

SURVEYORS' MANUAL

FOR THE

EXCLUSIVE USE AND GUIDANCE
OF EMPLOYEES



SANBORN MAP COMPANY

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Key of Symbols.
Introduction.

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INTRODUCTION

Sanborn Maps are the standard fire insurance maps in the United States. They are used universally in fire insurance underwriting. Various descriptions, symbols, etc., designate the character of fire insurance risks of all buildings.

Our customers rely upon the authenticity of our publications. Surveyors must realize the necessity for the highest degree of **accuracy and thoroughness**. If these characteristics are cultivated, our high and long established standards will be upheld.

The information reported is technical and surveyors must keep in mind the ultimate use to which our publications are to be put by our customers.

The corporation accepts your report of conditions in the field without question. We can only publish into a finished product that which the surveyors produce in the field. We are entrusting you with the opportunity to either improve or impair the **high standard** that has been attained by this company and sincerely believe that you will do your part to maintain this **high quality**.

There are thirteen chapters and diagrams illustrating various points in this Manual. Each chapter treats individually certain phases of our work. It is your duty to **know your Manual** and to apply its various instructions. Make the study and application of it one of your important tasks.



CHAPTER I

GENERAL INSTRUCTIONS

A thorough knowledge of the various chapters in this Manual, whether you are making new work, correcting old work for reprint or correcting work for pasters, is necessary before a surveyor can take up or do satisfactory work in the field.

Our maps are the standard insurance publications of the insurance field and used universally by them. Therefore, uniformity is essential and can only be obtained by a knowledge of the contents of this Manual as to what is required and how it is to be shown. Information cannot be placed on our maps according to individual ideas but must be shown in a uniform way if our maps are to serve the purpose for which they are intended.

In your work, keep upper-most in your mind these requirements: **Accuracy, Thoroughness, Neatness, Uniformity and Adherence to Manual Requirements.**

1. **Hazards** The fire insurance inspection and rating bureaus employ inspectors to make reports on the physical conditions of hazards. Our surveyors, on the other hand, have the duty of outlining that which exists on the ground at the time of the survey, and should make no comments on the nature of the hazards.

2. **Letter of Identification** When you are required to inspect private property remember the owner has the right to inquire why you are on his premises. Do not force your way but make a courteous request, explaining your mission.

(a) The management will endeavor to furnish you, at the beginning of each year, with an introductory letter from the rating organization operating in your territory. In the absence of such identification, a letter, explaining the nature of your work, from some local source, such as well-known agent or agents, secretary of local board, or public official should always be carried with you.

Always call at police headquarters, explaining the nature of your work. You are a stranger, usually, in the place where you are working and a knowledge of your presence by police department may save you much time and embarrassment.

(b) Example of form letter:

(Date)

To Whom It May Concern: The bearer, John Doe, is an employee of the Sanborn Map Company of New York. They are publishers of fire insurance drawings and surveys used by fire insurance companies throughout the United States in underwriting their business. Kindly permit him to enter your premises for this purpose and give him such information as he may need to make his work complete, and oblige

Yours very truly,

3. **Permission or Passes** We advise, except in uncommon cases, that surveyors inform their management when permission to do their work will have to be ob-

tained from outside of the place where they are working. Give type of risk, name and address where such permission may be obtained. If the letter is to be addressed to an individual of a company, be sure to give such name.

4. **Agents** Surveyors should call on one or two of the principal agents in the city where they are working. The agent can often be of help and occasionally you can ascertain if there is anything special to be done with the map. **Never promise to do any additional work until approved by the management.**

5. **Completing Work** All work must be finished completely in the place map covers and shipped from that place. Finishing up a map in another

locality often leads to guess-work of necessary information. If there is any reason why this is not done, advise at time of shipment.

6. **Shipment of Maps** Maps are to be shipped **flat or folded**, never **rolled**, and are to be shipped by **express** collect.

If charges are demanded at point of shipment, include same in your account current, giving name of map or maps involved. Express receipt is to be mailed at once to your office. Write on receipt name of map or maps covered by shipment. If express agent demands a valuation, give same as \$50.00 on each package shipped. If mail is used, **register or insure** package, sending receipt to your office. The company carries insurance against loss in hands of a common carrier (railroad, express company or trucking company) and parcel post.

7. **Departments** The work of our corporation is divided into three geographical departments:

(a) The Eastern Department covers the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, The District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Tennessee and Kentucky. **Address—Surveying Department, Pelham, New York.** **Address all mail to company, never to an individual.**

(b) The Central Department includes the states of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Arkansas, Wyoming, Colorado, and New Mexico. **Address—676 St. Clair Street, Chicago, Illinois.**

(c) The Pacific Department comprises the states of Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, Washington, the territories of Alaska, and the Hawaiian Islands. **Address—64 Pine Street, San Francisco, Calif.**

8. **Surveyor in Charge** On all classes of work where a surveyor is placed in charge, other surveyors are under his direct supervision and must be responsive to any work he assigns to them. It is his duty, under instructions from the management, to fix hours for work, plan, examine and criticize all work and report any dereliction of duty on the part of any of his associates. Each surveyor must follow his instructions not only as to the work in general, but as to work on such days when outside field work cannot be accomplished on account of climatic conditions. The surveyor in charge must have absolute control if the work is to achieve success. A wise ad-

ministration of his duties will be upheld by the management.

9. **Reports from Surveyors** (a) **WEEKLY.**—**Mail at end of each week.** Fill in all information. Specify number of sheet or sheets worked on each day of week. If plotting, finishing or other work, note same and day. **Days of inclement weather** are not holidays but should be used for inside work, etc.

(b) **ACCOUNTS CURRENT.**—**Mail at end of each month.** If during a month you have a leave of absence extending beyond the last day of month, submit your account current at completion of last work completed during month.

(c) **MONTHLY REPORT.**—Send in with account current, properly filled out.

(d) **SALES REPORT.**—Required with new town map work and is to be sent in with survey.

Pacific Department: Reports are required with all maps.

(e) **PRELIMINARY BOUND VOLUME CORRECTION REPORT.**—Send in by mail when requested.

(f) **PRE-SURVEY REPORT.**—Applies to Eastern Department only. Fill out carefully and attach to map.

(g) **FINAL SURVEY REPORT.**—Fill out one for each completed survey and pin to key sheet. We place additional information on these reports concerning coverage of town, date and class of next work and other valuable information for future reference. They are then filed away until succeeded by a subsequent report.

10. Standard Basis of Work.

1 standard 50' scale sheet equals one unit

NEW

1 sheet @ 50'	equals	1 standard 50' sheet	
1 " @ 60'	"	1 $\frac{1}{4}$ "	50' sheets
1 " @ 100'	"	2 "	50' "
1 " @ 120'	"	2 $\frac{1}{2}$ "	50' "
1 key map	"	2 "	50' "

REPRINT

1 sheet @ 50'	equals	$\frac{1}{2}$ standard 50' sheet	
1 " @ 60'	"	5 " "	50' "
1 " @ 100'	"	1 "	50' "
1 " @ 120'	"	1 $\frac{1}{4}$ "	50' sheets
1 key map	"	1 "	50' sheet

BOUNDED MAP CORRECTIONS

9 sheets @ 50'	equal	1 standard 50' sheet	
7 " @ 60'	"	1 "	50' "
4 " @ 100'	"	1 "	50' "
3 " @ 120'	"	1 "	50' "
4 key maps	"	1 "	50' "

TOWN MAP CORRECTIONS

6 sheets @ 50'	equal	1 standard 50' sheet	
3 " @ 100'	"	1 "	50' "
3 key maps	"	1 "	50' "

MISCELLANEOUS

6 plotted sheets @ 50'	equal	1 standard 50' sheet	
5 " @ 60'	"	1 "	50' "
3 " @ 100'	"	1 "	50' "
2 " @ 120'	"	1 "	50' "
3 pre-surveys	"	1 "	50' "

In all classes of work a sheet drawn to a scale smaller than 120' receives the same credit as a 120' scale sheet.

11.

Accidents

In order to secure the full benefits under our Workmen's Compensation Insurance Policies, it

is necessary that you immediately report all accidents, occurring during the course of your work, and all injuries incurred, no matter how trivial. Do not hesitate to consult a doctor at once as these policies cover reimbursement for all proper medical expense due to injuries incurred during working hours. If time is lost as a result of an accident, you will receive compensation in accordance with the Laws of the State in which you were working when the accident took place.

12.

Sickness

Compensation for sick leave will be made at the discretion of the management.

13.

Vacation

Vacation leave of fourteen (14) days on full salary is given each calendar year, providing a surveyor has been in our continuous employ for not less than two (2) years. Vacation leave, for less than two (2) years service is at the discretion of the management. Vacations are **not cumulative** but must be taken during calendar year and at such time as meets the approval of the management, preferably all at one time.

14.

Addresses

Give your address on every communication to the office. If mail address is **General Delivery**, send in your local address. We have many occasions when we want to reach surveyors with as little delay as possible. Leave a forwarding address at each town you are leaving.

15.

Supplies

Necessary supplies, including reports, are furnished for all of your work. Always have a full supply

on hand. We reserve the right to approve or disapprove the cost of any supplies purchased for which no authorization has been given.

16.

Prices of Maps

customers.

17.

Copy of Map

Never promise a copy of a map to a local agent. This is a matter between the agent and his company. A copy will only be forwarded on request of his companies when one or more than one have purchased a copy.

18.

Letter of Instructions on Map

Return, with completed map, all letters or instructions sent, with map or by mail, to you.

19.

List of Maps

Survey maps in order given on list. No change in order is permitted without approval of management. **Ten days** notice should be given when requesting additional work. When word, "original", is noted after town, it means we have never mapped town before.

20.

Photography

We are equipped to change scale of any work submitted by photographic apparatus in the publishing plant. Clear and legible copy is necessary. Blue prints can be photographed but they are not good copy. Whenever possible, send us black and white copy.

21.

Manual

This Manual is for the exclusive use of our surveyors. Do not loan or give it to anyone. You

are responsible for its safe keeping. When you leave our employ, it must be returned before your account will be closed. If it is lost, notify us at once, stating facts. Additional copy will be charged for if reasons are not satisfactory.

22. **Suggestions** The company is always anxious to keep in touch with new types of construction, new building materials, new ideas or anything for the improvement of our product.

If any part of this Manual is not clear, write for further information.

We want our surveyors to feel free to write us any time concerning any question that may arise regarding their work.

We appreciate information in regard to needs for work on any of our publications for such changes as street numbers, street names, extensive damage caused by fire, tornado or floods, extensive building operations, insufficient coverage and other reasons. Be sure to state whether information is from your own knowledge or from another source.

23. **Visits to Office** A cordial invitation is extended to surveyors to call at the office if working in the vicinity or passing through city where office is located. Personal contact is good for the surveyor and the management too.

CHAPTER II

PRIMARY POINTS

1. **Parts to be Mapped**
 - (a) The most important parts of a town or city to be mapped are those containing the business or mercantile buildings, the congested dwelling sections, and all manufacturing plants or "specials," as we shall hereafter designate them. However, all the territory that is built up within the corporate limits should be mapped.
 - (b) If built up sections or "specials" exist beyond and reasonably contiguous to the corporate limits, they should also be included unless shown on another map. It often happens two or more towns in the same county are separately mapped, in which case proximity to a town should determine in which map they should be shown.
 - (c) Isolated state institutions on which there may be no insurance, often include manufacturing plants on which insurance is written. In such cases consult not only the local agents but the superintendent of such institutions.
 - (d) Do not omit from a new map any existing risk shown on the old (previous edition). If any detached risks on the old are destroyed or in ruins and abandoned, and therefore need not be shown, make a note to that effect on the back of key sheet. This

information will enable us to answer any inquiries in regard to same.

