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Survey of Land Holdings in Towns of Fremont and Boscawen, N. H.

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SUMMARY

In order to clear up the property problems in certain sections of the town, avoid the accumulation of disputable areas, and record the findings in a way which would be convenient and practical, the town of Fremont voted to have a property map made. It was decided that this would be based on a paced survey since this would give fair accuracy at a low cost. The work was undertaken in cooperation with the Experiment Station of the University of New Hampshire with the understanding that land utilization data would be taken at the same time especially for the Station.

Mapping in the field was given precedence over tracing out deeds as these were incomplete and hard to find.

The resulting map showed the features which would help identify the boundaries of each lot (fences, monuments, etc.) as well as the location. The owner and acreage of each lot was printed on the map.

Fremont was found to be 64½% woodland, 21% pasture, 11% hayland and improved land, and the remaining 3½% swamp.

The ownerships are typically either large or small, with comparatively few between 25 and 75 acres. About 15% of the holdings exclusive of corporations are in the 100-acre-or-over class, with an average of 240 acres, and cover five-eighths of the total area of the town.

The Boscawen map was made under the direction of the State Tax Commission to find out how much a township map of this sort would cost. The two surveys differed in some important particulars. The records of property holdings in Boscawen were available through the assistance of local surveyors. They were fairly complete and accurate. For this reason, these records were used in preference to work in the field. The chief difference between the finished maps was that the Boscawen one showed the position of the lines without indicating identification marks. A feature developed in connection with this survey was the card index system, through which the permanent record of the lots could be kept without changing the master map except when a lot was subdivided.

The results obtained from the surveys have been satisfactory in that they have recorded the facts with a fair degree of accuracy and at a low cost. It is estimated that this cost should range between 5 and 10 cents an acre, depending on the special aims of each town and the local conditions affecting the survey, especially as respects the type of ownership, the condition of the lines and records (deeds, previous maps, etc.).

In cases where such a survey is contemplated but only a small fund is available at the time, much can be accomplished by securing a base map, and plotting or sketching in the ownerships. Such a map would cost about $25 to $50, which would be offset by the saving in time when the complete survey was made. Such a map would be particularly valuable if note was made of the exact reference in the county records of each deed.

SURVEY OF LAND HOLDINGS IN TOWNS OF FREMONT AND BOSCAWEN, NEW HAMPSHIRE*

It is increasingly difficult for the administrators of towns to keep on hand the information they need concerning the lands within their boundaries. Chiefly this depends on a knowledge of the property lines and bounds; for, with these, the periodic work on the lots can be done with comparative ease. The decrease in the acreage of land actively farmed results in decayed fences, lower values and less interest on the part of the owner in the bounds and the land itself. This makes the information harder to get. The comparatively low value of the land does not justify spending much time on the problem, especially as other branches of the town business are requiring more time.

The result is that areas where ownerships are vague have accumulated in most towns and some lots have been forgotten completely. This condition grows steadily worse.

In addition to the need for information on property lines, land utilization data are valuable. For the most part this requires a compilation of the uses of land, as hayland, pasture, etc., together with a rough estimate of the amount of material produced. Usually no attempt to evaluate individual lots is made, but the general averages found are useful in many problems. For instance, they give a concise cross-section of how readjustments in valuation would affect the town as a whole, and would have been very valuable in estimating the effect of the recent timber-yield tax bill.

Several agencies which are studying the economic situation in order to suggest ways of utilizing the abandoned and unproductive lands need such data as a basis for their work.

A survey of the town can assemble and record the facts needed to help prevent the accumulation of wild lands, and can clear up a large part, if not all, of the areas already doubtful. At the same time, and at little additional cost, the data necessary for the utilization problem can be secured.

While these surveys do not attempt to settle disputes as to property, they do furnish the basis for further work.

Growing interest in these problems justifies a report of the work done in the towns of Fremont and Boscawen, New Hampshire. A statement of a similar survey of Durham has already been published.†

*Prof. K. W. Woodward of the University of New Hampshire directed the Fremont survey, and Mr. E. C. Hirst, secretary of the New Hampshire Tax Commission, the one of Boscawen.

The work in Fremont was done by Mr. C. E. Walker, assisted for a time by Mr. G. R. Hyde. Mr. P. M. Hodgkins was the agent of the Tax Commission in Boscawen.

The writers wish to express their appreciation of the cooperation of the townspeople, and of the Boston and Maine Railroad, which furnished blueprints of their right of way through Fremont.

†University of New Hampshire Agricultural Experiment Station Bulletin 255, 1931.

PURPOSES OF THE SURVEYS

The Town of Fremont, believing that it would do well to clear up the ownership situation in those parts where the lines were indistinct and owners doubtful, voted an appropriation to start a map of the town. The aim was, without too much expense, to straighten out the boundaries with the aid of the owners and others who knew the country, as well as by deeds and other records. A map was to be made showing the lines themselves, the name of the owner of each lot and any markers which would help in locating the lines and corners on the ground. They also wanted obscure lines surveyed out and established. This last object the present survey did not attempt.

