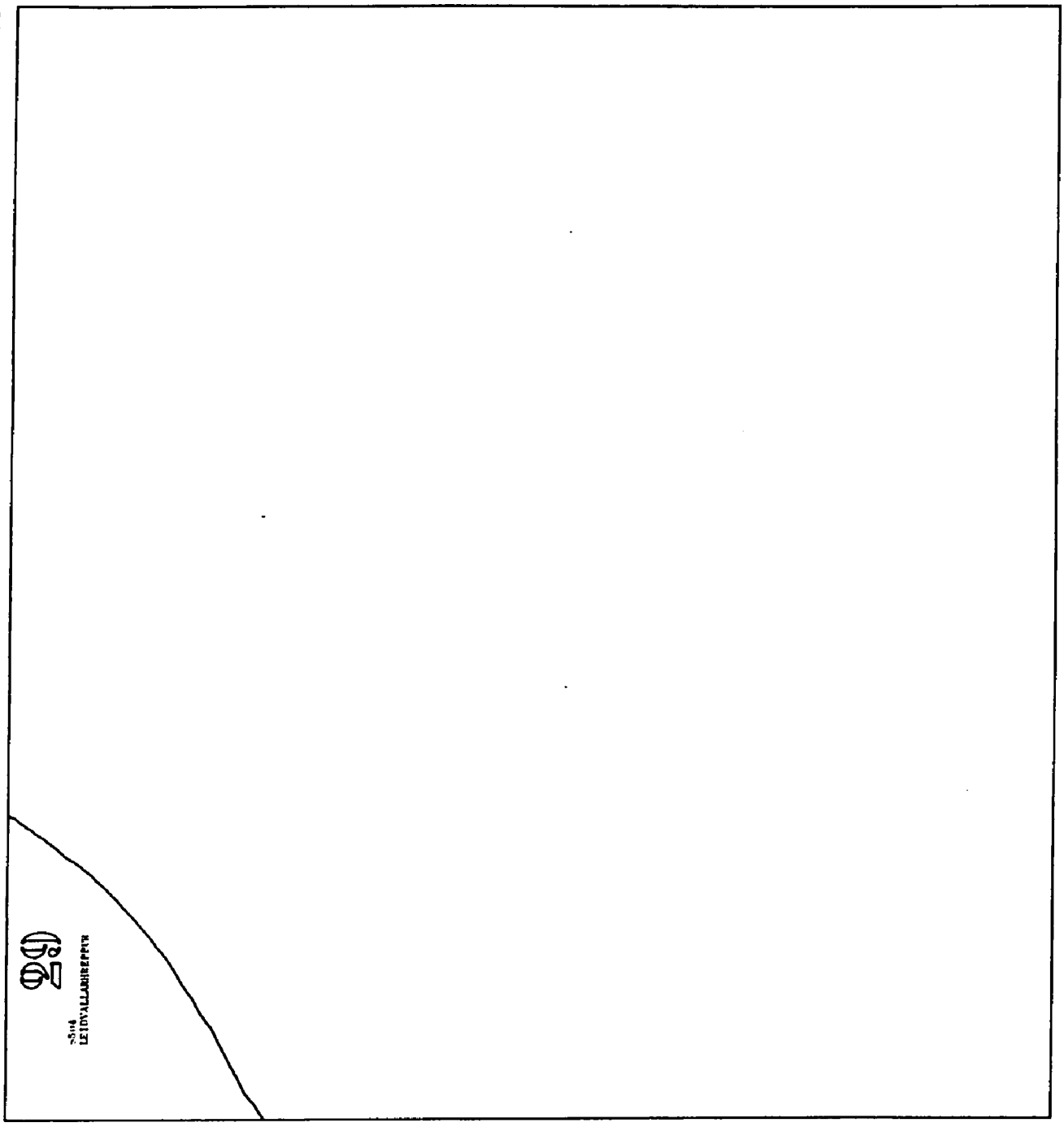
MAP 77



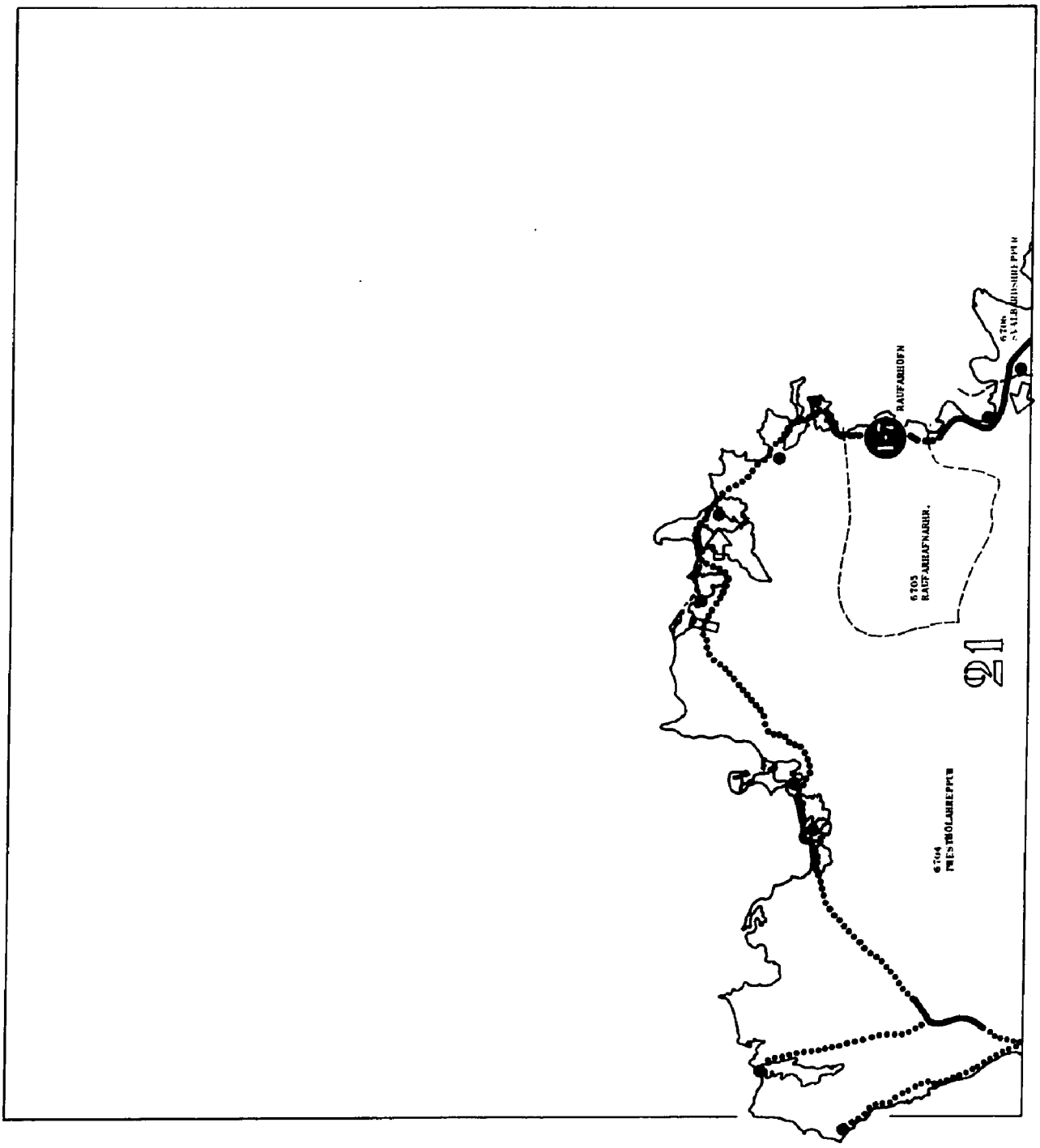
MAP 78



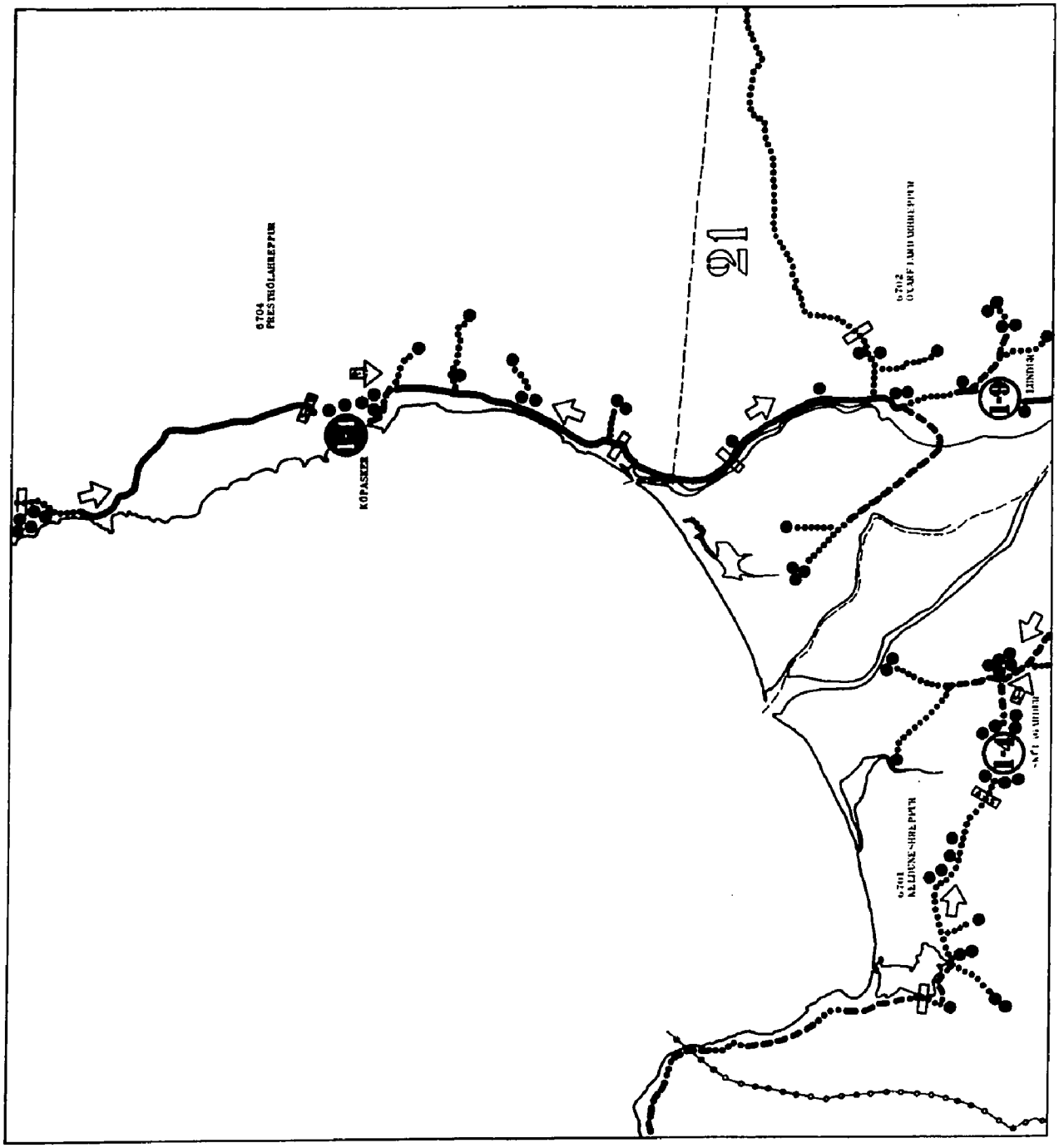
MAP 79



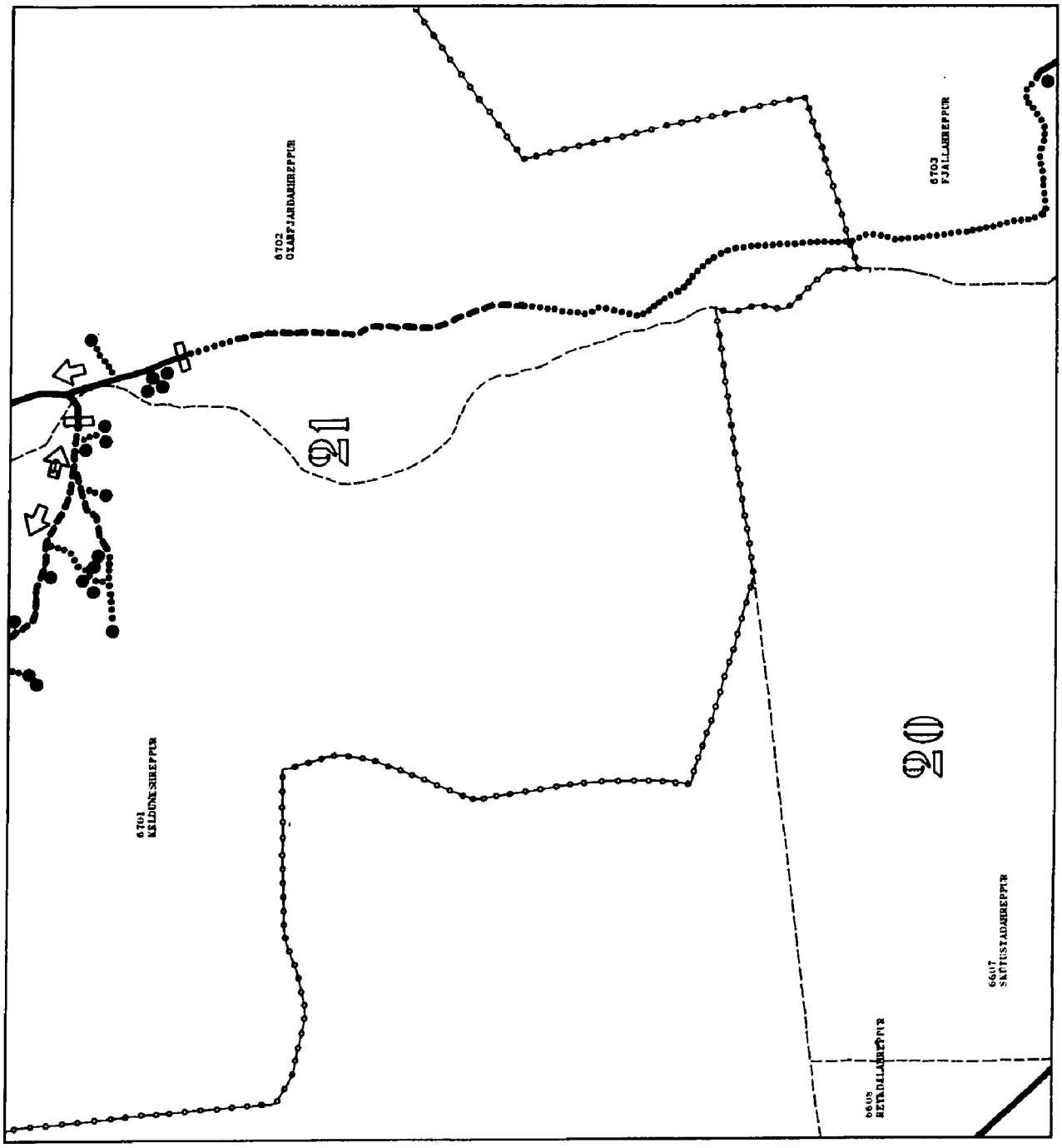
MAP 80-90



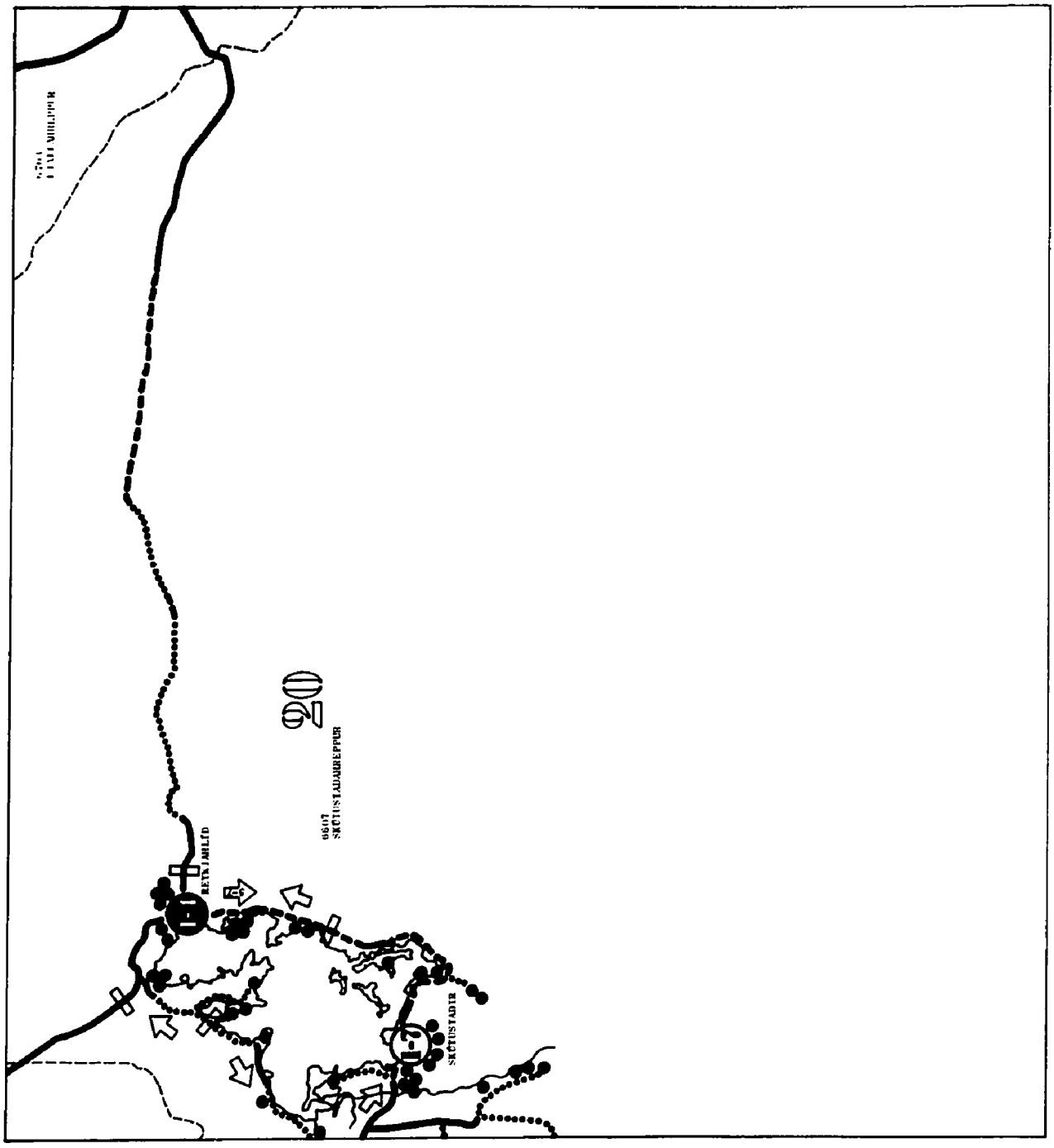
MAP 81