(e) In case of doubt as to what to include, communicate with the management.

2. **Standard Size and Scale of Sheets** (a) The standard size of sheets of survey paper is $20\frac{3}{4} \times 24\frac{3}{4}$ inches, cross-sectioned sufficiently accurate for scaling in one-fifth of an inch squares. (See exceptions

Chapter XI, Article 8.)

(b) The standard scales are 50 and 100 feet to an inch, hereafter referred to as the **large** and **small** scale. (See exceptions Chapter XI, Article 9.)

(c) When sheets or sections of sheets are drawn on a scale other than 50' to an inch, scale on such sheets or sections should be noted prominently, and underlined with **red** pencil.

3. **Layouts** (a) Having determined what territory is to be mapped, proceed to "layout" the territory, that is, when more than one sheet is required. Block it out at the proper scale on a small scale street map of the town or on the old key map.

(b) This preliminary layout must always be submitted to the management. Let your preliminary survey be so thorough that your estimate as to the number of sheets necessary will be reasonably close.

(c) Always try to map the territory completely. Avoid if possible, non-covered gaps between sheets; this does not refer to long stretches of vacant territory between built-up sections.

(d) Avoid cutting up a sheet to show detachments.

It is better to make an extra sheet as the surrounding territory is liable to build up and the detachments must then be removed.

(e) Occasionally fairgrounds, institutions or industrials occupy such large areas that they cannot be shown on a single 100' scale sheet. In such cases they may be shown at a scale of 150' or 200' to the inch, providing there is not too much detail. The important point about such risks is the conflagration hazard and this is best shown on the smaller scale.

(f) The smaller scale is also more suitable for large isolated residential estates.

(g) For our purposes the following dimensions will serve to lay out a one-mile race track: Straight-way stretches 1,320' on each side, distance between sides 840'; radius of ends 420', width of track 60'.

(h) Endeavor to use streets as divisions between sheets. Avoid breaking through blocks, particularly when necessary to cut through a risk consisting of several buildings.

(i) A margin of at least one inch on large scale sheets and a two-inch margin on small scale sheets is needed on all sides where there are connecting sheets. This rule is to be used flexibly when conditions arise making exceptions necessary. On the margin of a sheet or part of a sheet which has no connecting sheet, fill to edge unless a volume boundary intervenes.

TOWN MAPS

(j) Surveys requiring from one to approximately forty sheets are classified as town maps.

(k) On small town maps use the **large scale** only for the business section.

(l) On large town maps the **large scale** should be used for the business section and for the congested dwelling sections adjacent to the business area and secondary business districts occasionally found in the outskirts.

BOUND MAPS

(m) Surveys requiring more than forty sheets are usually published in more permanent style and called bound maps.

(n) It is well to anticipate the expansion of congested areas and provide for same by a more liberal use of the large scale than on town maps.

(o) When a city requires more than one bound map, they are referred to as Volumes 1, 2, 3, etc.

(p) Volume 1 should always embrace the entire business section.

EASTERN DEPARTMENT

Show as many business blocks as practical on one sheet, allowing the usual one-inch or two-inch margin. Skeleton sheets will be inserted in pairs for the heaviest business sheets, providing space for the customer to make notations.

CENTRAL DEPARTMENT

Allow wide margins for the sheets covering business sections. Usually two blocks can be shown on a sheet, allowing liberal margins on all sides. Of course, this depends much on the size of blocks and the way they are built up. We should not hesitate to show even one single block on a sheet if it becomes necessary in order to provide ample margins.

PACIFIC DEPARTMENT

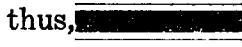
Allow wide margins for insurance lines on sheets covering business sections. Business streets may be widened out of scale when they are narrow, and blocks are congested. In such cases note width of street following street name, thus: (60' wide).

(q) Select as dividing lines between volumes some natural division or prominent thoroughfare running in a straight line through the city. Avoid zigzag boundary lines.

(r) Composite bound maps (volumes containing more than one series of numbers) should be planned and boundaries established, when making layouts for the outskirts of cities. This type of volume is effective in caring for sections where the developments warrant only one volume at the time of the survey but will necessitate two or more if expansion continues.

(s) In cities of more than one volume, it is advisable to arrange for at least one permanent closed volume, i. e., a volume completely mapped and enclosed by another volume or volumes, thereby preventing a further increase in its size, limiting composite layouts to territory beyond the congested district.

4. **Detachments** Detachments are isolated specials or small built up subdivisions which cannot be shown connectedly on one of the full sheets.

(a) At least two inches of margin or clear space should be provided around buildings of each detachment to show all immediate exposures and nearest street or road. Heavy black lines, thus, , should be drawn around each detachment.

(b) When several detachments are needed, they should be grouped so that all sections on any one sheet will be as near together as practical from a contiguous district.

(c) They should be placed in margins of sheets if possible, as other parts of sheets, though vacant at the time of survey, may develop.

(d) Use the same scale for detachments as the remainder of the sheet.

(e) Each detachment located beyond an incorporated area, should be so indicated, i. e., **Outside of corporate limits.**

(f) If there are no hydrants shown on a detachment, note the approximate distance to any public hydrant within 500 feet.

(g) When detachments are located beyond the confines of the key map, the approximate direction and distance of same, from some central point of the map, must be noted.

5. **Plotting** (a) Having the completed layout, proceed to plot your various sheets, putting on street and alley lines, widths, names and lot lines, etc. Be sure that the printed form on the back of the sheet is in the upper right-hand corner. (See Diagram No. 1).

(b) The information for plotting is generally obtainable at the city hall or court house, though on occasions much of the data may be secured from real estate agents.

(c) Requests for compensation of any sort, in return for furnishing copies of, or access to, any plottings, notes or records, must be forwarded to the

company for decision. **Under no circumstance should surveyor promise a copy of the map, or any other consideration.**

(d) If the official records obtainable are accurately compiled to a scale other than that which has been decided upon in the layout, copies or tracings of same should be forwarded to Pelham for **photographic reductions or enlargements.** This is particularly advantageous for irregularly laid out subdivisions.

(e) If records are not easily obtainable, do not waste too much time, but proceed to measure the territory with tape line and plot sheets from notes so secured.

(f) Since plotting may be done on days when weather will not permit field work, it is not advisable to plot the entire map before starting the actual field work.

(g) Street widths must be indicated by figures at each extremity of a street or alley on every sheet or detachment—also at every variation in width.

(h) Do not arbitrarily widen narrow streets or contract wide streets except as noted under **Article 3 (p) Pacific Department.**

(i) Print the street names distinctly in the center of each street and, where they differ from those of a previous survey, also show the old street names in brackets.

(j) Where there are no recorded names for any thoroughfares, or none in actual use, endeavor to supply the arbitrary names from rating bureau books or maps. In the absence of a name from any source, print "NO NAME," and an arbitrary one will be supplied at the publishing plant.

(k) Omit the word "alley" unless specifically named.

(l) A marginal street is a stub of a street shown as a connection between sheets and its lines should be extended one inch for large scale sheets and one-half inch for small scale sheets.

(m) On marginal streets omit street widths and old names.

(n) Corporate limits must be shown by a dot-dash line (— · — · — · — · — · —) on detail sheets. Always print the information on the inside of the line. Territory lying beyond an incorporated district should be indicated thus:—"Territory shown on this sheet outside of corporate limits," or "Territory shown on this section of sheet outside of corporate limits."

Pacific Dept. Show corporate limits on detail sheets thus:

Boundary Line Hillsborough,

— · — · — · —

San Mateo County.

(o) Indicate U. S. pierhead and bulkhead lines by dotted lines and notes.

(p) When your survey is to replace a previous edition and an investigation indicates the previous plotting is reasonably accurate, it is advisable to utilize the latter as much as possible. This can best be accomplished by either tracing the originals or cutting and pasting an unmounted printed copy to conform with the new layout. If there is a radical change in the new layout necessitating a great amount of cutting, it is better to trace from the originals.

(q) If the previous plotting is satisfactory, send the various sheets to Pelham for **adjustment of scale by photography**.

(r) Copies of maps on which there have been attached numerous correction pasters **must not** be utilized except for reference.

6.

(a) Whenever it becomes necessary to cut through blocks to join sheets, an A-B line is necessary.

This must be a straight dot-dash line (— · — · —), extending through such blocks, parts of which are shown on each of the connecting sheets. This is generally lettered "A" on the top or left and "B" on the bottom or right, but if more than one of these lines appear on the same sheet, use "C-D" for the second and so on. (See Diagram No. 5.)

(b) When using A-B lines and duplications, do not show the same building in detail on different sheets or detachments (show in skeleton on one sheet or detachment and in detail on the other) as the companies may thereby duplicate their insurance lines.

(c) Do not take a lot line for an A-B line. These connections must be absolute—the one placed over the other and connections pricked through or traced. It is not sufficient that the exposing risks should be sketched in; they must be so exact that when placed side by side, the sizes and shapes will correspond exactly.

(d) Wherever the lot lines are continuous and uniform, or some defined dividing line exists (other than a street or alley), and an A-B line is not deemed necessary, duplicate one inch of the building nearest this line on either side on either sheet, taking care, however, that all details and numbers of any risk should

appear on one sheet only, simply the outline properly colored on the other. (See Diagram No. 5.)

7. **Meridians** (a) Meridians or north points, drawn with **red** pencil, must be on every sheet, detachment and key map.

(b) Endeavor to arrange your sheets so that the meridian will point towards the top, but if towards a horizontal, preferably towards the left. If actually on a horizontal, always towards the left. Never point it below a horizontal.

(c) Arrange detachments, if possible, so their meridians will be the same as on the main part of sheet.

(d) On pairing sheets in bound maps, endeavor to point the meridians in the same direction, particularly where the territory is contiguous.

8. **Map Names and Sheet Numbers** (a) Show sheet numbers by **red** color. The name of city or town must be placed on both front and back of all sheets.

(b) Where two towns are included in one map, the names of both should be on the front and back of the sheet or sheets showing the secondary town. The name of the map should appear first on the back of sheet with the included town immediately following in brackets. On the front, directly under the name of map and sheet number, show name of included town and underline it if occupying entire sheet. If occupying only a portion of sheet, place name of included town in center of that portion and underline it.

(c) Use the first numbers for the heavy business sheets, after which number the sheets covering the

territory surrounding the business sheets. After these, work out where possible a system like reading matter, from left to right through one tier and resuming on left of next tier, and strive for uniformity in numbering.

(d) Where a river or other boundary divides a town into sections over which division sheets do not reach, number all the sheets continuously in one section before taking up the other. Similarly number all the sheets which join each other before providing numbers for the outlying or detached ones.

TOWN MAPS

(f) The sheet containing the key map must be numbered one.

(g) Always put the map name and sheet number in the upper right-hand corner.

(h) Old sheet numbers should not be shown in re-publications.

BOUND MAPS

(i) The first detail survey sheet should be numbered one. Do not number key sheet.

(j) Always put the map name, volume number, if any, and sheet number in the upper left-hand corner on odd numbered sheets and upper right-hand corner on even numbered sheets.

(k) Whether previous edition was a bound or town map, show old sheet numbers referring to corresponding sheets of previous edition in brackets under the new.

(l) If the volume number of the republication is

not the same as the old volume, this information must also be shown. It should read, for example (36 Vol. 7).

(m) Volume 1 should begin with sheet No. 1, Volume 2 should begin with sheet No. 201; after sheet No. 299, sheets following should be numbered 299A, 299B, 299C, etc.

(n) Do not attempt to provide for future sheets by omitting numbers. Always number sheets consecutively.