The Experiment Station at the University of New Hampshire had just completed a survey of Durham for basic data on the land utilization problem, and offered to cooperate with the town and secure additional land utilization data from the Fremont survey. The Station also wanted to test the adaptability of the methods used in the Durham survey to this new problem.

The Tax Commission of the State undertook to make the map of Boscawen without direct action or financial aid from the town. The Commission had believed for some time that towns should have maps indicating the location of all properties within their bounds for assessment purposes, and in the spring of 1930 selected the town of Boscawen as one to be mapped. The particular reason for the selection of this town was because the southern part of it, especially the area in and around Penacook, had been surveyed and mapped by local surveyors who were willing to cooperate with the Tax Commission in making the map. The map was to be drawn by these men, who had invaluable information and records of the town properties, working with the agent of the Commission, who was to do the field work.

The objects of the Boscawen survey were somewhat the same as those of the town of Fremont. As it was to be the first one to be attempted in the State, it was meant to be a test of the adaptability of the method to the making of reliable maps at a low cost. Approximate costs, the best methods of procedure to be followed in field and office, the details to be shown on the map, a suitable card-index system and other information gained through experience would then be made available to any interested towns.

LOCAL CONDITIONS AFFECTING THE SURVEY

The methods to be used, the results obtained, and the costs vary with the conditions in the town as well as with the aims of the survey.

Fremont

The Town of Fremont is situated nearly in the center of Rockingham County on the Nashua, Worcester and Portland branch of the

Boston and Maine Railroad. It was originally a part of Exeter, but, with Brentwood, was set off in 1742. Later, in 1764, it was separated from Brentwood and incorporated as Poplin. The name was changed to Fremont in 1854.

The land is rolling, and in some sections flat enough to form swamps of considerable extent. There are few hills of any size. The brooks seldom flow rapidly, and are frequently swampy. The town is drained chiefly by the Exeter River, which passes through the southwestern section, swings around through adjoining towns, reenters in the northwest section, and passes diagonally through town to the southeast, where it flows into Brentwood at the Fellows Co. mill. The only brook of any importance is Red Brook, which drains Spruce Swamp and most of the central eastern section of town. It flows southward into the Exeter River. The northeastern section is drained by a series of brooks which form into the Piscassic River. Except where the river is dammed, there is only one body of water, Loon Pond, which is located in the northwest corner.

The topography under these conditions does not materially hinder mapping, except for the swamps. While most of the town is wooded, this does not badly interfere with walking, for there are few areas of thick brush or juniper. Here again the swamps, with thickets of blueberry bushes, offer the chief obstacle.

The type of ownership has a very important influence on the mapping. Originally Fremont was allotted by rangeways running approximately N 29 degrees E half a mile apart, the area between being divided into lots. While so little remains of these lots that their original size is a matter of record only, the present property lines do frequently run parallel to the original layout. This makes the direction of lines regular, and much easier to trace. Some of the rangeways are still property divisions and form the skeleton of the survey for these sections.

Individual holdings are usually either large, or comparatively small. There are relatively few between 27 and 75 acres. Fifteen percent of the landowners, exclusive of corporations, own 60 percent of the land. Small properties are either home sites, usually with well established bounds, or woodlots. For the most part the latter are bounded clearly by differences in growth or by monuments, and rarely by fences. The worst problems in town, however, grew out of a mass of small lots, the owners of which had cut the wood and allowed the "useless" land to die a natural death, as far as boundaries were concerned. Not infrequently the owners have died, leaving the land to non-resident heirs who are interested in them only at tax time. By the time the timber or wood is ready to cut again, the lines are quite likely to have disappeared entirely. Often some neighbors will remember the lot, but all too frequently they say, "If old Mr. ———— were alive, he could show you the whole thing", or, "If this had been done twenty-five years ago, there would have been nothing to it". It is difficult to say what would have been the condition twenty-five years from now if the facts now known had not been recorded.

Perhaps the worst part of the problem is not that lots and lines are forgotten, but that the bounds are allowed to decay or be destroyed until they are unrecognizable. Pole fences, no longer kept up, have commonly disintegrated to a mound in the earth, or not even that. Barbed-wire fences have fallen into the duff and been covered up. Stakes have rotted, spotted trees have fallen, been cut, or grown over the spot. Differences in the growth have varied until they are hardly distinguishable. Fire has cleaned out all traces of lines in several sections. Stone walls, the most permanent common line markers, are scarce in the woodlands.

On the other hand, several owners have re-established corners while the old markers were still distinguishable. This is frequently done with iron pipe or pins, or even with stone bounds, and will save much bother and expense later on. Where there is no accurate surveyor's description, and where no trace can be found, it is exceedingly difficult to replace a corner.

While the lines, for the most part, were easily discernible, in some backwoods areas it often took a week to find lines which could be mapped in a day or so. This was the expensive part of the survey, and the most valuable when successful.