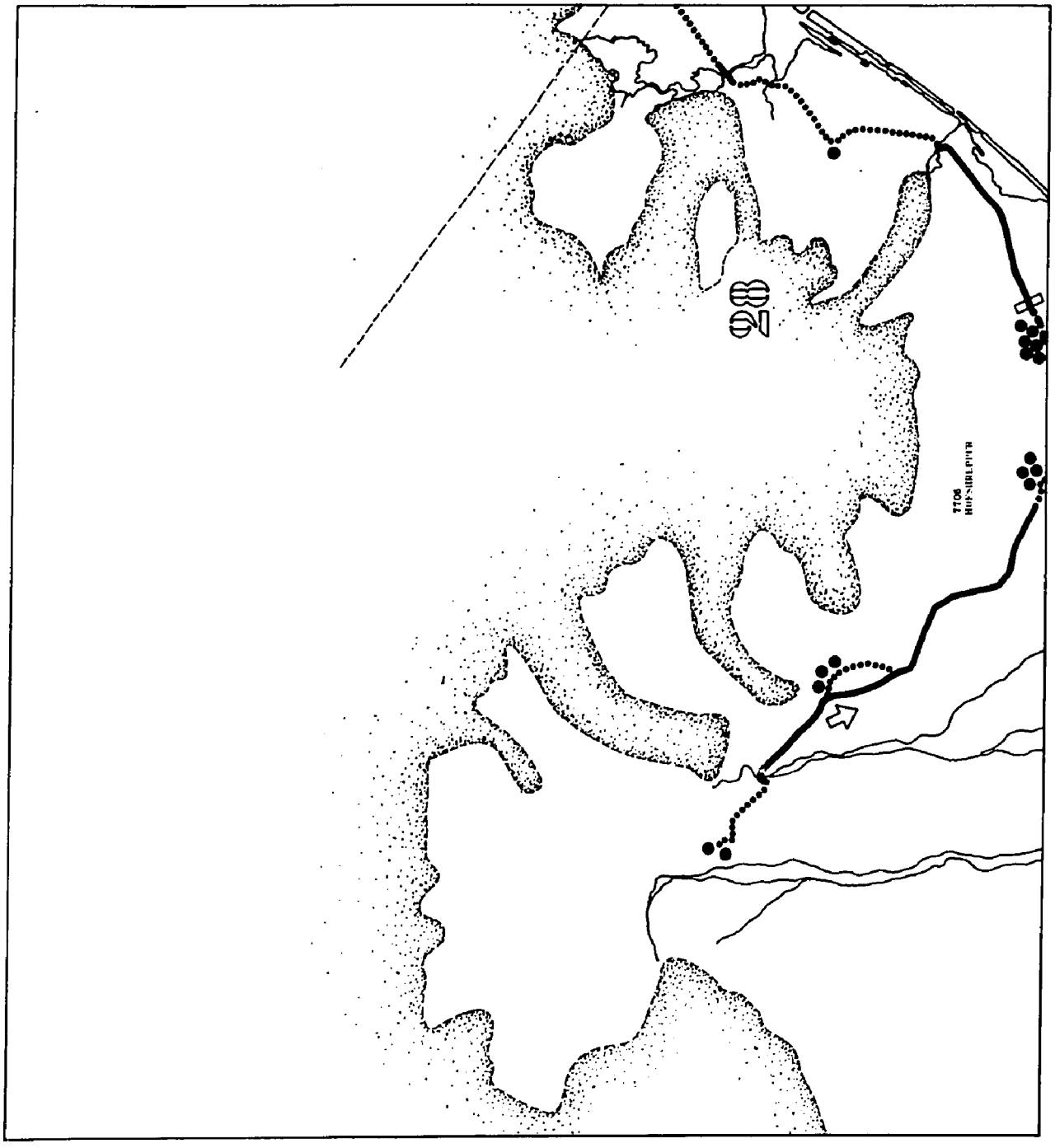
MAP 82


6702
ÖXARFJARÐARHREPPUR
6703
FJALLAHREPPUR
21
6701
KELDUNESHREPPUR
20
6607
SKÚTUSTAÐAHREPPUR

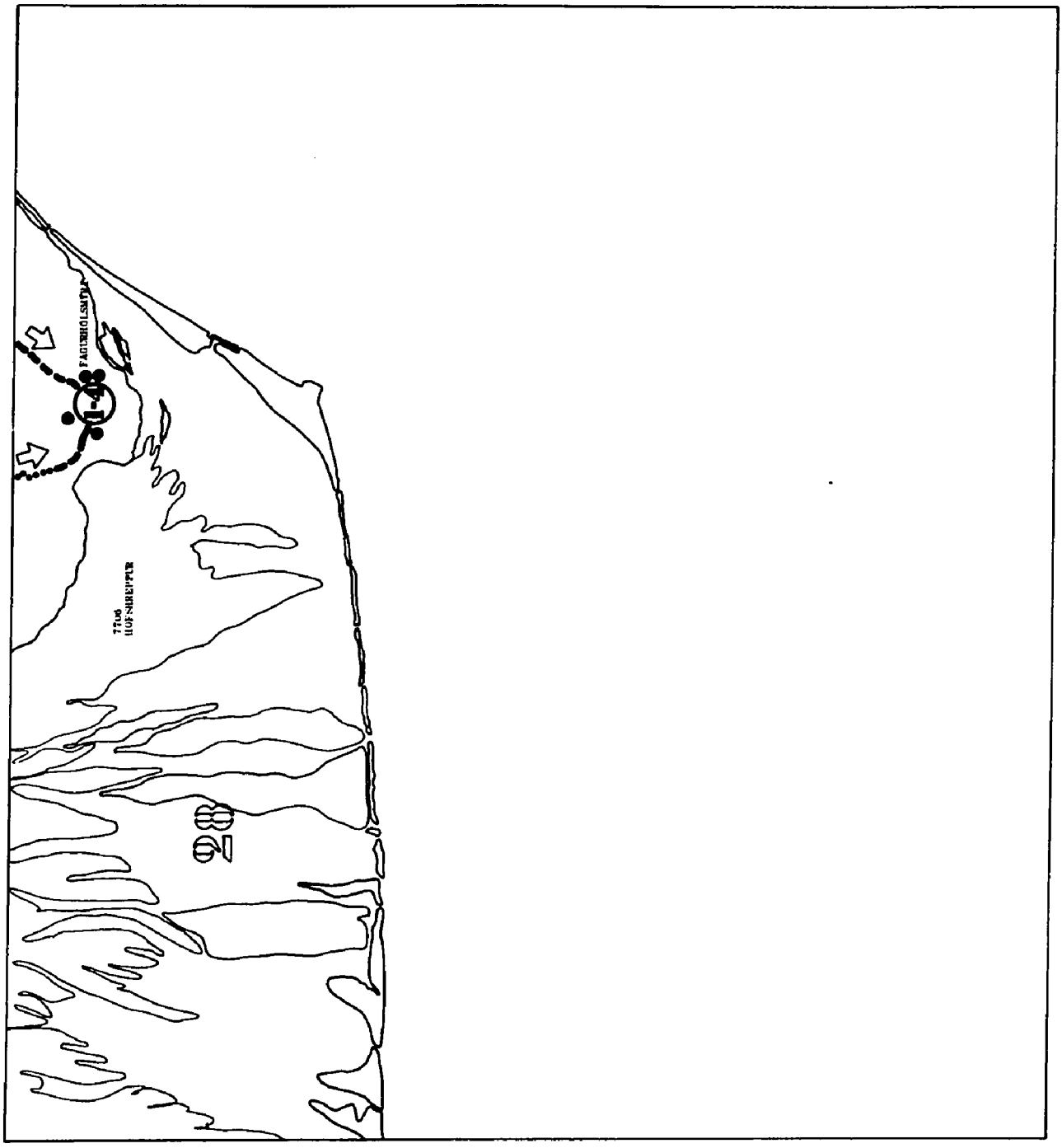
MAP 83



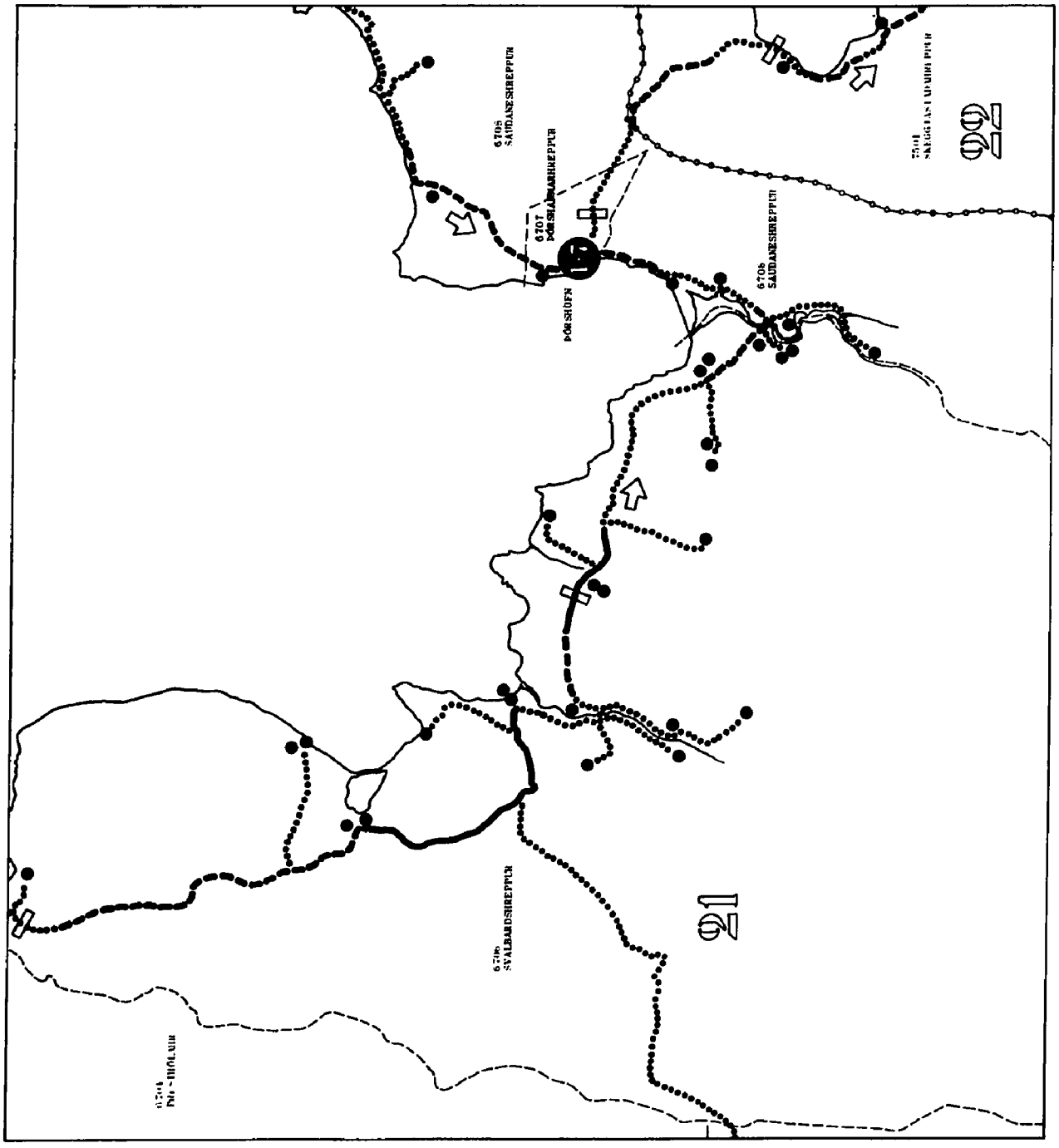
MAP 87



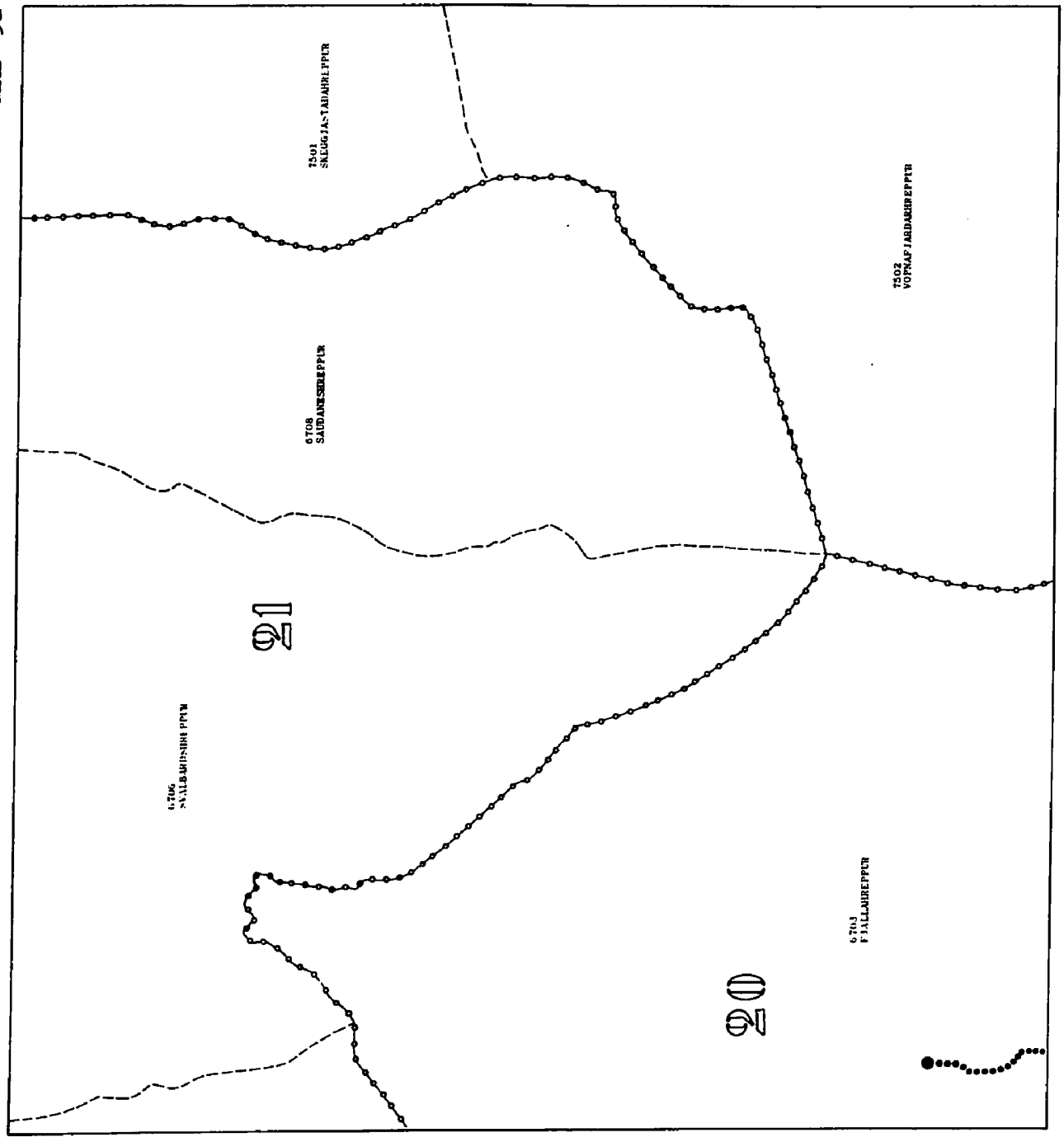