(o) The pairing of sheets is very much desired. However, in the Eastern Department, to facilitate the use of skeleton pages, it is preferable to have the congested business sheets numbered together, even though they may not cover contiguous territory.

(p) By pairing we mean that each couple of sheets will be bound facing each other, the two sheets connecting side by side by a street, the odd numbered sheet on the left and the even on the right. It is not always possible to get a pairing side by side, but vary from it as little as possible.

Where sheets pair top and bottom, first sheet should be top one so that reference from the bottom of the left-hand sheet should be to the top of right-hand sheet. Same applies to connecting detachments placed longitudinally on same sheet. Where connecting detachments are placed latitudinally on same sheet, reference should be from right extremity of one occupying highest position on sheet to left of one below.

(q) Avoid, where possible, pairing sheets drawn on different scales.

9.

Key Maps

(a) Each survey requiring more than two units (see "e") should contain a key map.

(b) It should show the extent of the town covered by detail sheets, the proximity of one sheet to another, and numerous other items pertaining to the town or city as a whole, which are explained elsewhere in this article.

(c) Key maps should at least extend to the corporate limits, which may usually be obtained from official sources.

(d) It need not be at any particular scale since its ultimate scale for publication will be determined at Pelham where the necessary adjustments are easily made by photography. It is, therefore, often expedient to utilize a copy of the town's official street map for this purpose. In the latter case the completed key may be pinned to sheet No. 1 on town maps or kept unattached for bound maps.

(e) In estimating the space required, consider the size of the map on an unit basis, i. e., 1 sheet at 50' = 1 unit; 1 sheet at 100' or smaller = 2 units.

TOWN MAPS

1. Maps consisting of 3 to 4 units need at least $\frac{1}{4}$ of a sheet for key map and index. This space must be the upper right-hand quarter of the sheet.

2. Maps of 5 to 8 units require at least $\frac{1}{2}$ of a sheet for key and index. This must be the upper half or right half and the key should be placed on the left or top side respectively of this space.

3. Maps of 9 to 13 units require at least $\frac{3}{4}$ of a sheet for key and index space. This must be on the upper portion of sheet and the key should be placed on the left of this space.

4. Maps of 14 units or more require an entire sheet for key and index.

5. As a general rule at least half of the space reserved for key will be used for title, reports, index, space for additional index, correction record, key of symbols and state map. A sample of sheet one of a 7-sheet Town Map is shown in **Diagram No. 7**.

6. When only a portion of the key sheet is required for key map, report, and index purposes, the remainder may be utilized for detachments.

7. The key sheet is invariably No. 1.

8. Do not make fancy titles on key maps.

BOUND MAPS

9. An entire sheet, without a number, should be reserved for key map and reports.

10. If the volume is one of a series, extend the street lines, etc. only $\frac{1}{2}$ inch beyond its boundaries.

(f) Data on key maps to include the following:

1. Approximate scale.

2. COLOR.—The territory covered by detail sheets should be colored in outline only, using different colors for connecting sheets. Color detachments identically the same as remainder of detail sheet. Use **solid green** color only for public reservations, parks, cemeteries, golf courses, etc., that are not covered by detail sheets. Use **blue** color for all bodies of water. Use **brown lines** to indicate volume boundaries.

3. CORPORATE LIMITS.—Show by heavy dot-dash line (— · · — · · —). Always place the note on

the **inside** of the line. Note name of adjoining town or township on outside of line and, if covered in part or whole by a separate publication, note thus "**See map of**".

4. COURT HOUSE, CITY OR TOWN HALL.—Show by small black squares in the proper block or blocks.

5. DETACHMENTS.—Show names of plants in addition to sheet numbers. Indicate by arrow and note the direction and distance to detachments beyond limits of key.

6. FIRE BOAT PIPE LINES.—Show by dotted line and note.

7. FIRE DEPARTMENT BUILDINGS.—Show by heavy black cross.

8. FIRE LIMITS.—Show by dotted red line with note placed on inside. In cases of inner and outer fire limits, show the latter by a dotted blue line with note placed on inside. Fire limits need not be shown on detail sheets except on small towns which have no key map.

9. HYDRANTS.—Show by black dots, without any reference to their size, on all mapped or unmapped territory.

10. MERIDIANS.—Show by red color.

11. NAMES.—Show names of lakes, streams, golf courses, parks, cemeteries, public reservations and included towns.

12. RADIAL CIRCLES.—Draw from permanent central point $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 3, etc. mile radius circles and make note on line. (**For table, see Chapter XII.**)

13. RAILROAD STATIONS.—Show by small black squares.

14. RAILROAD TRACKS.—Show main lines by single crossed line with names in full.

15. REAL ESTATE DESCRIPTION.—Show with block numbers when on detail sheets. Omit block numbers on bound map keys even though they are consecutive.

16. SHEET NUMBERS.—Show on all sheets or parts of sheets.

17. STANDPIPES, GRAVITY TANKS, AND RESERVOIRS.—Show in outline with names noted if any.

18. SPOTTING-IN.—Spot in on all classes of work, with reasonable accuracy, all buildings beyond the mapped areas, being particular to note in long hand the type and character of risks so represented. Use **red color** for residential buildings and **blue** for other classes of buildings.

19. STREETS AND NAMES.—Draw streets reasonably to scale. If scale is very small, names may be printed outside of lines. Omit alleys.

20. TOTAL NUMBER AND SCALE OF SHEETS.—Note in upper right-hand corner of key sheet.

21. U. S. PIERHEAD AND BULKHEAD LINES.—Indicate by dotted lines.

CHAPTER III

FIELD WORK

1. We have no regular order as to sequence of surveying sheets for publication but, survey your sheets more or less as they are numbered. It is advisable to survey sheets covering mercantile sections first, as, by doing this, your mission becomes known to the residents and when you reach the outlying sections you will be less troubled by inquiries as to the nature of your work.

Sheets showing industrials or other risks, for which permission is needed from outside sources, should be given early attention to avoid delay.

The most important points in insurance map making are:

Location of Buildings

Character and Construction of Buildings

Story Heights and Roof Signs

Street Numbers

Use all reasonable efforts to secure this information accurately and completely.

2.

Measurements on Field Sizes or outlines of buildings are put on in the field by pacing. A man can easily accustom himself to an accurate stride of two and

one-half feet ($2\frac{1}{2}'$). When pacing in buildings, should distances as shown not check out, use tape line to be certain. Incompleted plotting distances **must be taped, never paced.**

3. **Starting Work** There are various ways of starting field work but we refer only to one generally in use.

All plotting must be first tested in the field to see that ground is actually laid out as per plotting. Check street names; if other than on sheet, note, and from official sources determine correct name. Put a check mark on all street and alley widths. If lot lines are on sheet, check as to their correct locations. If lot lines are not on sheet, draw on ground in their correct locations. Lot lines are the best check as to proper location of buildings.

4. **Street Line** There are generally some defined marks as to street or property line. If not, we give a few ways said line may be determined:

(a) If a street is paved, except in unusual cases, the pavement is so many feet wide each side of center of street. Knowing width of pavement, the center of street is easy to establish. Take one-half official width of street and from center point establish street or property line.

(b) Determine by pacing recorded depth of block from an alley or rear lot line.

(c) The inside of sidewalk line may or may not be property line. Location of sidewalks vary as to local regulations.

(d) If street is unpaved, the street or property

line in some cases is hard to determine but there are very few cases where there is not some marker to guide you.

5. **Locating** Buildings which are parallel to a given line are easy to locate. Buildings not parallel to a given line are located by various methods, a few of which we mention:

(a) Produce one side of building and locate where it strikes both sides of street, or at two points on the sheet already located, then through these points draw the side and from the street line or any base line locate the front of the building, from which rest of diagram is readily finished.

(b) Locate corners of the front of your building or base line and take right angle measurements to each corner and through these two points as established, draw your front, from which diagram is readily completed.

(c) **See illustrations Chapter XII.**

6. **Fronting** (a) With street line determined, start at corner of block, pace distance building is back from street line, mark this distance by scaling on your sheet. (In many cases several buildings are in line or same distance back from street or property line. Note such fact so it will not be necessary to get said distance for every building). Pace distance from property line to building, then width of building and draw in front. If an established lot line is on ground, then pace to lot line to check location. Put on story height, roof sign (where possible), street number (if any), cornice (if called for), occupancy and color. Pace distance from this building to next, and continue in same manner to front all buildings in block. (See Diag. No. 2).

(b) Fire hydrants and fire alarm boxes are to be shown by symbols in their correct locations.

7. **Finishing and Completing Building**

(a) **Show exact outline of all buildings.** Starting with any building, pace its length and finish diagram. Follow same procedure for all buildings in block.

Many buildings can be put in from offset measurements of one building to another and thus eliminate the necessity of pacing in every building. (This is especially true in mercantile sections).

(b) Always keep checking your pacing by noticing the length of building with adjoining ones or to established lines.

(c) If building is of residential class, surveyors are not expected to enter except to ascertain construction, division walls and interior openings. On all buildings other than dwellings show all information required in this Manual.

(d) **Color all your work completely on ground.** Make this an invariable rule. Buildings with detail should be colored in **outline** only. Color skeleton buildings **solid**.

8.

Lining Across

Keep lining across street to completed buildings to check locations; for instance, where the lot lines are given, and several va-

cant lots may intervene between buildings, one may scale incorrectly and get building on wrong lot. By sighting across to other located buildings this error would easily be discovered. You cannot use too many checks for proper location of buildings.

9.

Finishing, Lining and Cleaning Up

(a) After all field work is completed, surveyor should go over his work, brightening it up to make a legible and **clean copy**.

(b) Keep your detail information within building. Do not use leaders if they can be avoided. Do not make **unnecessary notes**. Notes written in **long hand** do not appear on finished copy; vice versa, notes printed appear on finished copy.

(c) **Make your reference numbers large and distinct (green pencil)** and put as near as possible in the middle of the connection. Use numbers in all cases, even where a reference is to some other part of the sheet. Where no sheet joins, use a large cipher at extreme of margin. Omit **zero** reference numbers on detachments when locations are given on same.

10.

Endorsement

Fill out all information required by the printed form on the back of each survey sheet. Write on the back of the upper right-hand corner, whether printed form is there or not. **Actual time** means the time from when the sheet is taken into the field and completed, including finishing and lining up.

11.

Checking

(a) A surveyor cannot make too many checks or verifications on his work and should not hesitate to go over his finished sheet many times, as an omission or error may escape detection on a single examination.

(b) Do your examining systematically, going over each sheet for one thing at a time, not attempting to check everything at one glance. A form for checking is shown on Page 42, copies of which will be furnished

surveyors. Where there are two or more surveyors on the same town an exchange of sheets for examination is beneficial.

(c) Wherever there is doubt or where there may be more than one interpretation of any point, make and explanatory note in **long hand**. The examiner of sheets cannot know what was intended if the explanation is not clear and distinct.

12.

**Comparison
for
Connections**

on different sheets. This can only be done by putting sheets side by side and checking all points. This is a matter too often neglected, leaving us the choice between two sizes for the same water pipe or two widths for the same part of a street.

(b) On connecting sheets, it is only necessary to show one (1) building in skeleton, but in any case, skeleton connection should not be extended over one (1) inch. (See Diagram No. 5.)

(c) Special attention should be given to street numbers in this connection, to guard against the repetition of numbers on connecting sheets. Run over the numbers along each street on a sheet to see that they are perfectly regular and cross to the connecting sheet to see that the system is properly carried out. It sometimes happens that numbers are duplicated, and this caution, if heeded, will almost invariably discover these mistakes.

13. Put a **red** check mark on old Comparison with sheet signifying change in construction has been verified.
Old Sheets

14.