Boscawen

Boscawen presented a rather different situation. This town, in Merrimack County, lies just north of Concord, and is bounded on the north by Franklin and Salisbury, on the east by Northfield and Canterbury (the boundary line being the Merrimack River), and on the west by Webster.

The village of Boscawen, commonly called Boscawen Plains, extends about two miles along the Daniel Webster Highway close to the Merrimack River. The southeastern portion of the town lies in Penacook, a separate village which includes parts of both Boscawen and Concord.

The topography is quite hilly and rough except in the eastern portions along the river. All but the southwestern section of the town is accessible by roads. This area is an extensive woodland, largely cut over, accessible only by logging roads. The land is well drained with few swamps.

The original grant of Boscawen was made to about eighty of the first settlers, known as the proprietors, by the government of Massachusetts Bay in 1733. The land was surveyed and divided among these proprietors, each allotment being called a "Proprietor's Right". The lots were very irregular in size and shape, although some attempt was made to divide the town by lots and ranges. Many of these lots were walled in, and it is surprising to see how many of the lands today still follow the original boundaries.

A record of the measurements of these proprietors' rights was available in the office, and proved to be very valuable in checking with deed descriptions.

The farms and timber lots along the river and in the northern portion are fairly large, averaging from 75 to 100 acres. Little subdivision has taken place in these sections, many of the farms having been handed down from generation to generation with few changes.

The smaller ownerships are naturally found nearer the villages.

The boundary lines consist of stone walls, fences, brooks and roads. In most cases boundary lines are well defined, the exceptions being where lots were subdivided and portions sold off without being marked. Generally, the boundaries between timber lots are recognizable by the variation in timber growth even though there are no walls or fences. The large number of stone walls helped greatly in making this map.

Probably the most important factor in the low cost of the survey was the fact that property records were collected in the offices of local surveyors who themselves knew the town very well and were willing to help in every way to build the map.

METHODS

Fremont

The first step in each survey was to make a base map which showed the position of the roads, railroad, main streams, houses, etc. Then the distribution of ownerships had to be determined, and later entered on the map by plotting or field work. After that was completed, a final map had to be drawn.

For the base map of Fremont, on which the final paced map was built, the Pawtuckaway sheet of the U. S. G. S. topographical sheet, enlarged to the scale of eight inches to the mile, was used for the northern third of the town. The Haverhill sheet, covering the southern two-thirds, was not accurate enough in detail, so a traverse-board map of the roads and railroad had to be run out as a base for this area. This took about a week, but was indispensible. Since then, work has been completed for a more accurate map to replace the old Haverhill sheet.

The special problem of the Fremont survey was to hunt out the property lines. Even in the areas where the lines were well known, it was necessary to trace them out in some way with someone acquainted with the country before any mapping could be done. Where they were not definite it was necessary to search for all the evidence available, in the form of records as well as on the land itself, before mapping.

Several sources of information were offered for securing the necessary facts. The most dependable and satisfactory was to go onto the land with someone who knew the country, follow out some of the lines, see important corners, and generally get the lay of the land. Then, with a sketch of the property division as a guide, it was not difficult to pace out the map. The willingness of the townspeople to take time for this work is greatly appreciated.

Some of the areas were covered by plans previously drawn from surveyor's descriptions taken from deeds. After finding a few points on the ground which were represented on such a plan, it was fairly easy to check the rest, and transfer them to the map. All such plans had to be checked, however, for the data given in the deeds on which they were based were rarely complete as to directions and distances. Also, the compass directions were not strictly dependable, since these were based on magnetic, and not true, north, and the magnetic declination changes appreciably in a few years.

In the same way deeds giving surveyor's descriptions were very valuable, but had to be checked. To follow these it was, of course, necessary to have at least one corner of the lot known from which to work.

Frequently the owner of a lot would describe the bounds, with directions as to the best way to find them, and sketch out the ownerships around that section. Often this worked out very well; but where the lines were not distinct, or the bounds were at all hard to find, it was usually difficult to get good results without spending considerable time. On the other hand, of course, this method required less effort on the part of the owner.

Details mentioned during casual conversations concerning the survey proved very valuable at times in locating a bound or settling some questionable ownership.

Deeds without surveyor's descriptions, giving only adjoining owners, now or formerly, possibly a stake and stones or two, and the approximate acreage, were found to be of value only to supplement other data. They usually helped to finish out areas which were partly known and often supplied details even to those lots which were well established. They did not, however, give enough data to place the lot and its boundaries definitely without evidence from other sources to support and clarify them. At best they could not be accepted without careful checking in the field. It is seldom that all the deeds for a region are available; some are not recorded, and some have been handed down by inheritance for generations. Often where one man has traded lots frequently in a section his name will appear on nearly all the deeds for that time, either as owner or adjoining owner. This can be exceedingly confusing. Deeds of this sort are quite likely to be incorrect in some detail. In spite of these limitations, any deed is of assistance, and quite often will supply the information which is needed.