MAP 88



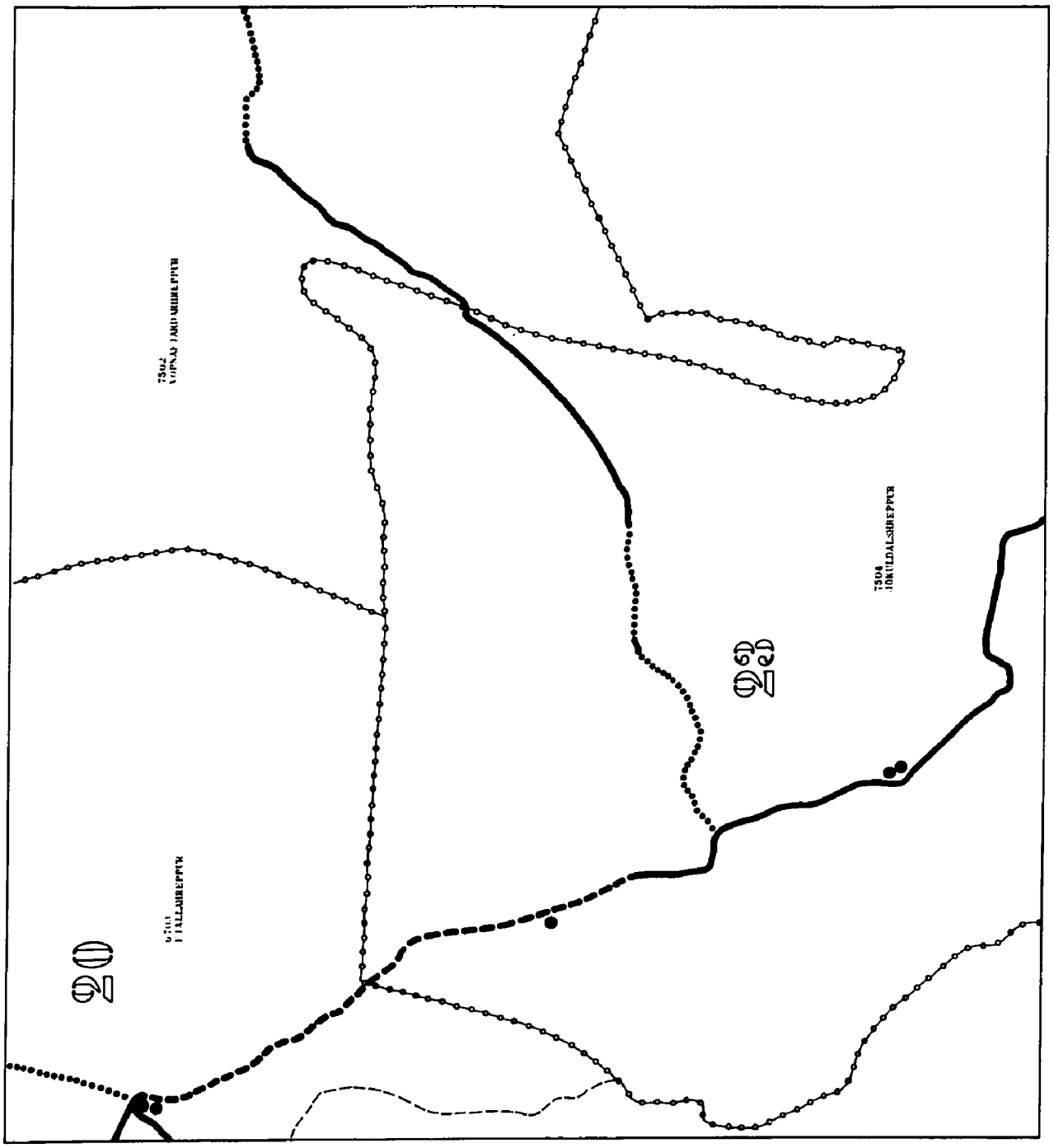
MAP 91

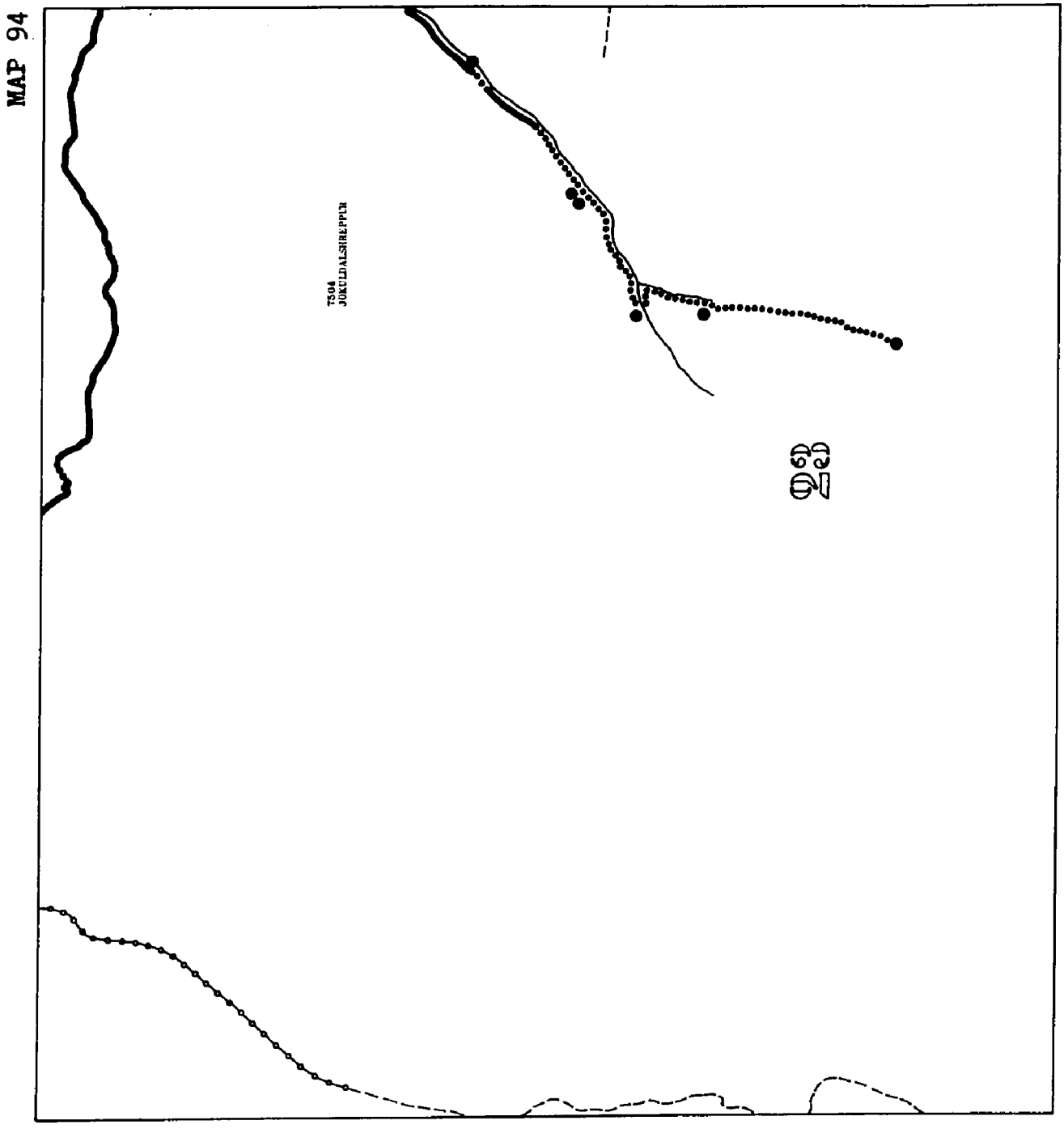

6705
SAUDANESHREPPUR
6707
PÓRSHÖFN
PÓRSHÖFN
6705
SAUDANESHREPPUR
6706
SVALBARÐSHREPPUR
91
90

MAP 92

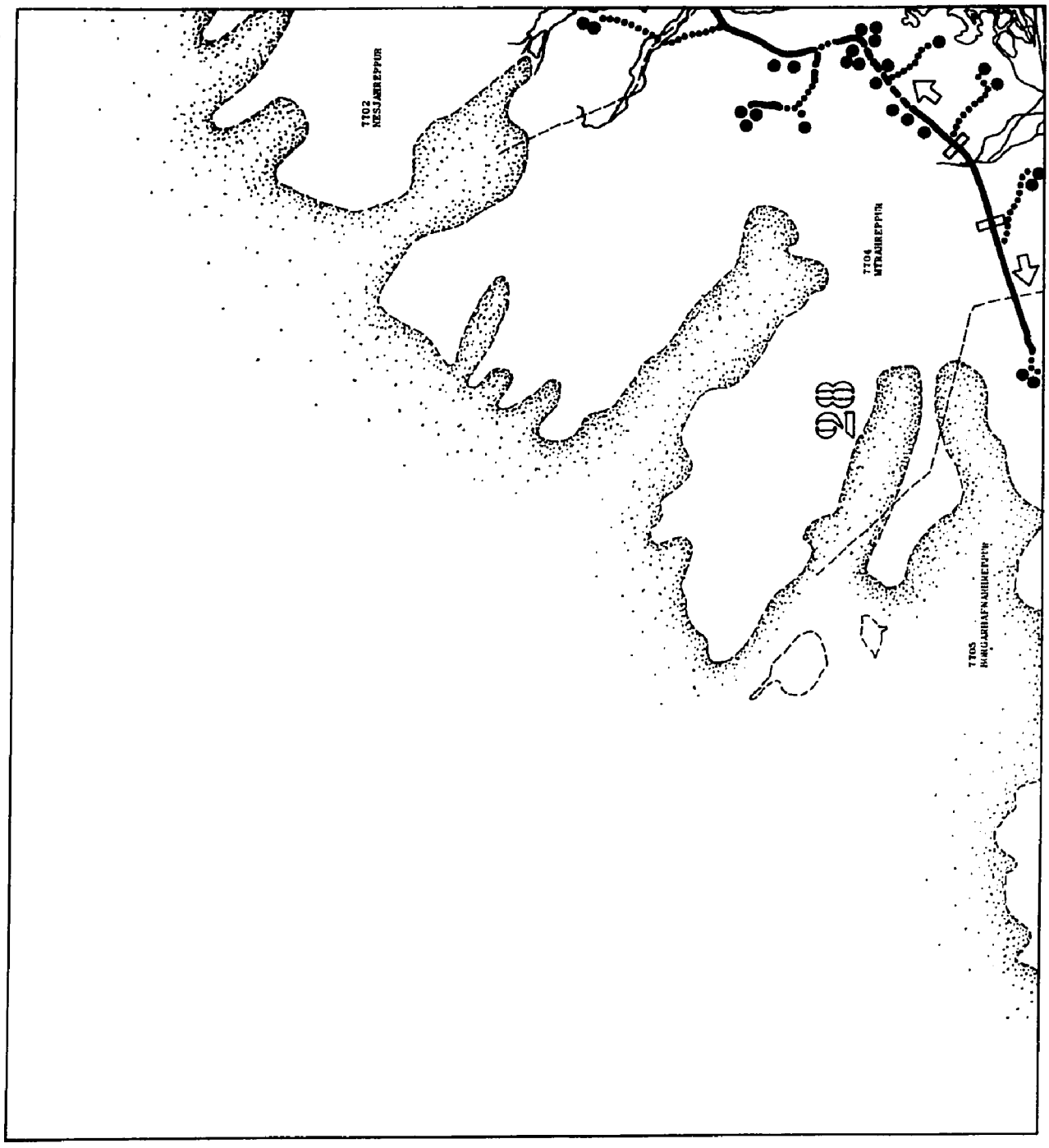

7501