Special Points

(a) **Use the grade of pencil** that is best adapted to the conditions under which you are working in the field to prevent **smudging** and **blurring**.

(b) Make your work **concise, distinct and intelligible**; remember your field work is re-drafted. **Legible and clear copy** is absolutely essential.

(c) Do not make a **figure or character** over another—use your **eraser** and have a clean spot to mark on. **Smudges** are exaggerated through tracing paper.

(d) Keep as much information away from walls as possible. Symbols or reading matter are very often mistaken for wall openings by the draughtsman.

(e) Keep **lettering, figures and signs** one way and that with the top of the sheet. By strictly conforming to this rule the surveyor is co-operating with the Publishing Department.

(f) Do not break lines to write in reports or descriptions.

(g) If a building is old, do not use the word "Un-insurable" but note "Dilapidated".

(h) On work for re-publication, if you have a special slip for a sheet, **paste** it down in its proper location. Never send it in **pinned** to the sheet.

(i) Don't use the term "Vacant Beyond" at the edge of a sheet. Use the term "No Exposure" or "No Exposure Beyond".

(j) Fill out all margins where there are no connections. If vacant, mark "No Exposure". Do not note "Scattered Frame Dwellings" on margins if such dwellings or parts of them can be shown.

(k) Note the word "Area" in long hand to show open areaways.

(l) Do not use **ink** or **water color** on any of your field work.

15. **Use of Old Sheets** (a) If sheets or parts of sheets are corrected for reprint, the surveyor must not be guided by old

work but must assume that it is all wrong and his work on such sheets must be as **thorough** as if he were doing new work. Often mistakes which a surveyor would probably not make on an original survey are allowed to pass uncorrected.

(b) **No sheets showing business sections are to be corrected for reprint without the approval of the management.**

(c) When lithographed copy is corrected for reprint, all surveyor's work on same must be final in the field and never copied onto another sheet.

Under no circumstance will we allow surveyors to take old lithographed sheets into the field and correct up roughly and in a crude manner, redrawing same inside. This method we will not tolerate, and we insist on the old copy, sent you, being returned.

(d) Erase all dates of publication on lithographed sheets corrected for republication.

(e) Where a medallion or description of any kind cuts out part of a building in correcting, complete this building, or draw any buildings complete which may occupy such space covered.

(f) When old sheets are used, on the margins of which may be such notes as "Three Frame Dwellings"

or "Scattered Houses"—the result of some previous careless survey—draw in these buildings even if only the fronts, with story heights and roof signs, can be shown.

(g) When correcting old sheets for reprint, references in feet are often found to exposure which can be shown. Check such distances and show such exposure or parts of them.

(h) All old sheets and parts of sheets not used must be returned with the new survey.

16. **Street Paving** (a) The term **Unpaved** (not applicable to Pacific Department), is to be used on streets which are not surfaced with any of the many characters of hard surfacing such as cinders, gravel, asphalt, macadam, concrete, etc.

(b) A street to be classed as paved must be accessible to fire apparatus throughout all seasons of the year.

(c) If a street is partly paved and partly unpaved, use the term unpaved only and indicate by arrow the extent of the part unpaved.

(d) The term, **Not Opened**, is to be noted on streets appearing on records but not opened on the ground.

(e) The term **Impassable** is to be used only on streets which cannot be traversed by fire apparatus due to ravines, cliffs or other insurmountable obstacles, and in no case is it to apply to character of surface.

17. **Levees** A levee is an embankment along bodies of water or water courses to prevent overflow. Show by

dotted lines the approximate location. Note the material and height in feet above grade level.

18.

Real Estate Description

On all town maps in Central Department and the State of Texas in the Eastern Department, put on each sheet lot and block numbers and subdivision names. These must be checked with the key map. Where there are not actual block numbers do not supply any, but state the fact on sheet 1. Retain the block numbers of the old map, and if they are to be replaced by other numbers, the old ones should be put in brackets.

Put block numbers in **blue** and subdivision names in **brown** and take every precaution to get names, numbers and letters correct.

19.

Grades

Where there are any great variations in the grades of the streets, ground elevations should be shown at top and bottom of grades and at corners of sheet. Note source of datum in town reports. (See Town Reports, Chapter IX, Article 1.)

If such information cannot be secured from official source, estimate the grades.

20.

Admittance Refused

If permission to survey a building is refused, show all you can from outside and note firm name, if any, and "Admittance Refused".

21.

Data from Architects, Contractors, City Building Departments

When unable to determine the construction of a building, consult the architect, contractor or city building department.

22.

From Plans

When a building is being built, get all information possible, seeing the builders, or architect, if necessary, and mark "**From Plans**".

23.

Exposure Distances

Do not put in distances between buildings in figures unless specially ordered to do so. Then they must be taped and always be the shortest distance between any parts of the two buildings, (eaves to be ignored in determining exposure distance).

(b) **Pacific Department.**—Exposure distances must be shown in figures, and surveyor should carefully tape distances ranging from 3 to 100 feet. Such measurements must be made from the main section of buildings, or from bay windows or porches, not from platforms or eaves.

24.

Removal of Buildings

Don't remove or note "To be removed" on any building that is in existence at time of survey.

25.

Railroad Sidings

Railroad sidings near any manufacturing plant should be shown reasonably accurate, not merely sketched in, connecting same with main tracks. In all cases show main line tracks. Abbreviate name. Instead of showing all tracks in large yards, show only the outside ones and mark "**FULL OF TRACKS**". (See Diagram No. 5.)

26.

Names for Permission

On all large risks, note name (in long hand) of individual to be seen for permission to make your inspection. This applies to all classes of work, and will aid surveyors on future revisions.

27. Form for Checking Sheets:

MAP OF	SURVEYED BY																														
<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td colspan="15"> </td></tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15																	
SHEET NUMBER-----																															
Color-----																															
Story Height-----																															
Roof Sign-----																															
Height in Feet-----																															
Occupancy-----																															
Parapets-----																															
Wall Thickness-----																															
Interior Openings-----																															
Windows-----																															
Factory Notes-----																															
Date of Constn of Public School Buildings (masonry or concrete)																															
Date of Constn of f. p. Buildings-----																															
Date of Constn of f. p. except Bldgs-----																															
Railroad and River Names-----																															
Meridians (Red Pencil)-----																															
Street Numbers-----																															
Street Names-----																															
Street Widths-----																															
Hydrants-----																															
Fire Alarm Boxes-----																															
Location of Specials (Note if beyond Corporate Limits)-----																															
Exposures-----																															
Scale-----																															
Signed and Dated-----																															
Compared with Old-----																															
Joined-----																															
Old Sheet Numbers-----																															
Block Numbers-----																															
Elevations-----																															
Reference Numbers-----																															
Water Pipes-----																															
Compare Edges of Adjoining Sheets-----																															
Final Examination-----																															

CHAPTER IV

STREET NUMBERS, BUILDING AND POLICY NUMBERS

1.

Street Numbers

A street number is necessary to identify insurance risks for every building, except small sheds, private auto houses, etc., fronting on a street.

(a) There are two classes of numbers, actual and arbitrary. Actual numbers are those as name signify. Where no actual system is in use, arbitrary numbers are supplied by examiner.

(b) Most cities or towns with an actual street numbering system, have maps showing the system; from these maps, or other official sources, supply the street numbers not found on buildings in the field. **We are satisfied that often-times surveyors fail to report numbers appearing on buildings.** Supply numbers on extreme corners of every street where there are no buildings. Such information is of great assistance in preparing a street index.

(c) If unable to supply a missing number, from any source, put a zero in front of building.

(d) Fractional or half numbers to rear buildings, shown on old maps, must be carefully copied on all new surveys. This refers to rear mercantiles, dwell-

ings, warehouses, stables, auto houses, etc., designated by fractional numbers such as, $6\frac{1}{2}$, $207\frac{1}{2}$, etc.

(e) If a number on a building is evidently wrong (not in harmony with the other numbers on that block), underline the number thus: 265.

(f) If a duplication of numbers exists, underline each duplication and supply outside the correct number from some official source if possible.

PACIFIC DEPARTMENT.—If a duplication of street numbers exist in the field, underline each duplication on the map and add suffixes A and B, thus: 265A, 265B.

(g) If you find a partial numbering system in a town (not official), put on numbers as found upon buildings and zero on buildings without numbers, and show numbers from old map in parenthesis.

(h) Where no street numbering system is in use, do not make any, but copy carefully all the old arbitrary numbers, whether each one refers to a risk or not.

(i) When an arbitrary system of street numbers appears on our map, do not copy book or tariff numbers from rate sheets or book. However, in making an original town if there is a bureau map in use and numbers on such publication are used on latest rate sheet, repeat such map numbers on our survey, noting authority for numbers.

(j) Where a new system has been installed, put the new numbers next to the building and the old ones in brackets outside. In correcting an old sheet, it will not be necessary to erase these old numbers and re-

write them to get this arrangement, but put brackets around old numbers and write new system on the outside, as follows:

OLD SHEET

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

NEW SHEET

101	103	105	107	109	111	113	115
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

CORRECTED SHEET

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
101	103	105	107	109	111	113	115

(k) Where an actual numbering system replaces arbitrary system, it is only necessary to repeat arbitrary numbers which were formerly used to designate buildings. Omit old arbitrary numbers for vacant lots between houses and for sides of corner buildings.

(l) Where two systems on old map—an actual and an arbitrary—the actual only need be repeated on new map.

(m) All actual street numbers allotted to vacant lots, except the ends of streets on each sheet, should be omitted.

(n) Where there are two systems on old map and a new one in use, repeat only the numbers next to the building on the old, as follows:

OLD SHEET

101	103	105	107	109	111	113	115
1	2	3	4	5	6	7	8

NEW SHEET

200	202	204	206	208	210	212	214
(101)	(103)	(105)	(107)	(109)	(111)	(113)	(115)

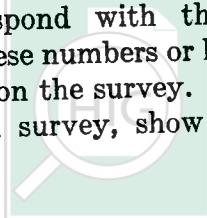
CORRECTED SHEET

(101)	(103)	(105)	(107)	(109)	(111)	(113)	(115)
X	Z	X	X	S	S	X	S
200	202	204	206	208	210	212	214

2.

**Policy
Numbers**

The separate buildings of almost all large manufacturing risks are numbered or lettered to correspond with the policy forms. Surveyors can get these numbers or letters and should carefully note them on the survey. If different from those shown on old survey, show the old ones in brackets.



CHAPTER V

CONSTRUCTION

1.

Materials

(a) The basic materials or substances commonly used in the construction of buildings are wood, iron, steel, masonry and concrete. For expediency's sake, the term "masonry", as used in this Manual, has reference to any of the following materials or substances, which when utilized, necessitate binders such as mortar, cement, and plaster to hold them in place: stone, tile, concrete, gypsum or cinder block; clay, concrete, cement, cinder or sand lime brick.

(b) The fire resistive qualities of each of these materials or substances, used under identical circumstances, is greatly dependent on the manufacturer and local building codes. However, surveyors need only designate a material as per the key of symbols and abbreviations shown in this Manual, without any reference to the quality or grade.

(c) Surveyors will occasionally encounter building materials of a new or composite nature for which there is no classification in the Manual. In such cases use the most logical color and describe by an **explanatory note**.

2.

Basements

(a) For our purposes, a basement or cellar is a story, the floor of which is below the ground and the ceiling of which is at least four feet above the ground.

(b) Show such existing basements in all classes of buildings by the letter "B" as part of the story height designation, i. e.: 1B, 2B, etc. No consideration is to be given the materials used in walls of basements when determining the construction of a building unless a basement is completed and the construction above is postponed. In such cases treat the basement as a building, i. e.: show color and detail dependent on the occupancy.