In the actual work, all these sources of information were helpful, that one being selected for each problem which seemed most likely to work out correctly with the least difficulty. Where the lines were definite and unquestioned, going over the ground with someone familiar with them was quick and usually satisfactory. The oral description was often all that was needed. Old maps and deeds were very valuable where they were available. Where there was any doubt, it was usually necessary to check one sort of evidence against another, with a final check in the field.

The actual mapping was done by pacing with a hand compass. While this seems at first to be too inaccurate for very good results, it was possible, by constant checking to well established points, to compensate errors so that the final map was quite accurate, especially where property divisions corresponded to the old lot lines. It has been found that it is more accurate to follow cardinal directions than to follow the line itself and record the compass direction. By crossing the line in several places several points on it are established, and the rest can be drawn in from them. This allows the map to be drawn up in the field, where any obvious errors can be checked and corrected immediately.

Figure 1 illustrates the method, indicating by arrows the path to be followed in mapping. The line shown starts as a barbed wire fence heading southwesterly, joining onto a stone wall which heads northwesterly. At the end of the wall, the line continues as a change in the growth due to recent cutting to the edge of a swamp,

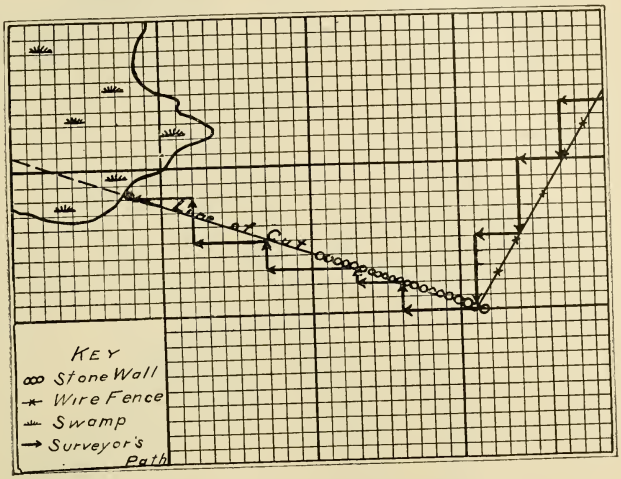


FIG. 1. Example of method used in Fremont mapping.

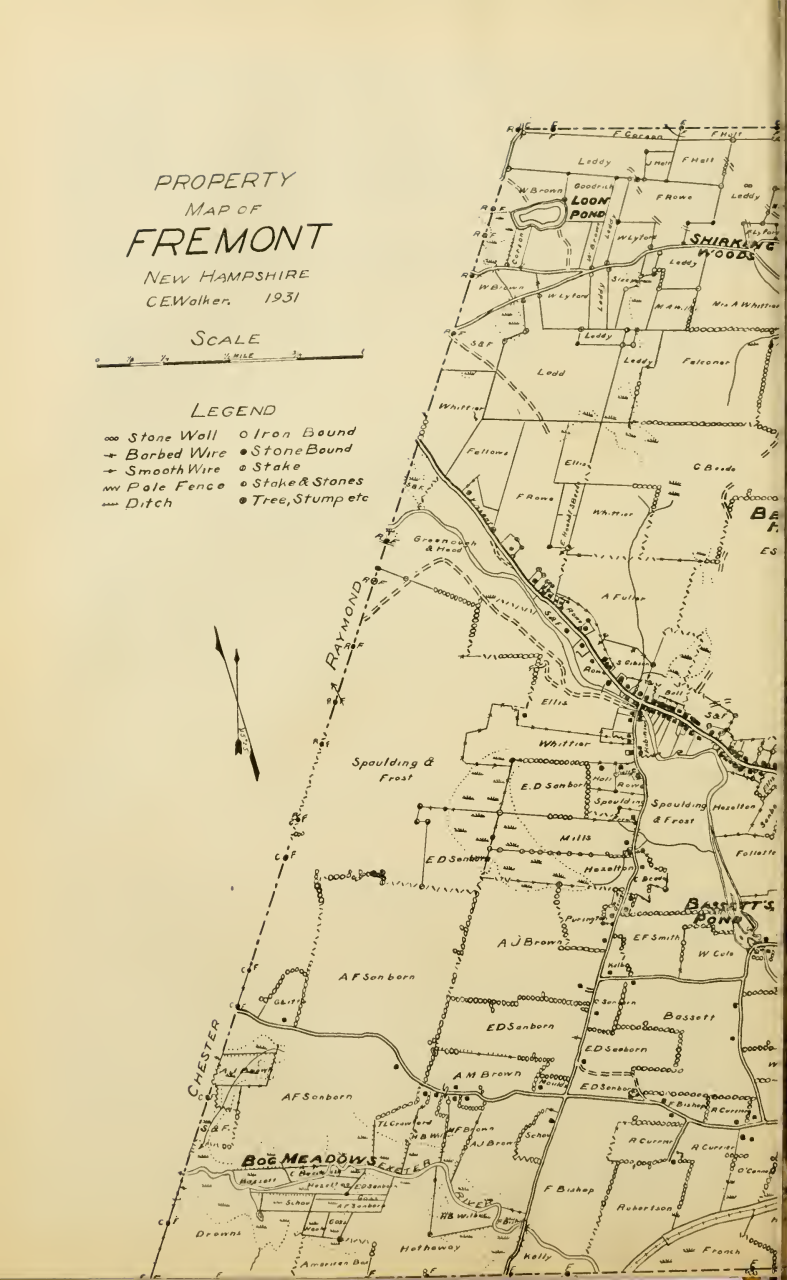
where there is a stone monument. The line continues into the swamp, but is somewhat doubtful, and obscure.