SKEGGJA-TAUMAHREPPUR
0708
SAUDANESHREPPUR
7502
VOPNAFJARDARHREPPUR
21
20

MAP 93

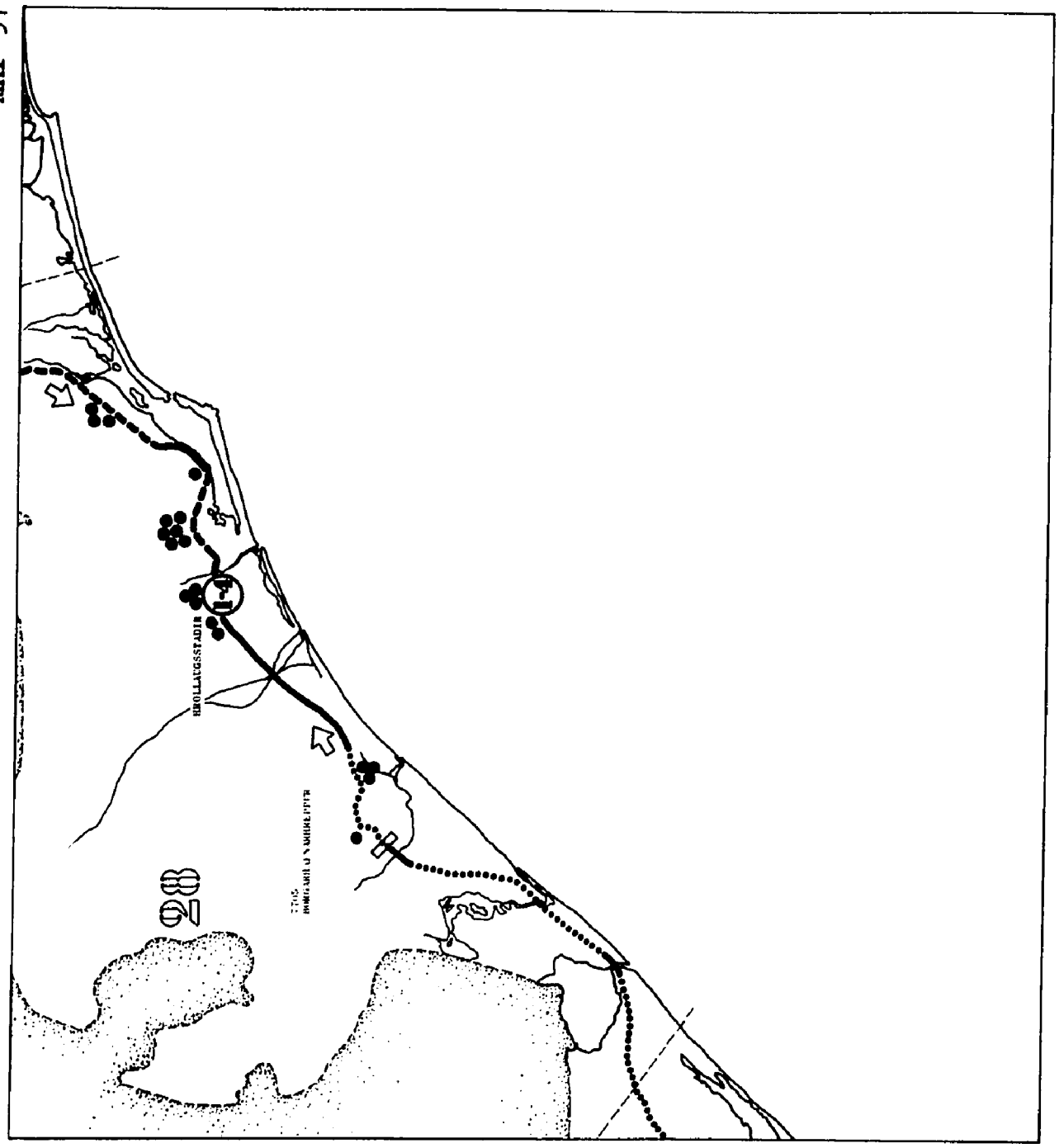



MAP 94
7504
JÖKULDALSHREPPUR

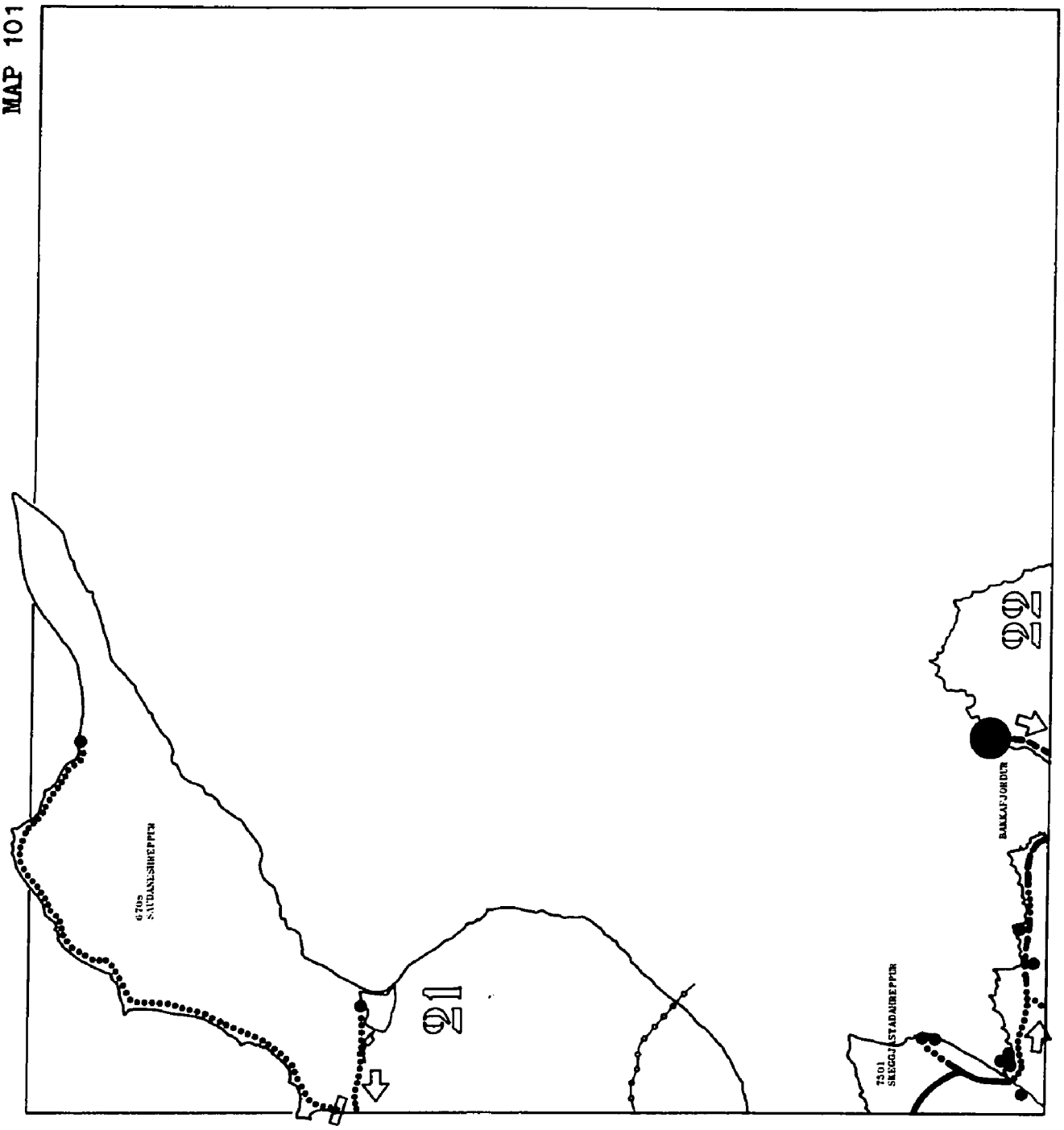
MAP 96



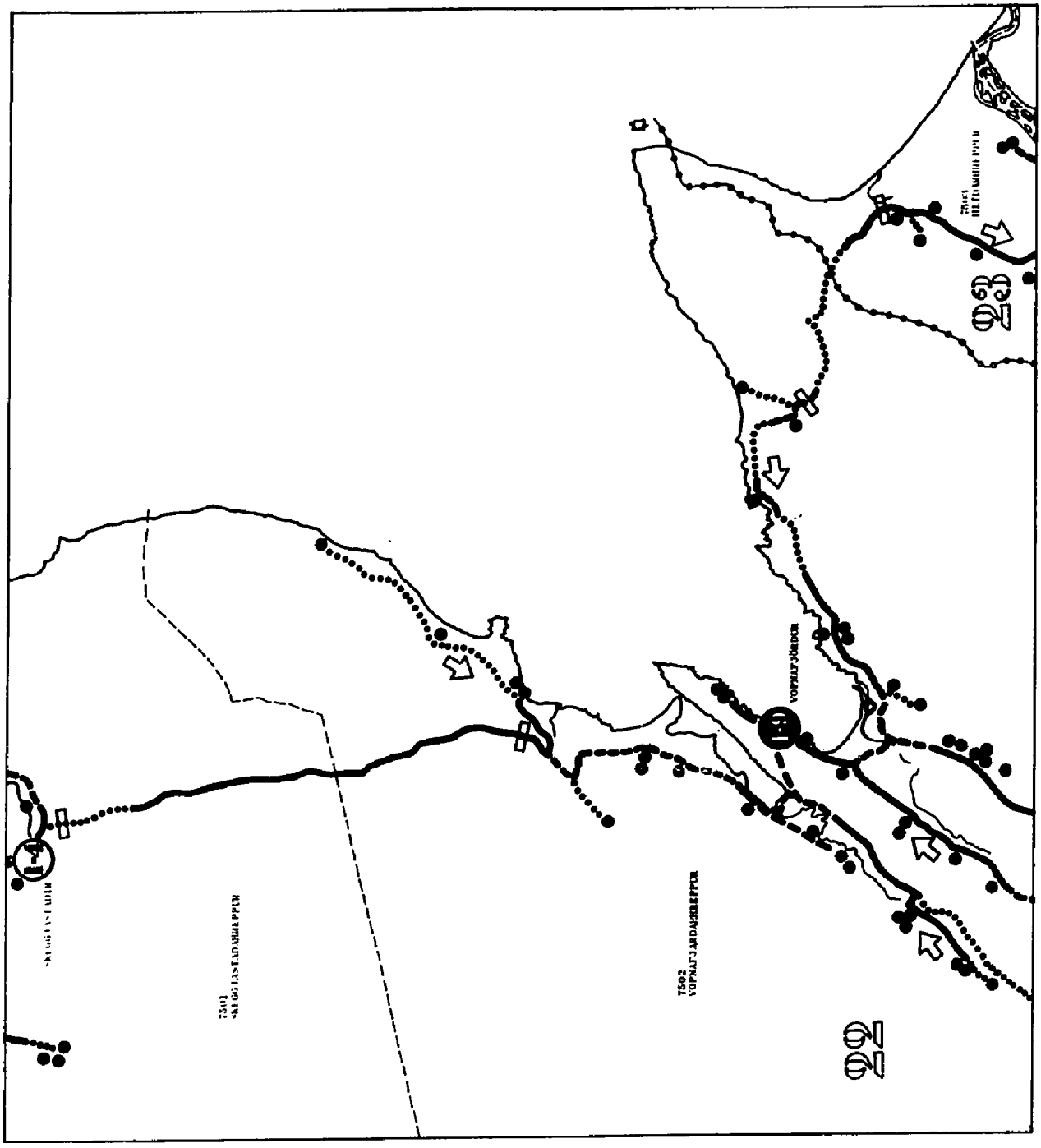
MAP 97