(c) Underground passageways connecting two or more buildings should be drawn and construction noted, but do not color them. This also applies to underground boiler rooms, etc. Areaways under sidewalks may be omitted unless they furnish the only communication between two buildings or are occupied by a hazardous occupancy.

3.

**Building
Heights**

(a) "Story" means that part of a building comprised between a floor and the floor or roof next above and includes basement and mansard. The number of such "stories", in a building, is the story height.

(b) Place this information invariably along the fronts of buildings and on each of their variations in story height. Where buildings vary in story height front and rear under a common roof show the height at each end.

(c) In cases of one-story churches, auditoriums, or buildings which are equal in height to two-story buildings, mark story height as 1 = 2, or 1B = 2B, etc., similarly in a building having the equivalent of five stories but with one floor omitted mark it 4 = 5.

(d) Mezzanines, balconies, and decks are not to be considered as stories; merely indicate by dotted line and note.

(e) Half-stories are attics which are occupied as living quarters in dwellings and storage rooms in other classes of buildings. These must be included in the story height excluding attics constructed for ornamental or ventilating purposes.

(f) In solid masonry and concrete buildings where the half-story is of frame construction make note thus: Fr. attic, but do not color yellow.

PACIFIC DEPARTMENT.—Do not use the term attic for half stories. A half story, when occupied, is rated as a full floor. Indicate on map as a half story, and color according to construction.

(g) Give heights in feet of all masonry, concrete, and veneered business buildings; of all frame business buildings adjoining and exposing same, and of all frame business buildings 30 feet or more in height; of all manufacturing, storage, public and institutional buildings regardless of construction, and of apartment buildings having 4 stories or more in height. The height in feet need not be given for small additions.

(h) "Height in feet" means the vertical distance from ground level to eaves, not to top of cornices or peaks of roofs. The desired information in such cases is the height of side walls. In case of flat-roof take height of roof back of the front cornice. A weight on the end of a tape line will make it easy for a surveyor to measure these heights from the roofs without assistance. This information can also be obtained by taping the height of each story in the hallways of buildings with allowances for joists, etc.

(i) In manufacturing, storage and business buildings where distance from eaves to apex is in excess of vertical distance from ground to eaves, note height to eaves and height to apex.

(j) In a business block it is not necessary to tape each building height since after a few buildings have been accurately measured the remainder may be obtained by offset measurements or estimates.

4. (a) Note the construction of all Roofs roofs other than wood. However, wooden roofs and wood-sheathed roofs must also be noted in buildings of non-combustible construction with that exception.

(b) Show mansard or French roofs by dotted lines only in masonry and concrete buildings. All other roof outlines may be omitted.

PACIFIC DEPARTMENT.—A mansard shall be considered as a wall of similar construction and not as a portion of the roof. Color accordingly.

(c) Gables, dormers, and small penthouses need not be noted or shown in any class of buildings.

(d) Note the roof supports in all classes of buildings except residential when the span between bearing walls is 50' or more, and no division walls are shown.

(e) Roof coverings designated by symbols must appear on every building or part of building for which a story height is given. Place roof symbols invariably along the fronts of buildings opposite the story heights.

(f) When a roof covering is partly of one covering and partly of another, use symbol for inferior covering only. In case of one covering over another, use symbol for top covering only.

(g) In a group or row of buildings of uniform height under a common roof with frame division walls or solid walls rising to but not above the roof, use but one story and roof symbol for entire row.

5. Walls (a) "Bearing Wall" means a wall which supports any vertical load in addition to its own weight and is usually a side wall. All outside walls in solid masonry and concrete buildings are assumed to be bearing walls unless otherwise specified. Any building using steel or concrete as a frame work (skeleton structure) for the support of walls, floors, and roof must have the type of frame noted.

(b) "Curtain Wall" (panel wall) means a non-bearing wall used in connection with concrete or steel frame work and supports no weight other than its own. Curtain walls should not be noted unless preceded by description of frame work.

(c) "Pilastered Wall" means a bearing wall containing piers or columns of masonry or concrete for additional strength and should be noted.

(d) "Lugged Wall" means a bearing wall with ledges built out at the floor levels supporting the floors and should be noted.

(e) "Hollow Wall" means a wall arranged by two parallel walls with an air space between and anchored together. Such walls are generally found in cold storage buildings and should be noted.

(f) "Filled Wall" (nogged wall) means a wooden wall which has non-combustible materials used as a filler between the studding. It should be noted and colored yellow.

(g) "Apron Wall" means a wall the base of which is masonry or concrete and remainder of another material. (See Diagram No. 4.)

(h) "Party Wall" means a wall used or adapted for joint use between two buildings.

(i) Where adjoining buildings or sections of buildings are of varying story height and construction, straddle the color of the party or division wall for the lower building and if the wall above is of a different material, color and mark it accordingly inside the higher building.

(j) Where frame buildings close to masonry or concrete buildings have independent walls, show two lines and color inside each according to construction.

(k) Use solid lines for divisions between all buildings or sections of buildings of varying story height, and all solid interior bearing walls rising from ground to roof. (See "m".)

(l) Use dotted lines for frame division walls or partitions separating occupancies within a building or row of buildings. (See "m".)

(m) Do not draw frame partitions in auto houses. Do not draw masonry or concrete division walls in auto houses unless parapeted or unless roof is non-combustible and walls rise to but not through roof. Do not consider the doors and wooden lintel in coloring masonry or concrete auto houses of one or two-car capacity.

(n) Masonry or concrete walls first floor only, separating occupancies in buildings over one story should be shown dotted and noted, i. e., **Tile 1st, Br. 1st, C. B. 1st, etc.** When wall 1st, walls 1st and 2nd, etc., enclose a section of non-combustible construction, i. e., tile or concrete floor and ceiling, indicate opening by the symbol if protected by a fire door. Where walls are first and second in a three-story building, note for example "**Br. 1 & 2**", and so on; in each case noting the floors where the walls exist and not the floor to which they rise.

(o) Walls in basements are not to be shown unless they completely cut off a hazardous occupancy.

6.

**Wall
Thickness**

(a) In all buildings of masonry or concrete construction, except those used for residential purposes, private auto and out houses, measure and note the thickness of side, division, or bearing walls on each floor except basement or half story. This does not apply to interior masonry or concrete walls shown by dotted lines.

(b) These thicknesses should be exclusive of plastering or wood sheathing, and in brick walls are 4" or multiple thereof, since bricks are generally 8" long by 4" wide. This information is sometimes difficult to obtain where walls have no openings in them, but there are usually windows on either side in the front walls which permit offset measurements. Each, apparent unsurmountable difficulty in this line, may present a different solution, but the cases are rare where the information cannot be obtained.

(c) In some sections solid walls are furred, i. e., strips of wood about an inch thick are nailed on the masonry and the laths nailed to these. The purpose is to keep dampness of the walls from the room. The effect on the insurance surveyor not familiar with the construction is to suggest a frame partition, as in "sounding" them they appear very hollow. The best test in such cases is in measuring the thicknesses, allowing about 2" on each side of the walls for furring. Frame partitions are rarely over 6" in thickness out to out of plaster.

(d) Wall thickness on party walls should straddle the wall (where over 8") each story in common, and the additional thicknesses in the highest building.

Do not straddle wall thickness where wall is common but not a party wall; that is, wood posts on one side supporting floors and roof of adjoining buildings.

(e) Give no wall thickness in veneered buildings except when wall is a division or party wall.

(f) Show thickness of curtain walls in buildings over two stories high in report only. Omit figures from diagram.

7. **Floors** (a) Note the **basic floor material**, when other than wood, of all buildings occupied by hazardous occupancies. Wood flooring is often used as a covering or surfacing for the concrete ceiling beneath, in such cases merely note for example: **Conc. Fl.**, **Tile Fl.**, etc.

(b) Note the **floor supports** in all classes of buildings, except residential, when the span between bearing walls is 50' or more and no supporting partitions or division walls are shown.

(c) Sometimes a party wall is not strong enough to safely support roof and floors of both buildings, and in such cases weight of floors and roof of one building are supported by posts or studding set against the wall. Show such supports by dotted line and note construction, but omit color. When such posts are covered by lath and plaster, surveyor may mistake them for furring.

8. **Stairs** (a) Do not show inside frame stairways unless common to two or more buildings. Stairways enclosed by masonry or concrete should always be shown. In either case only the outline of stairway or stairtower, marked "Stairs" is necessary. Do not draw steps.

(b) Outside stairways effecting the exposure distance (30') must be shown and colored in all cases. Draw steps for open outside stairways.

(c) Do not show fire escapes except when in connection with an outside vertical Pipe (see Key of Symbols).

9. **Parapets** A parapet is the extension of a masonry or concrete wall above the roof of a building. Its purpose is to retard the progress of fire via the roof; particularly when the wall below is blank or has all openings protected.

(a) Show a parapet by prolonging the line of a wall on which it exists. Indicate its height above the roof by a cross stroke for each 6". If more than 3" high indicate by figures. (See Key of Symbols.)

(b) Parapets vary in height generally from front to rear of a building. In such cases take the minimum height, though at least one stroke should be shown when the parapet is well over 6" at one end and a few inches less at the other.

(c) Where there are adjoining buildings with parapets on each, do not prolong each line parallel and close to the other, but angle one off and use separate cross strokes for each.

(d) A parapet symbol or "NOT" (indicating no parapet) is necessary for every side, rear, or through division wall whether blank or having protected or unprotected openings with the following exceptions:

1. Street sides where street is more than 30 feet in width.

2. Exterior walls of private auto houses and residential buildings unless wall is blank or exposed within 30 feet of business, public, storage or manufacturing building.

3. Rear walls with unprotected openings.

4. Exterior walls of small out houses.

(e) SOUTHERN FIELD.—Note thickness and coping of parapets beside the parapet symbol. Indicate thickness in inches, and coping by the letter "C".

(See Chapter XI, Article 7.)

(f) PACIFIC DEPARTMENT.—Show parapets on all side and rear walls, as well as division walls on all mercantile and industrial buildings.

10. (a) For our purposes, consider **Cornices** as a building cornice only the frame projection of a roof beyond an exterior wall.

(b) Indicate such cornices by dotted lines on the street sides of all masonry or concrete buildings except those used exclusively for residential purposes.

11. (a) Draw exterior chimneys as per key of symbols at all manufacturing plants and specials. Do not give height in feet.

(b) Make note of spark arresters on tops of chimneys.

(c) PACIFIC DEPARTMENT.—Show type of chimney on all buildings, including dwellings. The following abbreviations must be used: No CH. = No chimney; B. C. = Brick, stone, concrete brick, and standard concrete chimney; C. BL. C. = Concrete block chim-

ney; C. C. = Non-standard concrete chimney; T. C. = Tile chimney; P. C. = Patent chimney; IR. CH. = Iron chimney; S. P. = stove pipe. S. P. V. = Stove pipe with patent ventilator.

12. **Porches** (a) All porches, except very small ones in the fronts and rears of building, must be drawn and story height and roof symbol noted.

(b) Use dotted lines to indicate porches. The color is determined by the material of floor, lintel and roof supports.

(c) Platforms should not be colored, merely indicate by dotted line and note the material.

13. **Skylights and Raised Side-Lights** (a) Show skylights and raised side-lights in the roofs of all buildings of masonry or concrete construction.

(b) Indicate location and size of a skylight by solid outline. Be particular to note wired glass and the number of floors lighted if more than one. When a roof contains several skylights and they can not be conveniently drawn in diagram, indicate the situation by a note, i. e.: 6 SKYLIGHTS, 7 SMALL W. G. SKYLIGHTS, etc.