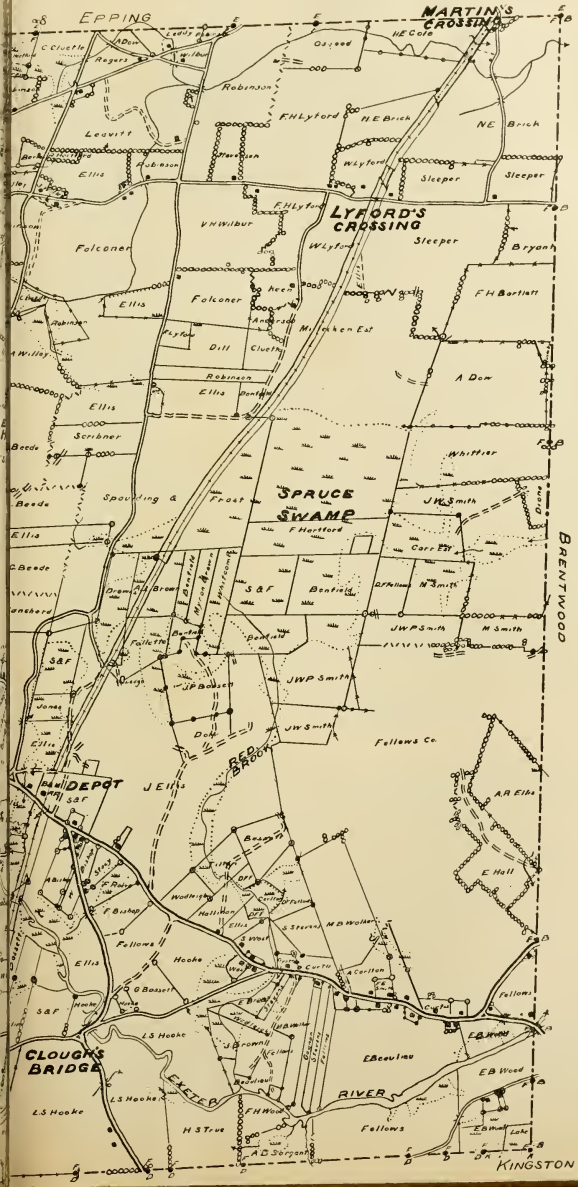
A more complete description of the field methods is given in the Durham bulletin.*

The problem of present land use required assembling data for a map to show the uses of land, independent of property lines. To do this, all changes in the kind of land use (hay to pasture, etc.) noticed in mapping the property lines were recorded in the field book. Where the lots were so large that they could not be mapped completely from this data, special strips had to be run across the center to map the interior. These strips also acted as checks on the accuracy of the pacing. Changes between hayland, pasture, hardwoods and pine were the chief classes recognized. Open, well grassed pasture (recorded as first class) was separated from that which was poorly grassed (second class) or partly covered by tree growth (wooded) The woodland areas were divided roughly as to age and density of white pine.

The classification used in the Durham survey was followed except for the division of open pasture into first and second classes.

*University of New Hampshire Agricultural Experiment Station Bulletin 255, March, 1931.


PROPERTY
MAP OF
FREMONT
NEW HAMPSHIRE
C.E. Walker. 1931
SCALE
LEGEND
Stone Wall
Barbed Wire
Smooth Wire
Pole Fence
Ditch
Iron Bound
Stone Bound
Stake
Stake & Stones
Tree, Stump etc
LOON POND
SHIRKING WOODS
RAYMOND
CHESTER
BASSETT'S CORNER
BOG MEADOWS
Spaulding & Frost
A J Brown
A F Sanborn
E D Sanborn
A M Brown
F Bishop
Robertson
Bassett
Leddy
Falconer
Fellows
Whittier
Greenough & Head
Mills
Hazelton
Hathaway
Kelly
French


EPPING
MARTIN'S CROSSING
LYFORD'S CROSSING
SPRUCE SWAMP
BRENTWOOD
DEPOT
CLOUGHS BRIDGE
EXETER RIVER
KINGSTON
Robinson
F H Lyford
W Lyford
Sleeper
Falconer
Ellis
Frost
Benfield
JWP Smith
JW Smith
Fellows Co
Hooke
L S Hooke
E Beaulieu
E B Wood
H S True
A D Sergeant

Boscawen

The general methods of the Boscawen survey differed from those used in Fremont chiefly in the manner of obtaining property data. In this town the records - deeds, plans and maps - for a large part of the town were available and were used as the chief basis for the map instead of working the lines out on the ground. A copy of the original proprietor's record map was secured, and an enlargement of the U. S. G. S. topographic map was made to the same scale. This government map is the most accurate obtainable, and was used as the base map on which to plot the properties.