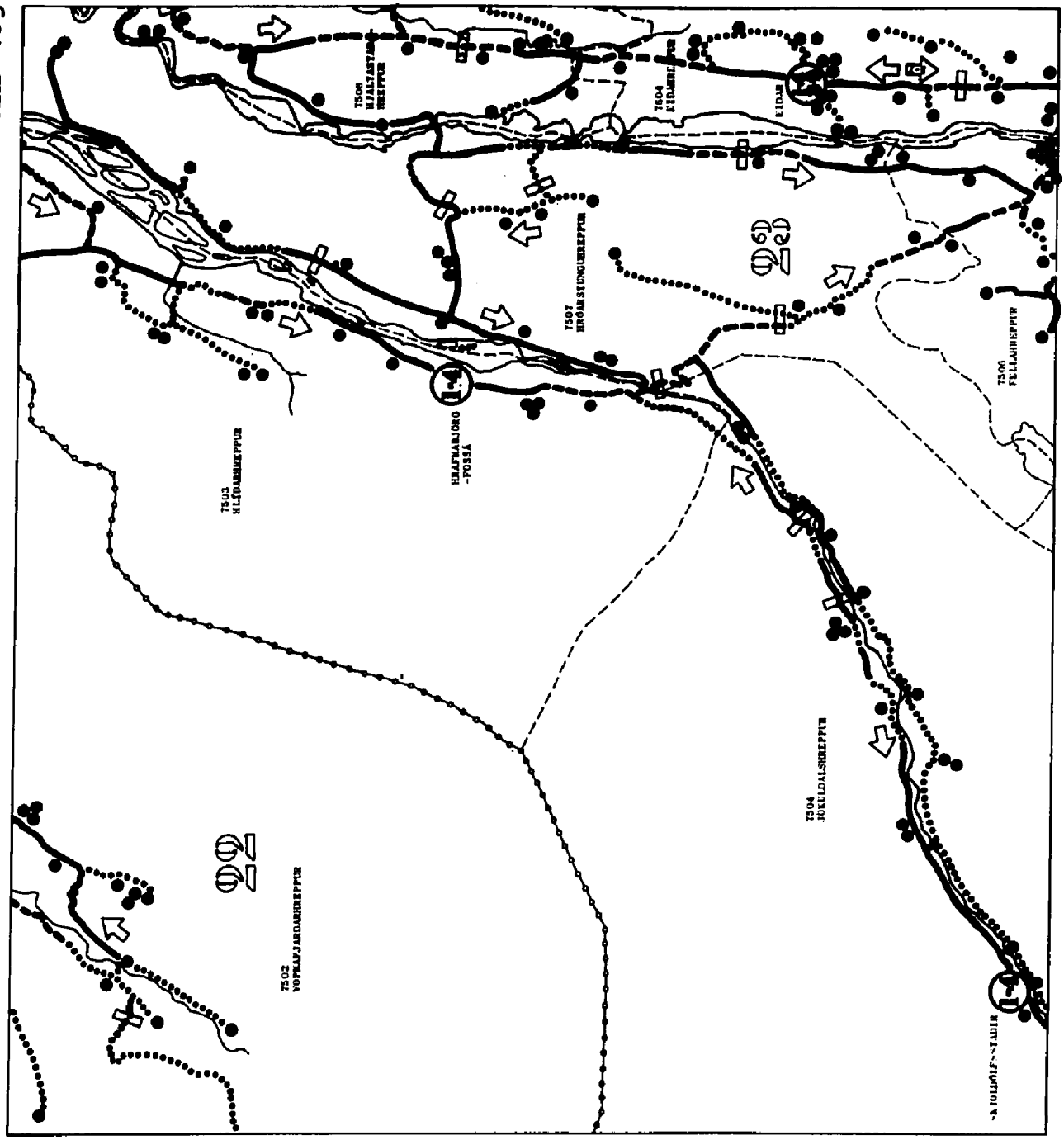
MAP 101



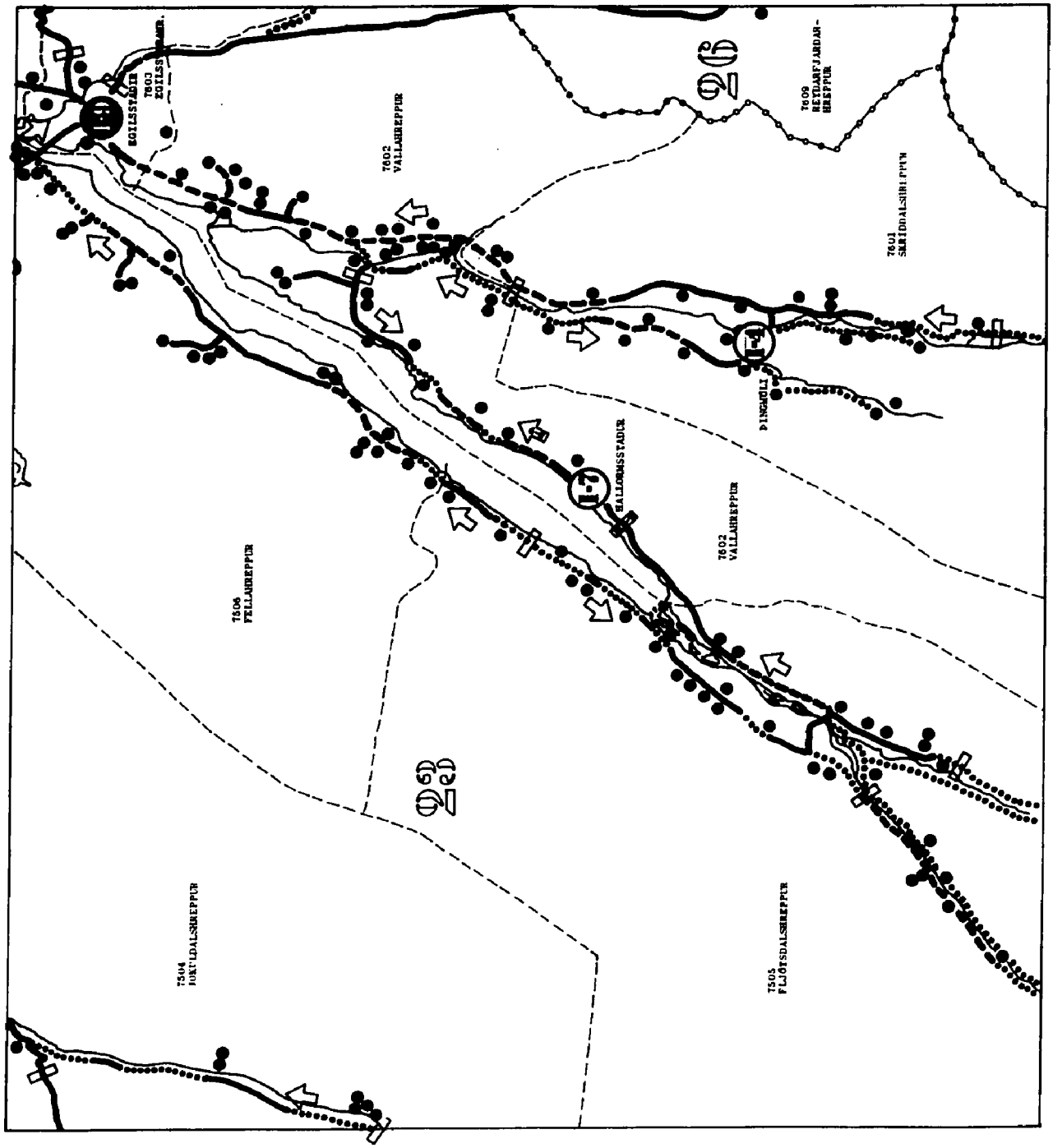
MAP 102



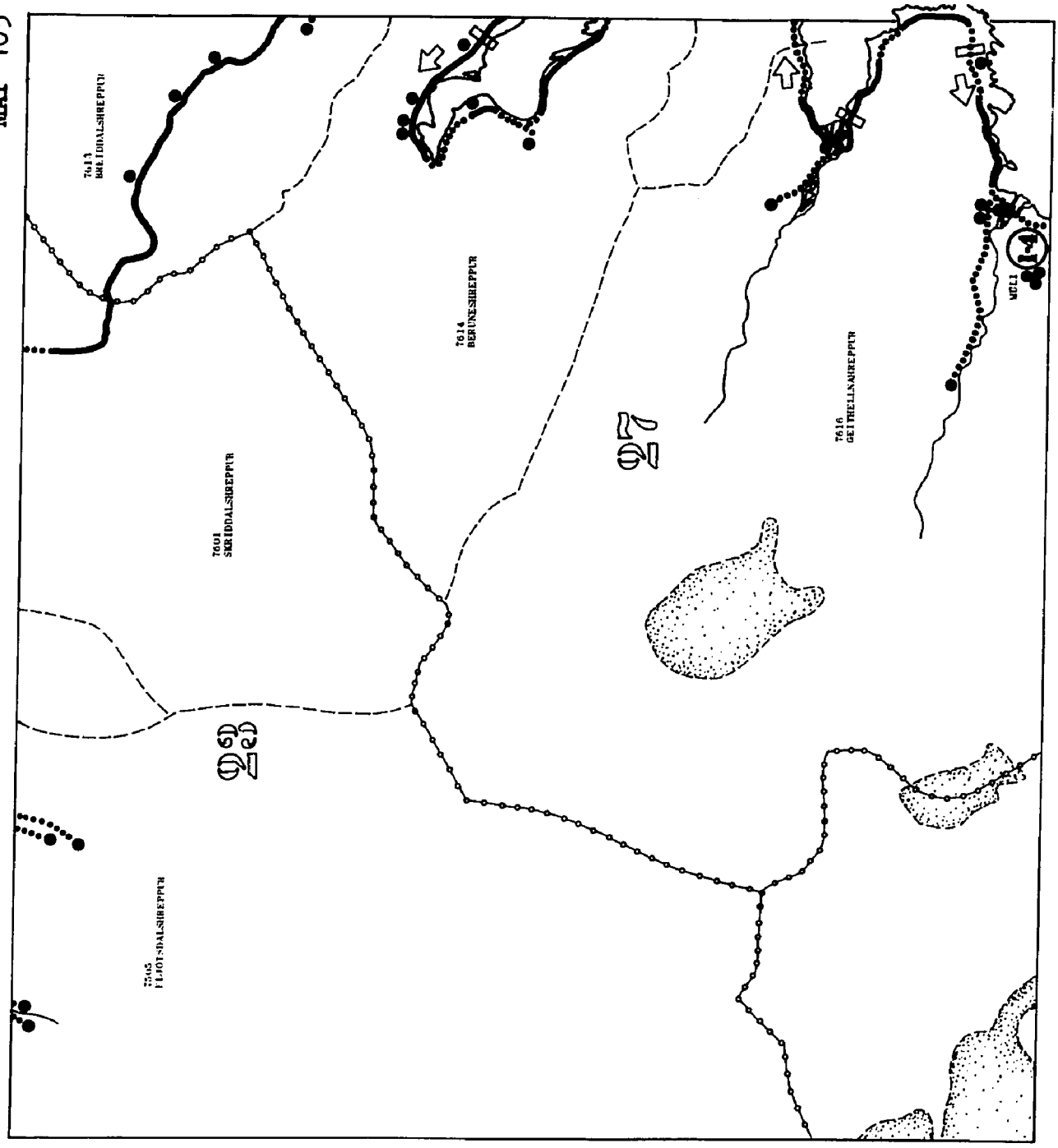
MAP 103


7506
7504
E1D13
7507
7500
FELLAHREPPUR
7503
HEIÐARHREPPUR
HRAFNABJÖRG
-FOSSÁ
7502
VOPNAFJARÐARHREPPUR
7504
JÖKULDALSHREPPUR