(c) Indicate location and size of a raised side light by dotted outline, and note the height of such raise. Unusually large or high (three feet or over) raised side-lights should be colored. This also applies to large area frame or iron-clad buildings, such as pier sheds, warehouses, etc.

14. **Open Under** (a) When a building of any character is open between ground and first floor note "O. U." This includes dwellings where frame lattice work may enclose the otherwise open area.

Do not note "O. U." on dwellings in Pacific Dept.

(b) Place information just outside at rear of building.

(c) Note height in feet above ground except on residential buildings.

15. **Miscellaneous Structures** (a) "Elevator" (hoist and elevator are synonymous terms) means a device, mechanically or manually operated, used for carrying persons or things upward and downward. Note elevators as per key of symbols. When an elevator does not run through all floors, note "B to 1st", "1 to 4", etc.

(b) "Ramp" means an inclined driveway from one story to another. When within a building merely make note of construction and state the floors affected, i. e., WOOD RAMP to 2nd; CONC. RAMPS ALL FL'S; etc. Outside ramps should be drawn by dotted lines.

(c) Piers, wharfs and docks should be drawn by solid lines. Use the proper name and note material but omit color. If open under, note the material of pilings or support.

(d) Bridges should be drawn over bodies of water by solid lines and over ground by dotted lines. Do not color bridges but note the construction.

(e) Viaducts should be drawn by dotted lines with construction noted. Color viaducts by diagonal stripes according to basic construction.

(f) Trestles should be drawn by dotted lines and construction noted but omit color.

(g) Steeples, spires, and cupolas should be indicated by notes only. Mention construction and height in feet above apex or roof.

(h) Roof structures, such as large penthouses, pavilions, roof gardens, etc.; should be shown and colored as per construction. Small roof structures may be omitted.

(i) Enclosed foyers, lobbies, and common entrances in business, public, and multi-family buildings should be noted.

16. **Building Types** (a) "Frame" as applied to buildings, means that in which exterior or party walls are wholly or partly of wood. Color yellow.

(b) "Adobe" means the mud or sun-dried brick buildings commonly found in the West and South West. Color brown and note (adobe).

(c) Stuccoed or Plastered: Do not note, but its general use as a surfacing emphasizes the need of greatest care in ascertaining the basic construction. Color stuccoed buildings as per basic materials.

(d) Iron or Metal: Color green and note (Iron).

(e) "Iron Clad or Metal Clad" means a frame structure covered with iron or metal. Color green next to lines and yellow inside. Do not note "Ir. Cl." except in buildings of varying constructions.

(f) Filled: Color yellow and note, i. e. (Br. Filled), (Ash Filled), etc.

(g) Asbestos Clad: Note "Asb. Cl.", and color as per basic material.

(h) Glass or Glass Blocks: Note and color ac-

cording to frame in which glass or glass blocks are set. (For Greenhouse, see Article 17 (b).)

- (i) Brick: Color red but omit note.
- (j) Tile or Terra Cotta: Color red and note (Tile).
- (k) Stone: Color blue and note (Stone).
- (l) Concrete: Color blue and note (Conc.). Pacific Department: Note reinforced concrete (Rein. Conc.) where found.
- (m) Concrete or Cement Block: Color blue and note (C. B.).
- (n) Cinder Block: Color blue and note (Cin. Bl.).
- (o) Cinder, Sand Lime, Cement, or Concrete Brick: Color blue and note (C. Br.).

(p) "Faced" should be noted on buildings of masonry or concrete construction, and on single walls 50' or more in length. Color faced buildings as per basic material only. When the facing is of greater thickness than the inner material and carries most of the building's weight, i. e., 12" clay brick outside and 4" cinder brick inside, color diagram red and note (C. Br. Lined).

(q) "Veneered" means a frame building faced with but not supported by masonry. Color such buildings as per masonry next to the lines and yellow inside; also note (Ven'd), (C. Br. Ven'd), etc. Where buildings are veneered the first story and frame above merely use yellow color and describe thus: (Br. Ven'd 1st) (Tile Ven'd 1st), etc.

It is often difficult to ascertain whether a building is veneered or of solid masonry with inside furring and insulating. Usually by measuring and sounding,

arrangement of masonry, basement inspection, or attic inspection, a surveyor will be able to determine the exact construction.

(r) Brick Siding. In certain territories there is a comparatively new type of construction known as "Brick Siding". It is nothing more than the application or veneering of bricks to a frame building. However, the bricks are approximately one-half inch in thickness and are attached to the building by metal cleats, etc., after which the mortar or plaster is applied. Color such buildings yellow and note ($\frac{1}{2}$ " Br. Siding).

(s) "Masonry and Frame" must be carefully noted and colored so that there will be no doubt as to the extent of each material. Where buildings of more than one story, are of solid masonry the first story and frame above, color as per masonry next to lines and yellow inside; also note (Br. 1st) (Stone 1st), etc. If the frame exists only in the half story, color as per masonry only and note (Fr. Attic).

Pacific Department, see Article 3 (f).

(t) "Masonry and Concrete" must be colored and described as per key of symbols. Where the materials vary from one story to another, always use color of material in first story next to line and other color or colors inside. Where the materials are irregularly used or mixed, use color only of the inferior material and describe, i. e., a building constructed of concrete blocks and clay bricks irregularly arranged should be colored blue and noted (C. B. & Br. Constn) Clay bricks, stone, tile, and concrete are generally considered superior to the other forms of masonry.

(u) Fire Proof Construction: Particular care must be exercised in determining, for our purposes, fire

proof construction. Primarily, all integral parts including frame work, floors, roof, and walls must be of **non-combustible materials**. However, in addition all structural steel must be **directly protected** with masonry or concrete, and bearing or curtain walls must not contain any cinder, lime, cement, or concrete bricks or blocks. Color such buildings brown, and plainly print "FIRE PROOF CONSTN". Note year when built, and describe frame, floor, roof, and wall construction, except on small boiler rooms or small outlying buildings. Woodwork found in door and window casings, floor coverings, minor partitions and temporary exposures of steel, are not defects and need not be noted.

False wooden roofs are often constructed above the top ceiling of fire proof buildings to keep out dampness, heat, etc. Make note of such and state if trap in ceiling of top story is protected or unprotected. (See illustration page). If large false wooden roofs are hipped, note: "False Wooden Hip Roof".

(v) Fire Proof Construction Except: Any building of fireproof construction with the exception of a small amount of exposed steel or inferior wall materials should be colored red or blue as the construction may demand, marked "FIRE PROOF CONSTN", exception and location thereof noted and carefully described. Note year when built.

(w) Steel Joist Construction (metal lumber construction): Buildings constructed of non-combustible materials with metal columns, beams, and joists **indirectly protected** should be colored red or blue as the wall construction may demand, and noted "STEEL JOIST CONSTN". In this type of construction the floors usually consist of two or more inches of concrete over metal lath on top of metal

beam or joist with a cement or gypsum plastered ceiling of seven-eighths inches on metal lath attached to under side of beam or joist. Metal lath and cement or gypsum plaster ceiling should be noted. For example: "Steel Joist Constn" "Conc. Fls. & Rf.", "Iron Cols.", "Metal Lath & Plaster Ceilings".

If building has a steel frame, note: "Steel Joist Constn, Steel Fr., Conc. Fls. and Rf.". Where only floor or roof of building is supported on steel joists, describe but omit note "Steel Joist Constn". Wooden floors or roof on steel joists and steel deck floors or roof on steel joists should be noted.

(x) Mill Construction: The following specifications of a slow combustion or mill construction building are generally applicable:

Building to be constructed of brick or stone, not to exceed 5 stories or 65' above ground level. No one story to be over 15 feet. Walls to be not less than 12 inches thick for top story, and increased 4 inches for each additional story or fraction thereof, the ledges thus formed acting as supports for the floor timbers. Where timbers enter walls they shall rest on iron plates and be self-releasing. If walls are of pier construction, piers to be not less than 20 inches for upper two stories, increasing 4 inches for each story below, and graded in width according to span of bays; face of pier to measure not less than one-fourth as much as space between centers. Walls between piers to be not less than 12 inches thick. All exposed wall to be carried at least 3 feet above roof and covered with non-combustible coping, and all openings in such walls to be protected.

Roof to be not less than 3" splined plank. Timbers not less than 6 inches either dimension. Covering to

be of metal, gravel or composition. Cornice to be brick or non-combustible material. Floors to be solid; to be less than 3" splined plank covered by 1" dressed flooring with two thicknesses waterproof material between. Timbers not less than 6 inches either diameter. All exposed wood work to be planed smooth.

Wood posts to be not less than 8 inches smallest dimension, all corners rounded. If pillars, girders or beams of iron or steel are used, they must be protected by not less than 2 inches of terra cotta, concrete or its equivalent. Stairways and elevators to be enclosed in brick shafts with standard fire doors at all openings to building.

Walls of shafts to pierce all floors and extend 3 feet above roof. Partitions to be constructed of non-combustible material, or of 2" matched plank, perfectly coated with fire-retarding paint.

Some of these details may vary in different localities but it is easy to ascertain whether a building is rated as slow-burning or not. This manner of building while still used to a considerable extent, has been largely supplanted by fire ~~proof~~ construction. It is found mostly in factories and special mention must be made, noting in such cases "Mill Construction" in building.

Where there are some defects in construction, as, for instance, absence of brick elevator and stairway shafts, but in many respects building conforms to above specifications, do not mark "Semi-Mill Construction". Use color for ordinary brick and frame construction only. "Superior Construction" and "Heavy Timber Construction" are synonymous with "Mill Construction".

17.

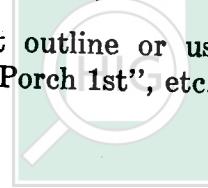
**Special
Points**

(a) Federal Buildings: Note story height, roof symbol, and names of federal buildings, such as POST OFFICE, CUSTOM HOUSE, etc. Color as per construction and describe but omit detail. (See Diagram No. 3.)

(b) Greenhouse: Make no note of glass roof or story height on greenhouses; merely note "GREEN HO.", and color diagram according to frame in which glass is set.

(c) When a building of material other than frame rests on wooden posts, note the fact.

(d) Do not outline or use terms, "Open 1st", "Open 2nd", "Porch 1st", etc. in detached dwellings.



CHAPTER VI

OCCUPANCIES

An occupancy must be shown for each building except sheds, out houses, out kitchens, coops and other small outlying buildings. Abbreviate occupancy wherever possible. (See List of Abbreviations, Chapter XIII.)

1. Occupancies are divided into the **Classifications** following classes:

(a) **Business Building**: A building occupied for the transaction of business, rendering of professional service, display, sale of goods, wares or merchandise (wholesale or retail), office buildings, auto repairing, auto sales, hotels, laboratories, laundries, markets, restaurants, service stations, etc.

(b) **Public and Institutional Building**: A building in which persons congregate for civic, educational, political, recreational, religious or social purposes, to receive medical, charitable or other care, or in which persons are held or detained by reason of public or civic duty, or for correctional purposes: i. e., armories, asylums, churches, colleges, court houses, fire houses, hospitals, jails, libraries, movies, museums, park buildings, police stations, prisons, sanitoriums, schools, theatres, etc.

(c) **Storage Building**: A building for housing of airplanes, automobiles, railway cars or other vehicles

of transportation, for the storage of goods, wares or merchandise: i. e., garages, hangars, storage warehouses, freight depots, grain elevators, oil tank farms, stables (livery or sales), etc.

(d) **Manufacturing Building**: A building used for the making of products by preparing and combining materials.

(e) **Residential Building**: A building occupied solely for residential purposes: i. e., apartments, boarding and rooming houses, dwellings, flats, fraternity houses, parsonages, rectories, sorority houses, etc.