Several weeks were spent at the County Court House looking up and copying deeds of all known properties. Then all tracts which were described in the deeds well enough to be located accurately were mapped as well as those of which old maps were obtainable. The proprietor's record map was used as a check, as many of the deed descriptions referred to it. Where present deed descriptions were vague and unintelligible, the deeds were traced back for a period of years; and, in many cases, good survey descriptions or references to the original allotment were found.

When the supply of records was exhausted, the areas still unaccounted for were mapped with a hand compass and pacing. Land-owners and all others who were able to give helpful information were interviewed. Where lines or corners were not known it was often possible to locate them by a process of elimination whereby the adjoining owners' lands were mapped, leaving the land in question as the remainder. No attempts were made to indicate by symbols the different types of fences or corners, as it was considered an added expense and would necessitate checking lines on the ground which would not otherwise have to be examined, particularly where recent accurate surveys had been made.

RESULTS

Maps

The most important result of each survey was a property map. The roads, rivers, important brooks, ponds, swamps, buildings, railroads, etc. formed the base, with the network of property lines superimposed. On the Fremont map, any identifying markers, such as fences, walls, changes in the growth or ditches were indicated by symbols. Established corner bounds - stone, stakes, iron pins, pipes, trees, etc. - were similarly represented. Woodroads, or paths, brooks, or other features, or any description which seemed necessary to identify and help locate bounds were also included.

It was felt that such a map would be the most convenient method of dealing with any property problem which might come up, either by avoiding the need of actually going onto the lot, or, when this was necessary, by helping in finding the lot and its boundaries.

In form, the Fremont map was drawn up in sheets each representing one square mile (eight inches square, the scale being 1 inch to 1-8 mile, 10 chains, 40 rods or 660 feet). These sheets were then mounted on cloth so that the map could be hung on a wall or folded up for convenience in storing.

TABLE 1—Classification by size and number of land holdings in Town of Fremont

Class of Properties	Principally in Fremont		Partly in other Towns		Total		Average size of ownerships	
Privately owned	Acreage	Number	Acreage	Number	Acreage	Number		
0-5 acres	130¼	74	21½	6	151¾	80	0-5	1.76 acres
5-25	435	34	234½	18	669½	52	5-25	12.79 "
25-50	385¼	10	413¾	12	799	22	25-50	38.52 "
50-100	681½	9	495	7	1176½	16	50-100	75.72 "
100 and over	5288¼	22	943¾	7	6232	29	100 and over	240.37 "
TOTAL	6920¼	149	2108½	50	9028¾	199		46.44 acres
Corporations					2052¾	9		
Water (Loon and Bassett's ponds)					22½			
GRAND TOTAL					11104	208		

The reproduction of this map included in this report is on so small a scale that it is impossible to include details shown on the original, but it does illustrate the general features of the town and its property divisions as represented on the larger map.

In connection with this map a list of owners was made, giving the acreage of each lot owned by each man.

As a basis for the study of present uses of land, a separate map was made showing the distribution of cover classes. This was drawn on the same base, and with the same scale, as the property map, but did not show any property lines. It was in looseleaf form, each leaf representing a square mile. While this could not be used as a wall map, it is convenient for general reference and easily filed.

It was from this type map that the tabulations were made on which the utilization study was based.

The property map completed in the Boscawen survey shows the ownership divisions as dot and dash lines. Each tract has been numbered, and a card with the corresponding number placed in the card index file. Because of the large number of house lots and village homes, it was found impracticable to show them on the town map with any accuracy, so separate maps of the villages of Boscawen and Penacook were made, using a scale over three times as large as that of the main map. This enables the lots to be shown in detail which is to be desired as they have a greater value per acre than the outlying farm and timber lands.

Card Index

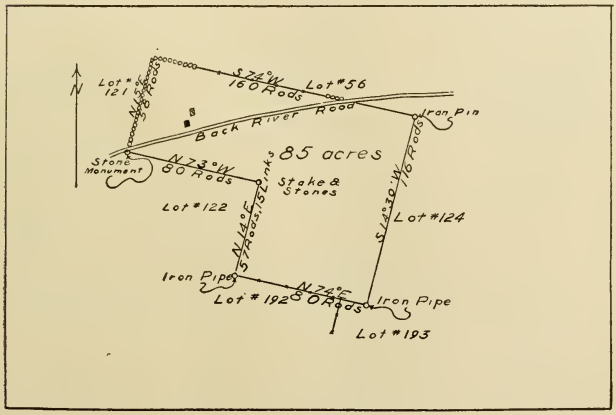
A card index system has been completed, using a card for each tract of land. A number is placed in the upper right hand corner of each card to correspond to a number on the map. On the left hand side is a column for the names of owners, the present owner being the last entry. The center of the card is arranged to show how the land changed hands. If by deed, the date, and volume and page number of its registry in the county records is indicated. If the land came to the present owner by inheritance, this is shown. If title is now held by inheritance, the previous transfer by deed should be shown so that a reference to a deed is always available. The acreage is entered in a column on the right hand side of the card.