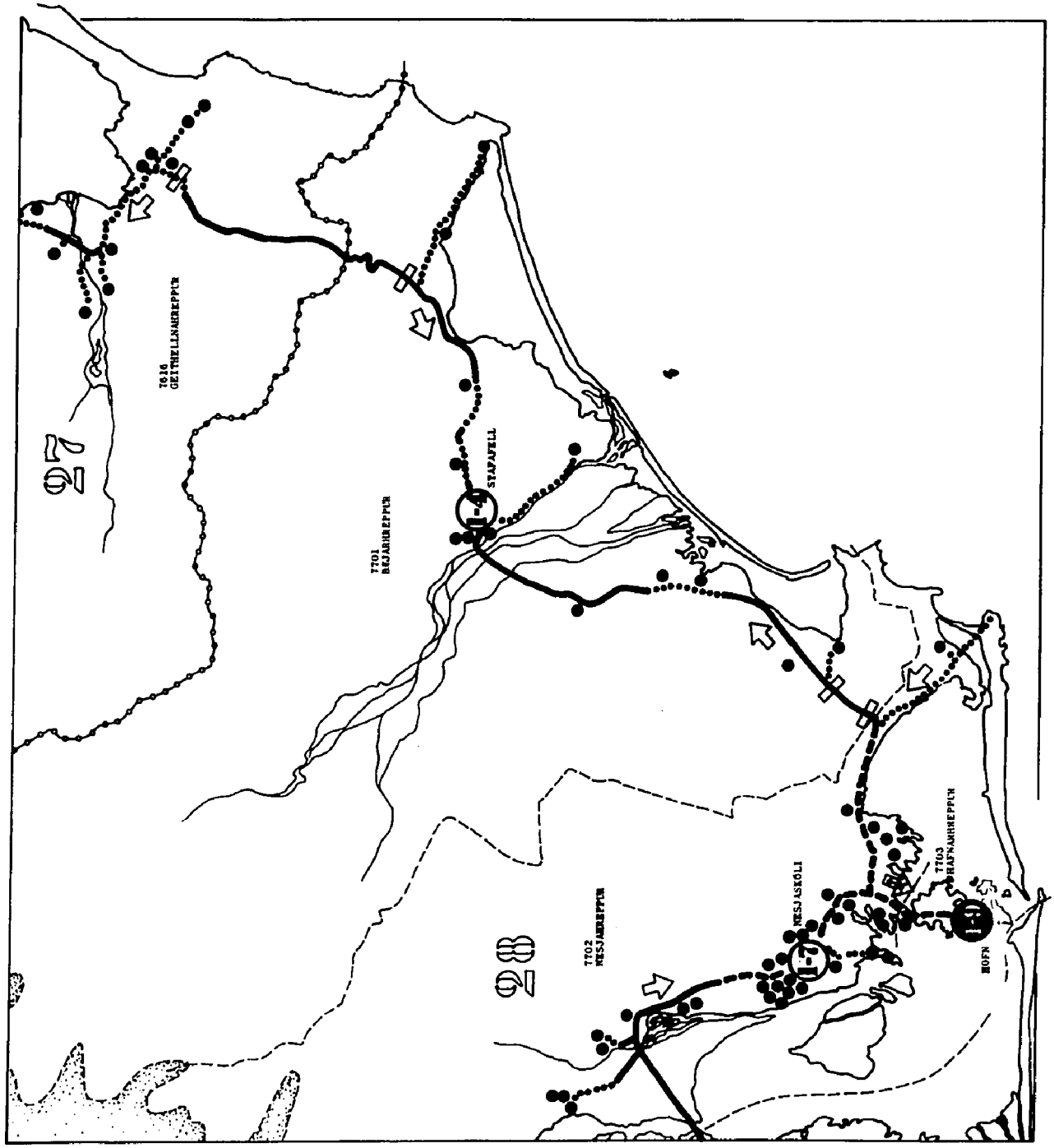
MAP 104


1-0
EGILSSTAÐIR
7603
EGILSSTAÐIR
7602
VALLAHREPPUR
7609
REYÐARFJARÐAR-
HREPPUR
7601
SKRIÐDALSHREPPUR
1-4
ÞINGMÚLI
1-1
HALLORMSSTAÐUR
7602
VALLAHREPPUR
7606
FELLAHREPPUR
7504
FÁSKRÚÐSFJARÐARHREPPUR
7505
FLJÓTSDALSHREPPUR