2.

Business Buildings

(a) Show a ground floor occupancy used for mercantile purposes as per list on **Page 81 "S"**, unless a **hazardous occupancy** as per list on **Page 82**.

(b) Note specific wholesale occupancies. In such a case give occupancy as "Wholesale Drugs", "Wholesale Grocery", etc.; give name on large or prominent wholesale buildings and in all cases where two or more buildings in a group are occupied by one company or individual.

(c) Do not note any upper floor occupancy unless hall, lodge room, loft or a hazardous occupancy as per list on **Page 82**. Such occupancies as offices, apartments, etc., are not to be shown.

(d) Note restaurants only on town maps and on bound volumes of cities covered by three volumes or less.

PACIFIC DEPARTMENT.—Note restaurants, unless small and non-hazardous, on all maps.

A restaurant is a place which has tables and kit-

chen, and not drug stores, confectioneries, etc., which serve only light lunches, and whose principal business is the retailing of other commodities.

Lunch wagons and tea rooms (irrespective of size or location) are to be noted as restaurants.

(e) Note name for a hotel when it is principal occupancy or has a lobby on ground floor. Simply note hotel "2nd", "2nd-3rd", etc., for hotel occupying upper floors of building only. Write "Hotel" in full. Note kitchen.

(f) Note Funeral Chapel, Mortuary and Funeral Home as Undertaker.

(g) Service Stations: Note occupancy in general.

1. Auto sales and service. (Do not note repairing).

2. Filling stations. (Show gasoline tanks in proper locations.)

PACIFIC DEPARTMENT.—Show location of gasoline tanks only when above ground, or when buried under building or awning.

3. Tire sales and service. (Do not note vulcanizing.)

4. Auto greasing and washing.

5. Battery service.

3. **Public and Institutional Buildings** (a) Note general occupancy and official name: Federal Building, Post Office (do not abbreviate), Sing Sing State Prison, Indiana County Court House, Municipal

Auditorium, Columbia University, John Marshall High School, St. Joseph Parochial School, Rye Coun-

try Day School (private), Mt. Vernon Hospital (private), First Presby'n Church of Spokane, Metropolitan Museum of Arts, etc.

(b) Note schools, sanitoriums, asylums, hospitals, etc., when names would not show them as such, "Private": i. e., Mt. Vernon Hospital is a private hospital; St. Joseph Parochial School (parochial means private).

(c) When a small store or residence is used for religious purposes, merely note church, mission or chapel.

(d) Note local designation on Police Station or Fire Department as "3rd District Police Station", or "Fire Dept., Hose Co. No. 1".

(e) When there is a group of buildings making up one general occupancy, note name (if any) and general occupancy for each building.

(f) Do not note special occupancies in any building when character of official name indicates such an occupancy: i. e., operating room in a hospital; offices in a municipal building; court room in a court house, etc.

(g) Distinguish between a theatre and a motion picture theatre. A theatre has a complete stage and scenery and used for either motion pictures or personal acting, or both. Note stage and scenery and kind of fire curtain. A motion picture theatre is one used for showing motion pictures only and has no full stage and little or no scenery. Name of theatre should be given and specific occupancy noted. Motion picture theatres should be noted as "Movies".

(h) Give date when built, on all Public School Buildings of masonry or concrete construction.

4.

Storage Buildings

(a) Note contents or materials as to kind of merchandise or materials stored, i. e., in a general way.

(b) Auto houses (private): If division walls are of masonry or concrete and not parapeted and capacity is more than 2 cars, note "A" 3 stalls, etc. Do not draw division walls, unless parapeted or unless roof is non-combustible, in which case draw division walls which rise to but not through roof.

If there are no division walls or division walls are of combustible material, note capacity in cars as three (3) cars, etc.

In use of letter "A" make a pointed "A" so it will not be confused with letter "D".

(c) Garage: Note car capacity, repairing if any, and gasoline tanks. Mark large garage, not used by public, "Private".

(d) Hangar: Show gasoline tank. Note doping or other hazardous features.

(e) Retail Lumber Yard: Do not give height of lumber piles or average amount of lumber, merely note "Lumber" or "Lumber Piles".

(f) Street Car Barns and Bus Garages: In large cities where there are many barns and bus garages belonging to the consolidated companies, secure the specific name of each. Note capacity of car barns and yards; also capacity of bus garages.

(g) Tobacco Warehouses: Note capacity figured in hogsheads.

5.

Manufacturing Buildings

(a) Do not note specific occupancy of each floor in each building or division of building. Merely note "Factory Building", "Finished Product W. Ho.", "Raw Material W. Ho.", etc.

(b) Term "Loft" is to be used for tenant buildings occupied by various manufacturers or occupancies.

(c) It would be an endless task to give a complete list of all hazardous occupancies in manufacturing plants, so the surveyor must ever be alert to grasp new details and familiarize himself with the essential requirements.

Special hazards which should be noted in manufacturing plants:

BATTERY MANUFACTURING.—Kettles and dry oven.

BRASS WORKS.—Furnaces and Pots.

BREWERY.—Malt kiln.

CANDY FACTORY.—Kettles.

COFFEE AND SPICE MILL.—Coffee roaster.

COTTON AND WOOLEN MILL.—"Picker Room", show how protected from other parts of building.

DRY CLEANING PLANT.—Solvent (gasoline, benzine, etc.). Tanks. **Contents** of tanks very important.

FILM EXCHANGES.—Note carefully where and how films are stored.

FORGE SHOPS.—Furnaces.

FOUNDRY.—Cupola and core ovens.

FURNITURE FACTORY.—Dry kiln, shaving vault, lacquer spraying, varnishing, enamel oven, dip tanks.

GAS WORKS.—Generators, retorts, purifiers.

GLASS WORKS.—Furnaces and annealing ovens.

GLUE FACTORY.—Kettles.

GRAIN ELEVATOR AND FLOUR MILL.—Bleachers—wheat dryers.

ICE FACTORY, PACKING HOUSE, ETC.—Ammonia tanks used in connection with refrigerating machinery. **Specially note** outside connection for fire department or others for neutralizing ammonia.

MATTRESS FACTORY.—Picker.

METAL FURNITURE FACTORY.—Ovens for baking, drying, etc.

OIL CLOTH AND LINOLEUM WORKS.—Coating machine.

OIL REFINERY.—Stills and tanks. (**For general report, see Chapter IX.**) General information; show relative elevations and by arrows indicate probable flow of oil from tanks in case of fire. Show dikes around tanks and material of which constructed. Show oil drains. Note capacity of tanks in gallons or barrels. Where roof of metal tank has frame and sheathing of wood, note same "Wood Roof" irrespective of covering of composition or metal and in report say "All tanks are all metal except those marked Wood Roof". Do not color tanks.

PACKING HOUSE.—Smoke houses.

PAINT AND LACQUER SPRAYING.—Note wherever used, also spray booth, if any, and how protected.

PAINT AND VARNISH WORKS.—Kettles, dry color grinders.

ROLLING, WIRE AND TUBE WORKS.—Annealing ovens.

ROOFING PLANTS.—Boiling kettles or tanks.

SILK MILL.—Dryers.

SOAP FACTORY.—Still, soap kettles.

STAMPING AND SHEET METAL WORKS.—Drying ovens.

STOVE WORKS.—Drying or japanning ovens, cupola.

SUGAR REFINERY.—Sugar mill or pulverizer, dry ovens.

TANNERY, LEATHER MANUFACTURING.—Bark mill, dry rooms or lofts.

TOBACCO FACTORY.—Dryers.

WHISKEY DISTILLERIES AND WAREHOUSES
SPECIAL INFORMATION REQUIRED:

- (a) Present name and former Report name or names if any.
- (b) Official registered number.
- (c) (**For general report, see Chapter IX, Page 101.**)
- (d) Note number of months operated.
- (e) Show steam doubler or fire under doubler (wood or coal). If no doubler, state fact.

General Information (a) Note occupancy, heights, actual size (nearest foot) and distance in feet (nearest foot) between all distillery buildings and buildings used in connection with distillery. **These must be taped, not paced.**

(b) Show relative ground elevations and by arrows probable flow of whiskey from warehouses in case of fire.

(c) Show drains, if any, to carry off burning whiskey.

STILL HOUSE.—Note Still House. Show doubler with cross hatched line. Not necessary to note various kinds of stills.

FERMENTING HOUSE.—Note number and construction of tubs; as 7 wood tubs or 7 steel tubs, etc.

GRAIN ELEVATOR.—Give capacity in bushels and make note if of "Cribbed construction".

MILL.—Note location only.

MASH HOUSE.—Note number of tubs and meal cooker.

YEAST ROOM.—Note location and heat, if other than steam.

MEAL ROOM.—Note location.

FLAKE STAND.—Note.

SLOP OR FEED DRYERS.—Note and whether heat is steam or direct fire.

GRATE FLOORS.—Note grate floors usually found in still and fermenting houses. This type of floor is practically open from first floor to roof.

WHISKEY WAREHOUSES

Internal Revenue (a) Warehouses usually contain **Bonded** racks and should be so designated.
Warehouses

1. Rack Warehouses are classified as "open rack" or "floored rack".

2. An open rack warehouse has no floors but "cat-walks". (See Chapter V, Article 3 (c).)

3. A floored rack warehouse has racks each floor.

(b) Note construction of racks and number of tiers, if so equipped.

(c) Note official number.

(d) Note capacity in barrels.

(e) Give heat; if no heat, note.

(f) If warehouse is racked, note as "Int. Rev. Bonded Open Rack or Floored Rack W. Ho. 4E".

(g) If warehouse is not racked, show as "Int. Rev. Bonded W. Ho. 4E".

(h) If warehouses are racked and customs, show as "Int. Rev. Bonded Open Rack or Floored Rack Custom W. Ho. 4E".

(i) If warehouses are not racked but customs, show as "Int. Rev. Bonded Custom W. Ho. 4E".

(j) Whiskey warehouses partially or wholly bonded when located in general warehouse buildings, and not a contiguous part of any distillery, require only bonded number and capacity.

Rectifying and Blending Plants When not a contiguous part of any distillery require no detail information, but should be noted.

WOOD WORKING (includes interior woodwork, veneer works, box factories, sash, door and blind factories, hard wood turning, pail and wooden-ware, etc.). Show dryers or dry kilns, shaving or sawdust vault, blowers, varnishing and painting.

6. **Residential Buildings**

(a) Boarding or rooming houses and tourist homes should be noted "D" unless more than 10 rooms are used for lodging purposes, in which case note "Room'g".

PACIFIC DEPARTMENT.—Private boarding and rooming houses should be noted as "D" unless the number of rooms rented, not counting those occupied by the family, is in excess of the following: Arizona, California, Nevada, Utah, Montana—6 rooms; Oregon and Washington—5 rooms; Idaho and Hawaii—4 rooms.

(b) Fraternity or sorority houses, etc., should be noted as "Frat. Ho.", "Sorority Ho.", etc.; do not give name of fraternity or sorority, etc.

(c) Summer cottages, etc., near ocean fronts, on lakes, streams, etc., used solely for residential purposes should be noted as "D". If not numbered note name or other designation, if any.

(d) Rectories, parsonages, etc., should be noted as "D".

(e) Small real estate offices, beauty parlors, doctor's offices, dressmaking, etc., in a dwelling, flat or apartment, need not be noted if main part of dwelling, flat or apartment is used by occupant for personal residential purposes.

(f) Do not note occupancy of any residential building as "Tenement".

(g) Note name of large estates in addition to street number. By large estates are meant large acreage properties and not former large acreage properties subdivided into smaller units.