Figure 2 represents the system used. By this hypothetical illustration it will be seen that on April 7, 1871, John Smith bought from George Jones, a one-third undivided interest in a tract of land containing 85 acres and shown as Lot No. 123 on the town map. The deed was recorded in Volume 352, on page 61 of the county registry. On the following day Smith bought the other two-thirds interest to this lot from Alma Carlson, and the transfer was recorded on the next page of the same valume. At John Smith's death, the lot was left to his married daughter, Mary Wilkins. On May 24, 1900, she sold the lot to Frank Brown, and the deed was recorded on Page 5 of Volume 402. Carl Butler, administrator of the estate of Frank Brown, sold the lot to Roy Grimes in settling the estate, and Grimes sold it to Alcide Dubois. Since Dubois' death, while the estate is yet unsettled, the lot has belonged to his heirs.

Lot #123

Ownership	Date of Deed	Register Vol	Page	Acreage
John Smith & George Jones (½ undivided interest	April 7 1871	352	61	½ of 85
" " & Alma Carlson (½ undivided interest	April 8, 1871	352	62	½ of 85
Mary (Smith) Wilkins by	Inheritance			
Frank Brown & Mary Wilkins	May 24, 1900	402	5	85
Roy Grimes & Carl Butler (Admr F Brown Est	June 14, 1918	423	472	85
Alcide Dubois & Roy Grimes	Nov 15, 1925	400	269	85
Alcide Dubois heirs				

Sample Index Card
Front



Back

FIG. 2. Sample card used in Boscawen study.

PRESENT USES OF LAND

Uses of land in the town of Fremont were studied to give basic data for land utilization problems.

Fremont has never been primarily a farming town. It has a few large farms, but the backbone of the town is in its wood-using industry. Sixty-four percent of the town is wooded, and has furnished material not only for Spaulding and Frost's cooperage mill, but for other industries in the neighboring towns. Fellows Co.'s wood heel and box factory and the brickyards of Epping are examples.

TABLE 2. Summary of types of land in Town of Fremont.

Classes	Acres		Percent
Hayland and improved land		1255½	11.3%
Pasture, 1st class	367		16%
2nd class	260¾		11%
Wooded	1697¾		73%
		2325½	20.9%
Meadow, swamp and water		366	3.3%
Woodlands			
Pine	1108¼		15½%
(Merchantable)	(774)		
Hardwoods	5261		73½%
(Merchantable)	(2786)		
Cutover	787¾		11%
		7157	64.5%
TOTAL		11,104	

There are several commercial poultry plants in town, but as these take up comparatively little land they are not important in a land survey.

There is a distinct tendency for the cutover lands to come in to hardwoods rather than to regenerate to pine. At present nearly three quarters of the woodlands are hardwood, and 11 percent recent cutover. Only 16 percent is pine. Forty percent of the pine lands are merchantable, and 70 percent would produce some boxboards. The pine is allowed to grow older before cutting than is the case in a good many towns, which means that the cut is of better average quality.

There is quite evidently a deficiency in young and growing pine. The uplands are excellent pine lands, but hardwoods, topping the seedlings at the start, crowd them out. While pine has been overemphasized, Fremont is placed in an unusually favorable position by the dependable market offered by local industries.

Of the pasture land about three quarters has enough tree growth usually pine, to hinder the growth of grass. About 16 percent is well grassed, and the rest is partly choked by juniper and other shrubs. The capacity of these pastures is probably in excess of the needs of the 185 cattle in the town.

About 500 of the 1100 odd acres of hayland, excluding the area used for mills and residences, is producing fairly well. Here, too, the estimated total acreage is more than adequate for the needs of the present amount of stock.

Unlike other towns, and probably because of its tendency to use only the best lands for farming, Fremont has few "abandoned" farms. Ownerships which pass out of active use by one family are usually bought into neighboring farms.

TABLE 3. Estimate of merchantable standing timber in Town of Fremont.

	WHITE PINE bd. ft.	HARDWOOD Cords
PINE		
40 yr.	2,887,000	91
50 yr.	6,742,000	211
60 yr.	1,435,000	104
Uneven-aged	575,000	73
	11,639,000	479
HARDWOOD		
30 yr. class	79,700	4,150
40 yr.	211,500	825
50 yr.	12,200	818
Uneven-aged	672,400	3,444
	976,000	9,231
PASTURE		
40 yr.	1,076,700	218
50 yr.	1,327,500	
Uneven-aged	194,700	62
	2,598,000	280
TOTAL	15,213,000 bd. ft.	9,990 cds.

DISCUSSION

Is this type of surveying practicable?