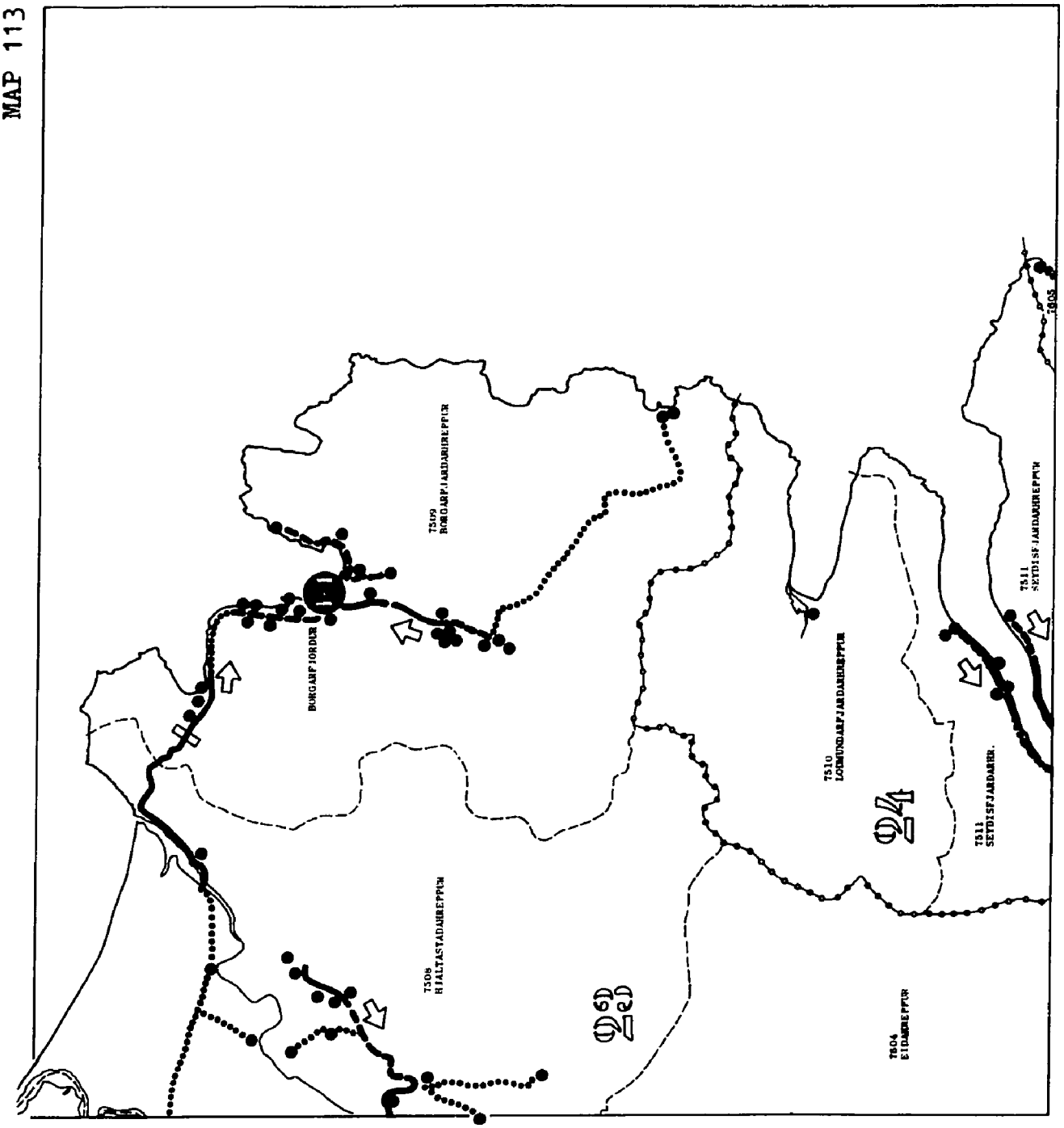
MAP 105


7613
7614
BERUNESHREPPUR
7616
GEITHELLNAHREPPUR
7601
SKRIDDALSHREPPUR
7605
MCL1
Q7
Q6

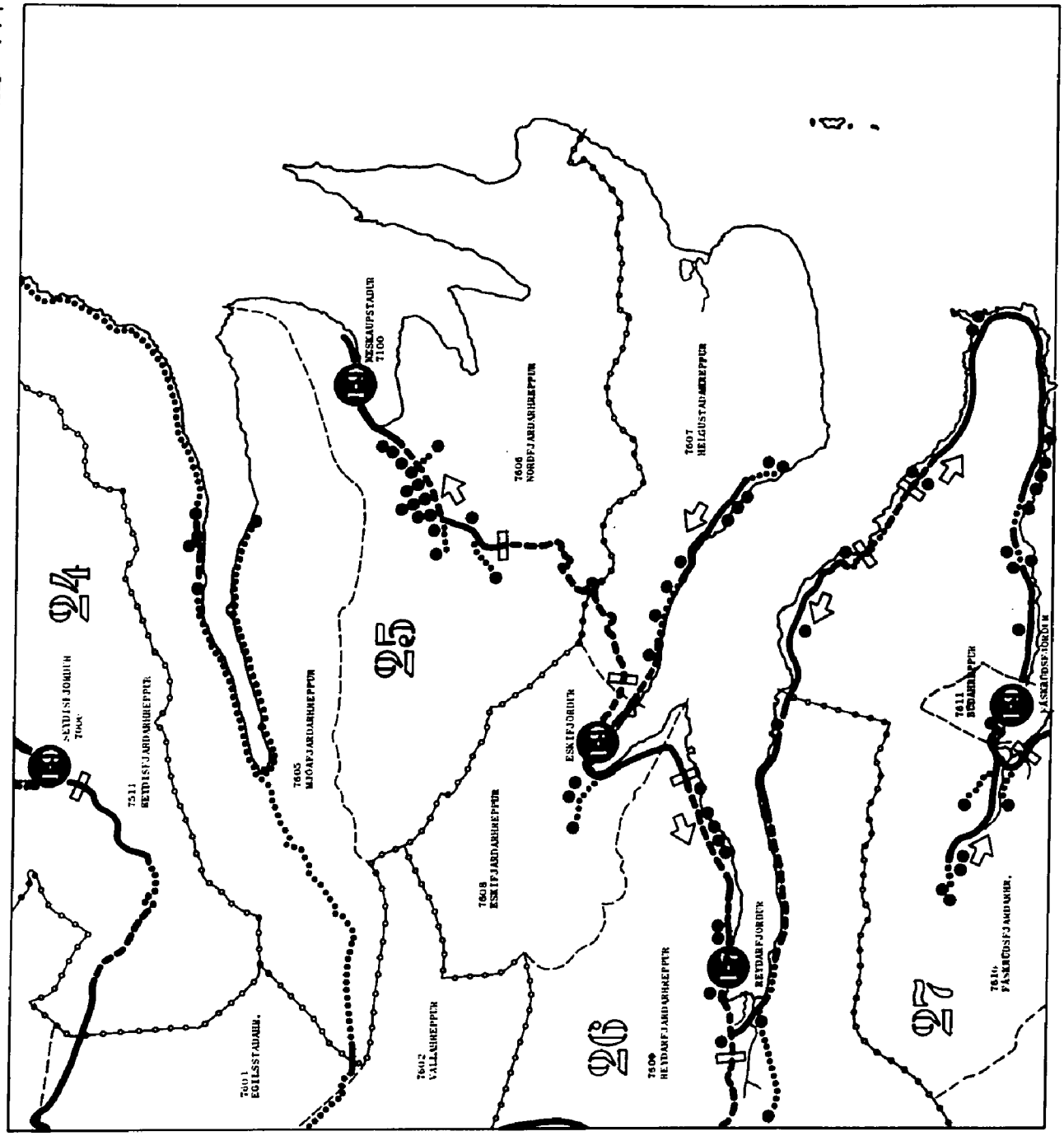
MAP 106


27
28
7016
GEITHELLNADREPPUR
7701
BÁJARHREPPUR
STAÐARFELL
7702
KESJAHREPPUR
KESJASKÓLI
7703
BRÁÐRAHREPPUR
HÖFN

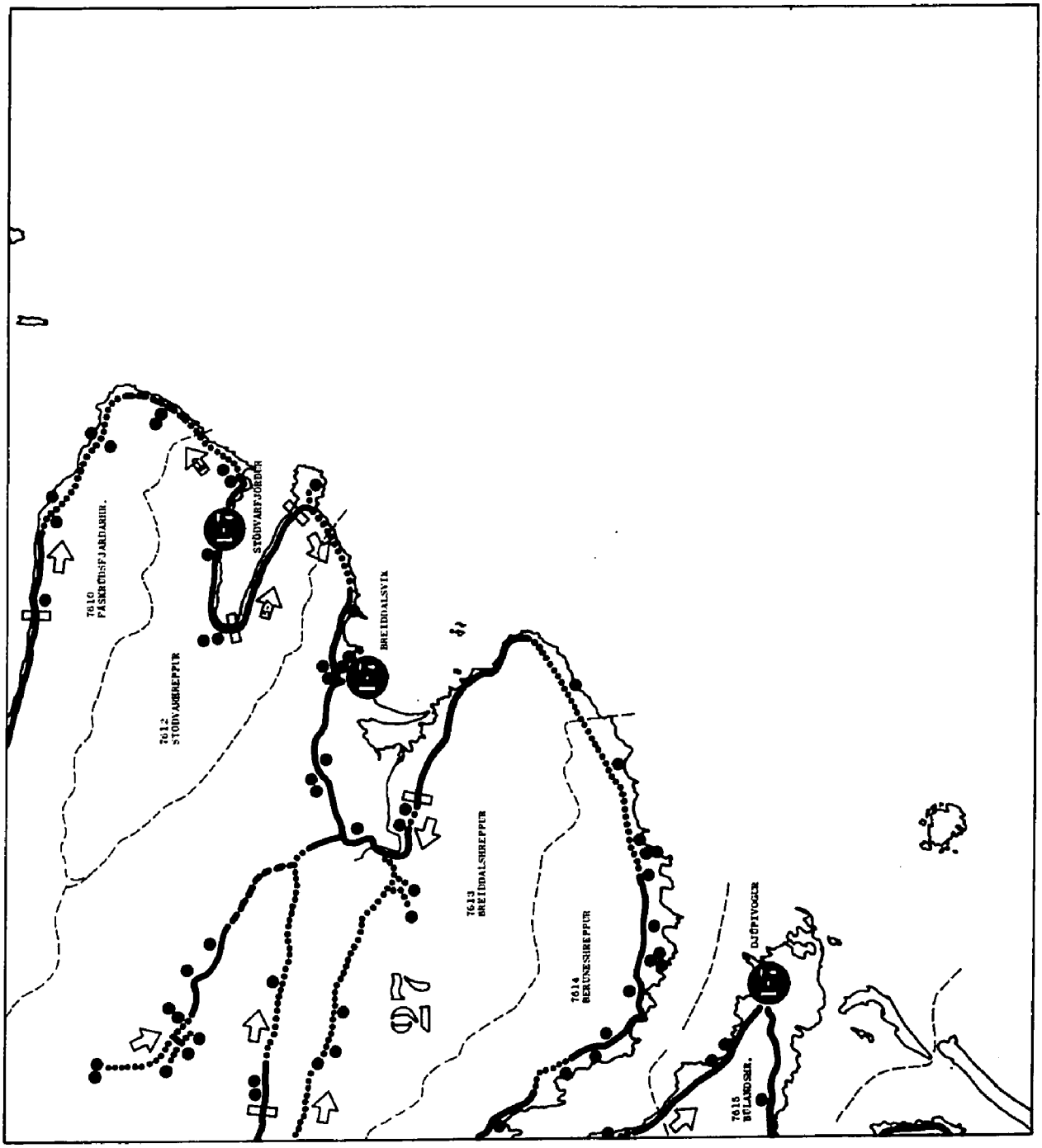
MAP 113


7509
BORGARFJARÐARHREPPUR
BORGARFJÖRÐUR
7506
HÁLSASVEITARHREPPUR
7510
LUNDARREYKJADALSHREPPUR
7511
SKORRADALSHREPPUR
7504
EIÐAHREPPUR
1805
1804
1805

MAP 114



MAP 115


7610
7612
STÖÐVARFJÖRÐUR
BREIÐDALSVÍK
7613
BREIÐDALSHREPPUR
7614
BERUNESHREPPUR
DJÚPIVOGUR
7615
BÚLANDSH.
1
1
1

APPENDIX D

THE PROPOSED SCHOOLS, GRADES OFFERED AND NUMBER OF STUDENTS

DISTRICT NO 1

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Varmá, Brúarland	1 - 9	127	95	78	300
Ásgarður	1 - 7	30	23	-	53
Total		157	118	78	353

Note:

The number in grades as of 1971-1972 is computed from the tables presented in Appendix A, which are substantiated through analysis presented in Appendix B. The distribution among facilities is established from maps presented in Appendix C.
The distribution between farms is based on average number of students in yeargroup per family unit. The number of family units was provided by Hagstofa Íslands, from the National Census Computer File.

DISTRICT NO 2

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Akranes	1 - 9	394	295	211	900
Leirárskóli	1 - 7	28	21	-	49
Total		422	316	211	949

DISTRICT NO 3

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Borgarnes	1 - 9	138	119	79	336
Reykholt	8 - 9	-	-	49	49
Kleppjárnsreykir	1 - 7	55	41	-	96
Varmaland	1 - 7	37	32	-	69
Hvanneyri	1 - 4	22	-	-	22
Home study	1 - 2	4	-	-	4
Total		256	192	128	576

DISTRICT NO 4

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Stykkishólmur	1 - 9	95	71	79	245
Laugagerðisskóli	1 - 7	40	48	-	88
Lýsuhóll	1 - 4	20	-	-	20
Home study	1 - 2	4	-	-	4
Total		159	119	79	357

DISTRICT NO 5

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Ólafsvík	1 - 9	107	81	124	312
Grundarfjörður	1 - 7	74	56	-	130
Hellissandur	1 - 7	66	49	-	115
Total		247	186	124	557

DISTRICT NO 6

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Laugaskóli	1 - 9	13	28	68	109
Búðardalur	1 - 7	62	46	-	108
Reykhólar	1 - 7	12	28	-	40
Tjarnarbúð,Saurbæ	1 - 4	22	-	-	22
Króksfjarðarnes	1 - 4	17	-	-	17
Flatey	1 - 4	4	-	-	4
Home study	1 - 2	6	-	-	6
Total		136	102	68	306

DISTRICT NO 7

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Patreksfjörður	1 - 9	90	91	91	272
Bíldudalur	1 - 7	32	24	-	56
Tálknafjörður	1 - 7	29	22	-	51
Hagi, Barðaströnd	1 - 4	21	-	-	21
Örlygshöfn	1 - 4	8	-	-	8
Home study	1 - 2	2	-	-	2
Total		182	137	91	410

DISTRICT NO 8

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Núpur	1 - 4, 8 - 9	15	-	73	88
Þingeyri	1 - 7	43	45	-	88
Suðureyri	1 - 7	49	36	-	85
Flateyri	1 - 7	37	28	-	65
Home study	1 - 2	2	-	-	2
Total		146	109	73	328

DISTRICT NO 9

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Bolungarvík	1 - 9	97	73	49	219
Total		97	73	49	219

DISTRICT NO 10

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Isafjörður	1 - 9	222	202	135	559
Hnífsdalur	1 - 4	27	-	-	27
Súðavík	1 - 4	20	-	-	20
Home study	1 - 2	1	-	-	1
Total		270	202	135	607

DISTRICT NO 11

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Reykjanesskóli	1 - 9	17	18+[1]	12+	47+
Home study	1 - 2	8	-	-	8
Total		25	18+	12+	55+

[1] + indicates that this school receives students from the centers Reykjavík and Akureyri and who are boarded at the school. The number is uncertain and not included in the analysis.

DISTRICT NO 12

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Hólmavík	1 - 7	36	54	-	90
Borðeyri	1 - 4	21	-	-	21
Finnbogastaðir	1 - 4	11	-	-	11
Drangsnes	1 - 4	8	-	-	8
Klúka	1 - 4	8	-	-	8
Laugarbakki, in district no 13		-	16	-	16
Reykir í Hrútafirði, in district no 13		-	-	46	46
Home study	1 - 2	8	-	-	8
Total		92	70	46	208

DISTRICT NO 13

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Reykir í Hrútaf.	1 - 4, 8 - 9	13	-	53+46	66/112
Laugarbakki	1 - 7	42	54+16	-	96/112
Hvammstangi	1 - 7	35	26	-	61
Þorfinnsstaðir	1 - 4	11	-	-	11
Flóðvangur, in district no 14		3	-	-	3
Home study	1 - 2	3	-	-	3
Total		107	80	53	240
Reykir í Hrútaf., from district no 12				46	
Laugarbakki, from district no 12			16		

DISTRICT NO 14

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Blönduós	1 - 9	78	59	96	233
Skagaströnd	1 - 7	57	43	-	100
Húnavellir	1 - 7	21	42	-	63
Flóðvangur	1 - 4	18+3	-	-	18/21
Húnaver	1 - 4	16	-	-	16
Home study	1 - 2	1	-	-	1
Total		191	144	96	431
Flóðvangur, from district no 13		3			

DISTRICT NO 15

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Sauðárkrókur	1 - 9	168	128	85	381
Varmahlíð	1 - 9	32	80	87	199
Hofsós	1 - 7	52	50	-	102
Stóru Akrar	1 - 4	28	-	-	28
Steinsstaðir	1 - 4	22	-	-	22
Sólgarðar	1 - 4	21	-	-	21
Hólar	1 - 4	17	-	-	17
Home study	1 - 2	4	-	-	4
Total		344	258	172	774

DISTRICT NO 16

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Siglufjörður	1 - 9	151	113	76	340
Total		151	113	76	340

DISTRICT NO 17

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Ólafsfjörður	1 - 9	106	86	57	249
Grímsey	1 - 4	9	-	-	9
Total		115	86	57	258

DISTRICT NO 18

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Dalvík	1 - 9	98	88	90	276
Árskógur	1 - 7	34	26	-	60
Hrísey	1 - 7	29	22	-	51
Húsabakki	1 - 4	20	-	-	20
Total		181	136	90	407

DISTRICT NO 19

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Hrafnagil	1 - 9	61	81	77	219
Laugaland	1 - 7	42	46	-	88
Grenivík	1 - 7	34	25	-	59
Saurbæjarhreppur	1 - 4	24	-	-	24
Svalbarðseyri	1 - 4	22	-	-	22
Hjalteyri	1 - 4	20	-	-	20
Akureyri [1]		-	-	24	24
Total		203	152	101	456

[1] Akureyri is outside the study area.

DISTRICT NO 20

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Húsavík	1 - 9	212	159	106	477
Laugar, Litlu L.	1 - 4, 8 - 9	30	-	86	116
Hafralækjarskóli	1 - 7	52	62	-	114
Stóru Tjarnir	1 - 7	40	38	-	78
Skútustaðir	1 - 7	14	29	-	43
Reykjahlíð	1 - 4	24	-	-	24
Stóru Vellir	1 - 4	10	-	-	10
Home study	1 - 2	1	-	-	1
Total		383	288	192	863

DISTRICT NO 21

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Lundur	1 - 9	17	37	69	123
Þórshöfn	1 - 7	43	35	-	78
Raufarhöfn	1 - 7	41	31	-	72
Kópasker	1 - 4	17	-	-	17
Skúlagarður	1 - 4	14	-	-	14
Home study	1 - 2	6	-	-	6
Total		138	103	69	310

DISTRICT NO 22

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Vopnafjörður	1 - 9	63	52	34	149
Skeggjastaðir	1 - 4	6	-	-	6
Total		69	52	34	155

DISTRICT NO 23

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Egilsstaðir	1 - 9	112	93	57	262
Eiðar	1 - 4, 8 - 9	22	-	47	69
Hallormsstaður	1 - 7	15	63	-	78
Hrafnabj.-Fossá	1 - 4	21	-	-	21
Borgarfjörður	1 - 4	13	-	-	13
Skjöldólfsstaðir	1 - 4	10	-	-	10
Þingmúli	1 - 4	8	-	-	8
Home study	1 - 2	6	-	-	6
Total		207	156	104	467

DISTRICT NO 24

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Seyðisfjörður	1 - 9	86	64	43	193
Total		86	64	43	193

DISTRICT NO 25

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Neskaupstaður	1 - 9	146	111	74	331
Home study	1 - 2	1	-	-	1
Total		147	111	74	332

DISTRICT NO 26

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Eskifjörður	1 - 9	91	68	78	237
Reyðarfjörður	1 - 7	65+1	48+1	-	113/115
Total		156	116	78	350
Búðareyri, from district no 27		1	1		

DISTRICT NO 27

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Fáskrúðsfjörður	1 - 9	85	64	98	247
Djúpivogur	1 - 7	35	32	-	67
Stöðvarfjörður	1 - 7	35	26	-	61
Breiðdalsvík	1 - 7	29	24	-	53
Múli	1 - 4	8	-	-	8
Búðareyri, in district no 26		1	1	-	2
Home study	1 - 2	3	-	-	3
Total		196	147	98	441

DISTRICT NO 28

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Höfn	1 - 9	100	75	72	247
Nesjaskóli	1 - 7	25	34	-	59
Hrollaugsstaðir	1 - 4	8	-	-	8
Stafafell	1 - 4	6	-	-	6
Fagurhólsmýri	1 - 4	6	-	-	6
Total		145	109	72	326

DISTRICT NO 29

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Skógar	1 - 9	39	33	68	140
Víkurskóli	1 - 7	35	36	-	71
Kirkjub.klaustur	1 - 7	29	33	-	62
Ketilsstaðir	1 - 4	18	-	-	18
Hrífunes	1 - 4	13	-	-	13
Bergþórshvoll, in district no 30		1	-	-	1
Hvolsvöllur, in district no 30		3	4	2	9
Home study	1 - 2	3	-	-	3
Total		141	106	70	317

DISTRICT NO 30

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Hvolsvöllur	1 - 9	84+3	83+4	55+2	222/231
Hella	1 - 9	55	63	61	179
Laugaland	1 - 7	38	28	-	66
Þykkvibær	1 - 4	29	-	-	29
Bergþórshvoll	1 - 4	26+1	-	-	26/27
Total		232	174	116	522
Bergþórshvoll, from district no 29		1			
Hvolsvöllur, from district no 29		3	4	2	

DISTRICT NO 31

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Selfoss	1 - 9	272	253	223	748
Hveragerði	1 - 9	101	76	77	254
Flúðir	1 - 9	46	68	87	201
Eyrarb.,Stokkseyri	1 - 7	92	81	-	173
Reykholt	1 - 7	55	62	-	117
Þorlákshöfn	1 - 7	53	40	-	93
Villingaholtsskóli	1 - 4	45	-	-	45
Laugarvatn	1 - 4	27	-	-	27
Skeiðaskóli	1 - 4	26	-	-	26
Ljósifoss	1 - 4	23	-	-	23
Ásaskóli	1 - 4	22	-	-	22
Búrfell	1 - 4	10	-	-	10
Home study	1 - 2	2	-	-	2
Total		774	580	387	1741

DISTRICT NO 32

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Vestmannaeyjar[1]	1 - 9	466	349	233	1048
Total		466	349	233	1048

[1]The town was temporarily evacuated because of volcanic eruption on January 23, 1973.