It accomplished the work it set out to do, i. e., to record the ownerships in a way that was satisfactory to the town.. There was, however, one of the purposes for which the appropriation was made which the survey did not attempt to fulfill - that of establishing obscure lines on the ground. That requires more accurate instruments. The survey did record information from which those lines could be run out. These instances were comparatively few, and it was decided that it would be more economical to make up the map

as a whole, and to enter on it any descriptions of lines which were run out or re-established later, since this would minimize the more expensive surveying.

Now that the information for the whole town has been recorded, there is much less chance that the unsurveyed lines will be forgotten completely, even if they are not actually established until needed for cutting off the wood, sale, or other reason.

Many of the lines and bounds which are not well established can be repaired by the owners before they become completely obscure, and save or lower the cost of a future survey.

While the methods used in surveying other towns would vary with the conditions in each town, as well as with the detailed aims in view, the general method seems to have proven successful. A U. S. Geological Survey topographic sheet, enlarged, seems the best usually available base map. The scale should vary with the town, in order to make the final map of a convenient size for reference. For the average sized town, 8" to the mile is convenient. This scale gives sufficient detail, and will not be too large except in towns of 20,000 acres or so. It is convenient in that a square inch represents exactly 10 acres, and a tenth of an inch equals one chain, (66 feet) the unit usually used in pacing. When this scale is not applicable, a multiple is recommended. Inserts or special maps showing the congested parts of the towns on a larger scale may be desirable.

The conditions in each town will determine which sources of information concerning property lines will be the best to use. It seems advisable to go over the roads, at least, mapping the ends of property lines and getting a general idea of the layout of the town. At the same time, talking with the owners, in order to get the history of the areas, copies of deeds, etc. will secure much valuable information. In this way data needed in making out the card index can be obtained. If copies of deeds, plans, etc., can be collected beforehand in one place - say at the selectmen's office - much time and expense can be saved.

The main problem will be to decide whether it is more feasible to do most of the work on the ground or in the Registry of Deeds. If the records are available, and someone who knows the country well enough to tell where each deed fits in on the map will help, more accurate results can be obtained by basing the work on these. If, however, the records are fragmentary, or accurate surveyors' measurements are few, and it appears that the lines on the ground are easier to find than accurate deeds, this plan is the one to use. Ordinarily some sections of a town will suit one system, others another.

The low cost of the paced survey is, of course, its chief argument. The cost of any map will depend on the conditions, especially as to how well the property divisions are known and whether or not there are accurate records covering most of the town to go by.

Fremont, with 11,100 acres, took 1100 man hours all told. About two thirds of this was spent in collecting data and field mapping, while one third was necessary to draw up the maps and reports. This is, of course, exclusive of the time spent in preparing this bulletin. Several weeks were spent in one area which could have been completed in a day or so if the lines had been well known and in good

condition. The base map of the southern part of town, which ordinarily would be unnecessary, took another week. This town could have been done commercially at a rate of 10 cents an acre.

The cost of the Boscawen map was between 7 and 8 cents an acre. The Tax Commission believes that this could be lowered to 5 cents in another survey under similar conditions.

These seem to present the two extremes. Not only was the property situation in Fremont much worse than that in Boscawen, but more was required. The land utilization data, and the attempt to map anything which would identify the lines on the ground both took time. . There are so many factors which may affect the cost per acre that each town is a separate problem. In some of the northern towns where ownerships usually follow the original layout, where the average owner holds a comparatively large tract, where the records are fairly complete and the topography not too rough, five cents may be too high. This is especially true of towns whose lands are largely included in the National Forest. On the other hand very bad property tangles may raise the cost over ten cents.

In another survey, we would recommend changing the form of the card index system slightly. The main features would remain the same, but it is suggested that a rough plan, at least, of the lot should be drawn on the back of the card, which would show features given in the deed, the card index numbers of adjoining lots, the acreage as closely as possible, and any other features which may be desired, such as monuments, notes as to the type of land for assessment purposes, or buildings. Perhaps a copy of the map, blueprinted, could be cut up, and each lot pasted on the back of its index card to serve this purpose. Figure 2 illustrates a completed card. A separate index to the file by owners would make it easier to locate individual lots.

It is likely that some towns will be interested in making a map, but will not feel in position to spend much money toward it at the time. In such cases the Tax Commission recommends buying a base map on which the lots can be plotted or sketched by residents or local surveyors. . This would preserve on paper much information which might be lost before the more accurate map could be undertaken. The cost of this map would certainly be made up in saving of time when the survey was made. . This cost, for a map showing roads, railroads, main streams, buildings and town lines raised to the scale planned for the completed map, would be between $25 and $50 for towns covered by fairly recent typographical maps of the U. S. Geological Survey..

If the registry reference to deeds to each lot were written on this sketch, and notes as to any other valuable information, such a map would be still more worth while.

It is estimated that it would take somewhat over $400,000 to map the entire state of New Hampshire, with its 5,646,051 acres, according to the method used in these two surveys– about 6-100 of 1% of $625,000,000, the total valuation for the State. The more expensive and the more valuable work would be in the southern, and especially the southeastern section where the settlements are older and the property divisions more irregular.