DISTRICT NO 33

SCHOOLS, GRADES AND NUMBER OF STUDENTS

Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Grindavík	1 - 9	139	104	69	312
Total		139	104	69	312

DISTRICT NO 34

SCHOOLS, GRADES AND NUMBER OF STUDENTS

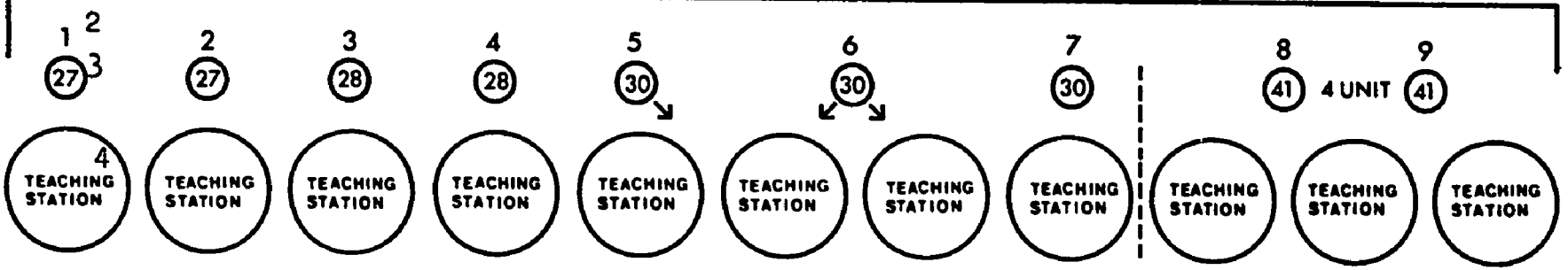
Schools	Grades offered	Number in grades as for 71-72			Total
		1 - 4	5 - 7	8 - 9	
Keflavík	1 - 9	524	393	262	1179
Njarðvíkur	1 - 9	165	147	98	410
Sandgerði	1 - 9	96	72	78	246
Gerðar	1 - 7	60	45	-	105
Vogar	1 - 4	32	-	-	32
Total		877	657	438	1972

APPENDIX E

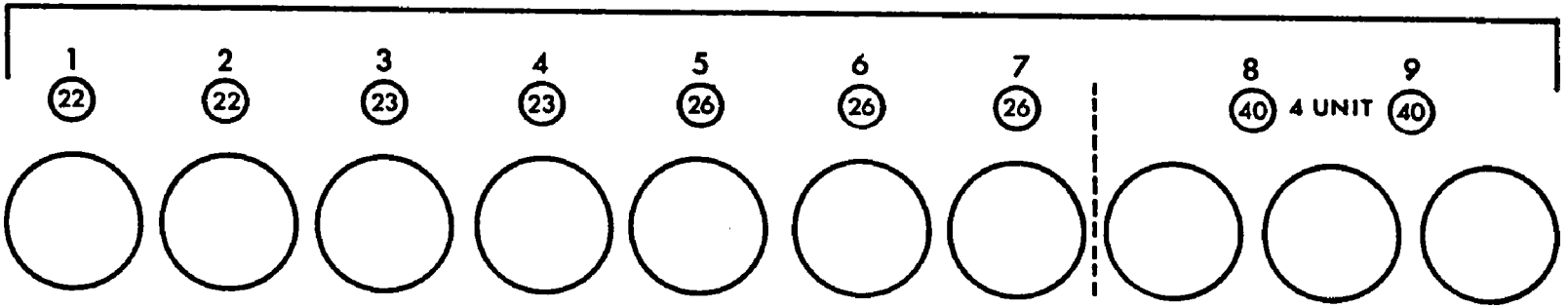
HYPOTHETICAL GROUPING INTO GRADES, BASIC TEACHING STATIONS, AND NUMBER OF TEACHERS FOR THE TYPIFIED SCHOOL FACILITIES

SCHOOLS TYPE 1-9, BASIC TEACHING STATIONS

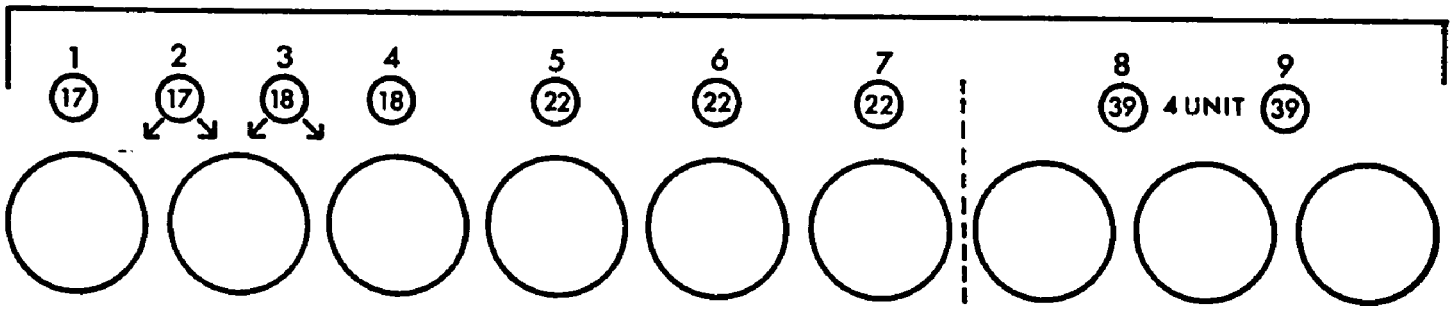
School for 282 students. Number of teachers 15.8 [1]



School for 248 students. Number of teachers 13.9

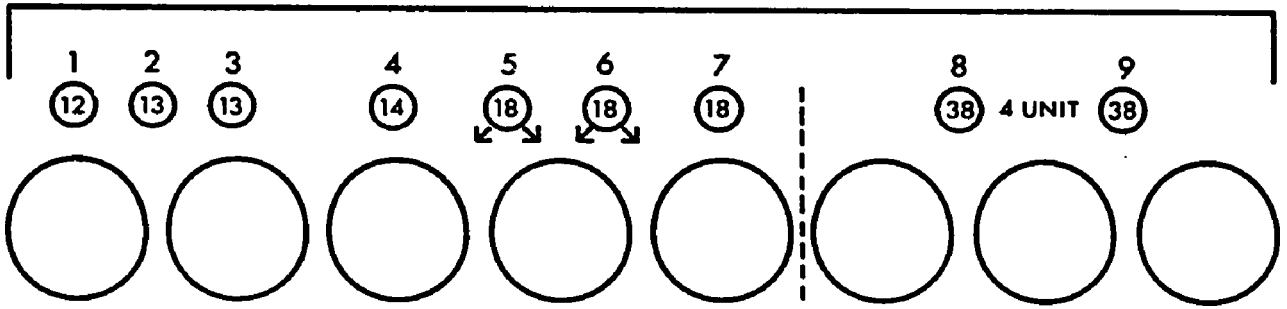


School for 214 students. Number of teachers 12.6

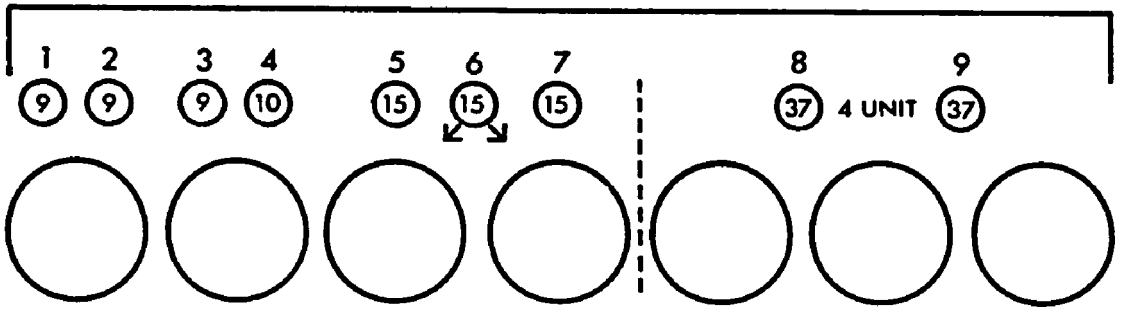


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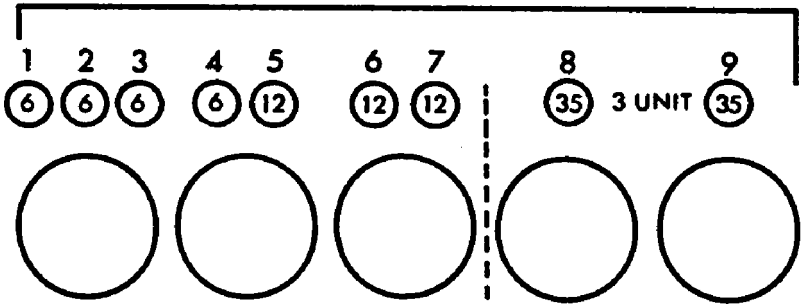
School for 182 students. Number of teachers 11.2



Schools for 156 students. Number of students 10.1



Schools for 130 students. Number of students 8.9



Notes:

1 Principal included.

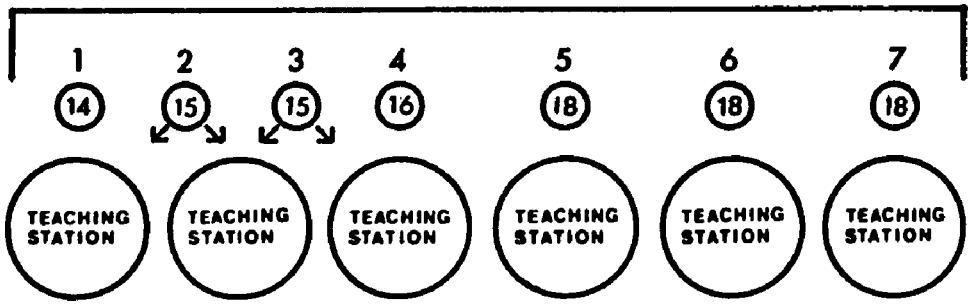
2 Grade, i.e. students of the same age.

3 Number of students in grades.

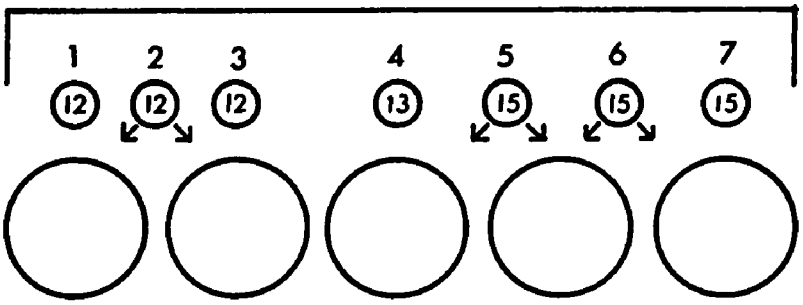
4 Teaching stations indicates a hypothetical space for the general instruction of the basic group. Additional stations for specialized activities - art, lab. music and physical education are needed for all units.

SCHOOLS TYPE 1-7, BASIC TEACHING STATIONS

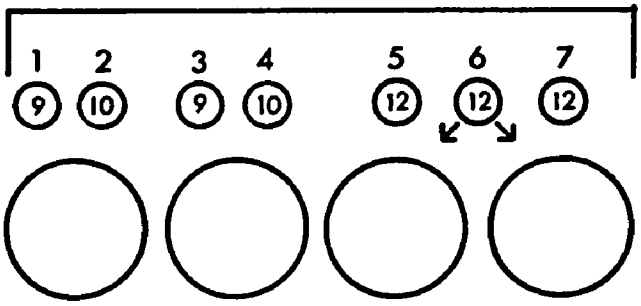
Schools for 114 students. Number of teachers 7.1



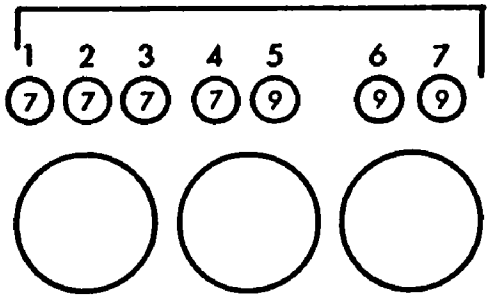
Schools for 94 students. Number of teachers 6.1



Schools for 74 students. Number of teachers 5.1

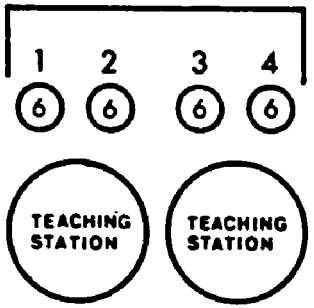


Schools for 55 students. Number of teachers 4.1

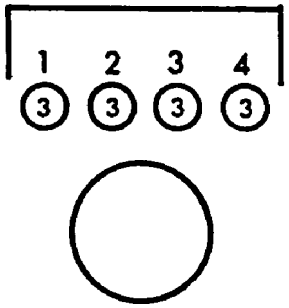


SCHOOLS TYPE 1-4, BASIC TEACHING STATIONS

Schools for 24 students. Number of teachers 1.8



Schools for 12 students. Number of teachers 1.0



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