(h) Automobiles in basement of residential buildings should be noted as follows: "A in B" in a single building and "Autos in Bst's" in a row of buildings regardless of construction or protection unless fire proof. In the latter case say "A or Autos in Fire Proof B".

PACIFIC DEPARTMENT.—Do not note "A in B" in dwellings but show same in apartment houses.

(i) EASTERN DEPARTMENT

DWELLING.—A dwelling is a building constructed and occupied solely for dwelling purposes by not more than one family (temporary doubling up occasioning no alteration in construction does not change classification), or a two-story (2) building, occupied by not more than two families, one family each floor, and should be noted as "D".

FLAT.—A flat is a building having more than two (2) floors, occupied solely for residential purposes by one family for each floor and should be noted "F".

APARTMENT.—An apartment is a multi-family building having two or more apartments for each floor and occupied solely for residential purposes, and should be noted "Apts.".

Where residential buildings have distinct combustible or non-combustible division walls and only one occupant to a floor on each side of division walls or off a common entrance, use separate designations of occupancy.

(j) CENTRAL DEPARTMENT

DWELLING.—A dwelling is a building constructed for and occupied solely for dwelling purposes by not

more than one family and should be noted "D". Temporary doubling up of families for economic reasons occasioning no alteration in construction does not change classification.

FLAT.—A flat is a building two or more stories high and occupied solely for residential purposes by not more than two families for each floor and should be noted "F".

APARTMENT.—An apartment is a multi-family building having three or more apartments for each floor and occupied for residential purposes, and should be noted "Apts.".

(k) PACIFIC DEPARTMENT

DWELLING.—A dwelling is a building constructed and solely occupied for dwelling purposes by one family, and should be noted as "D". In some cases several dwellings may be attached, as in so-called bungalow courts. Temporary doubling up of families for economic reasons does not change this classification.

FLAT.—A flat is a building two or more stories high and occupied solely for residential purposes by two or more families, one or more living on each floor, and each family having a separate entrance.

APARTMENT.—An apartment is a building occupied solely for residential purposes by two or more families using a common main entrance.

All residential buildings occupied by more than one family are classed as multiple occupancy dwellings, and the number of families, flats or apartments must be shown. A building does not lose its dwelling classification unless the number of families is in excess of

the following: Arizona, Idaho and Hawaii—1 family; Oregon and Washington—2 families; California, Nevada, Utah and Montana—6 families. When using the term "Housekeeping Rooms", show the number of families as in apartments.

7. (a) **NAMES ON BUILDINGS.**—
General Detail for All Classes of Buildings Show names in addition to street numbers on principal buildings where more commonly known by name or occupancy than by street number. However, common sense must be used as we do not wish a lot of unnecessary names shown unless more or less of a permanent character and not subject to frequent changes.

(b) **VACANCIES.**—No building or division of a building used for business, public and institutional, storage or manufacturing purposes should be marked "Vac." unless the vacancy is of a permanent nature. (See exceptions, Article 1, 2 and 3.) By this, we mean unoccupied risks with equipment fixtures either removed or in such a condition that they cannot again be utilized.

1. When a vacant building is found originally designated by a hazardous occupancy that has since been removed, the term "Vac." should be used if the designation "S" will not properly convey the probable occupancy when it takes place.

2. If a building is vacant, and is open to aggress to anyone, note "Vac. and Open".

3. If a building is so dilapidated as to be unfit for occupancy, note "Vac. and Dilap'd". Do not note a building dilapidated because of its appearance or interior condition if exterior walls are in fairly good condition.

(c) NOT IN OPERATION.—This term is to be used when a building contains equipment and fixtures but has ceased operation of a permanent nature.

Care must be used by the surveyor that he does not report "Not In Operation" simply because at the time of survey, there is no apparent activity. Many plants operate on irregular schedules.

(d) BOILERS.—Do not show or note number of boilers and engines in any building. In buildings using high pressure boilers, use term "Boiler Rm". If in a separate building, use term "Boiler Ho.". Do not note horsepower of engines, use term "Eng. Rm".

(e) FURNACES, CUPOLAS, TANKS, OVENS, ETC.—Do not draw outlines of furnaces, cupolas, ovens, tanks, pots, etc., within building. Notes such as "Three Glass Furnaces", "Brick Bake Oven", "Two Core Ovens", etc., in their approximate location will suffice. (See Chapter VIII, Article 9 (h)).

(f) PUMPS.—Note by symbol only, pumps used for fire purposes.

(g) FAN ROOM.—Note fan room in connection with a ventilating system.

(h) INDEPENDENT ELECTRIC PLANT.—When a plant is equipped with an independent electric plant (i. e., they make their own electricity), the symbol **I. E. P.** should be placed immediately after "Lights Electric" or "Power Electric" in report. This symbol must also be placed in diagram of buildings which are used exclusively as independent electric plants.

(i) Note gasoline engines and independent gas lighting plants and material from which gas is generated.

(j) FUEL OIL TANKS.—Where crude oil is used for fuel, unless residential building, show tank. Do not give capacity.

(k) FOAMITE GENERATING BUILDING.—Note on diagram.

LIST OF STORES TO BE MARKED AS "S".

Agricultural Implements	Cleaning (Spot cleaning & pressing—no tanks)
Antiques	Cobbler
Army Goods	Coffee, etc. retail (Note roaster)
Art Dealer	Costumes
Artists Material	Curios
Automobile Supplies	Cutlery
Bakery (Note oven and Bake House)	Delicatessen
Barber	Desks
Bazaar	Dressmaker (If in dwelling, do not note)
Beauty Parlors	Drugs
Billiards and Pool	Dry Goods
Bird Stores	Electric Lamps and Fixtures
Books	Electrical Goods
Boots and Shoes	Engineers Supplies
Bowling Alleys	Feed Store
Brushes	Fish Dealer
Buffets	Fishing Tackle
Butcher	Florist
Butter, Eggs, etc.	Flower and Vegetable Seeds
Cameras	Fruit and Vegetable Furniture (Show repairing)
Candy (Note kettle, if any)	Furrier
Carpets and Rugs	General Merchandise
Cash Registers	Glassware, etc.
Caterer	Grocer (Retail)
Children's Wear	Guns and Sport'g Goods
China, Crockery and Glassware	Hair Goods and Hairdressers
Chinese Laundry	Hand Laundry
Chinese Stores	
Church Goods	
Cigars and Tobacco (Note m'f'g, if any)	
Clothing	

LIST OF STORES—Continued

Hardware (Retail)
 Harness
 Hats and Caps
 Janitors Supplies
 Jeweler
 Ladies Furnishings
 Liquor Store
 Meat Market
 Men's Furnishings
 Millinery
 Monuments
 (Where no work)
 Musical Instruments
 and Sheet Music
 Newsdealer
 Notions
 Novelties
 Office
 (Except in plants)
 Optical Goods
 Paper
 Pawnbroker
 Phonographs & Records
 Photographic Supplies

**HAZARDOUS OCCUPANCIES****A**

Automobile Repairing
 Auto and Carriage Body Work
 (Note paint and lacquer spraying)

B

Bank (Not hazardous—shown for location only)
 Battery Service Station
 Binderies
 Blacksmith
 Broom and Brush Works

C

Cabinet Shop
 Candy Shop (Note kettle)
 Carpenter Shop
 Carpet and Rug Mill
 Chemical Works
 Cleaning and Dyeing
 Clothing Factory
 Coffee Roasting (Note roaster)
 Cooperage Works
 Cordage Works

D

Department Store

E

Electrical Works

F

Feed and Hay
 Furniture Repairing

G

Garage

H

Harness Factory
 Hat or Cap Factory

J

Jewelry Manufacturing
 Junk Storage

L

Laboratory
 Lacquer Spraying (Note spray booth if any)
 Laundry (Steam)
 Leather Working
 Lithographing

M

Machine Shop
 Mattress Factory

Metal Working
Monument Works
Moving Pictures (Movies)

N

Neon Sign Works

O

Oils

P

Painting

Paints and Varnish

Photo Gallery

Picture Framing (Wood waste and paint)

Plumbing Shop

Printing (Inflammable Liquids)

Pyroxylin Spraying

R

Radio Works

Restaurant (Maps of three volumes or less)

S

Shoe Factory

Sign Manufacturing or Painting

Silk Mill

Stencil and Stamp Works

Stove Works or Repairing

T

Telegraph Office (No hazard—shown for location only)

Tel. Exchange (No hazard—shown for location only)

Tent and Awning Factory

Tin Shop

Tire Sales and Service

U

Undertaker

Upholstering

W

Wall Paper

Wood Working

CHAPTER VII**WINDOWS AND OPENINGS**

1.

Windows

(a) Windows are only shown in walls of masonry and concrete construction.

(b) Exterior openings are shown by window symbols, whether they are windows or doors.

(c) Show, by symbols, floors on which windows are located. Never use the word **windows**, use the **Symbol**. Do not attempt to show all windows in a wall which has a great many, however, show window symbols approximately every 35'.

(d) If there are no windows in a wall, where called for, note "NONE" or "NON".

(e) Show protected windows where found.

(f) If an ordinary symbol does not show a window which is overlooking as such, note window as overlooking (abbreviate O. L.). For example, one building might have a window in the second floor overlooking the roof of adjoining two (2) story building.

(g) In buildings six (6) stories high, or over, show one (1) window symbol and note next to symbol on inside of diagram the floors which have windows, as for example: 1 to 6 meaning windows on all six (6) floors, or 9, 10 meaning windows ninth (9th) and tenth (10th) floors only. In buildings less than six (6) stories

high, where space does not permit showing windows in the regular way, the same idea can be used.

(h) Where a new building with independent wall is built against an old building of masonry or concrete construction in which windows were shown, be careful to scratch out the symbols if windows have been closed. If windows still exist and are merely blocked by new wall, show them by window symbol.

(i) In showing windows do not consider the basement as a story, though basement windows should be shown as in first floor, and marked "B" if they are the only openings or only protected or unprotected openings in wall.

(j) Unprotected windows are to be shown as follows:

1. Rear of business building (irrespective of exposure).

2. Walls on alley line or within 5' of alley line, unless one story private auto houses.

3. Walls where there are both protected and unprotected windows.

4. On side walls (unless residential building) whether or not on lot line, unless there are bay windows, courts or ells along wall.

5. On walls of manufacturing buildings.

(k) Unprotected windows are not to be shown, as follows:

1. Dwellings, small flats or apartments, private garages, and other out buildings unless exposing within 30' of a business, public and institutional,

storage or manufacturing building of combustible or non-combustible construction.

2. Veneered residential building.

3. STREET SIDES: If street is less than 30' wide and building does not front on street, show window symbols.

4. Walls with ells, bays, areaways and courts.

5. School houses and churches unless exposed within 30'.

6. Opening on or overlooking porches.

7. Overlooking windows having unprotected interior openings below.

8. If major part of wall is of combustible construction.

(1.) PACIFIC DEPARTMENT.—Show both protected and unprotected windows in walls of masonry or concrete construction, except in interior areaways, courts or light wells. This does not apply to dwellings.

2. **Openings** (a) Interior communications whether passageways or windows are classified as "OPENINGS".

(b) On new work and work corrected for republication, all openings should be shown by symbols and not by broken line as on printed map.

(c) Interior openings (no other data) should be shown on skeleton outline buildings.

(d) Note floor location of opening in proper position on division walls by figures; for example: B-1, meaning basement and 1st; 1 & 4, meaning 1st and 4th; 1 to 4 meaning 1st, 2nd, 3rd & 4th, etc. If open-

ings are on all floors, note "ALL". It is not necessary to note the location of openings from a one story into another one story building, or from a higher building into a one story building.

(e) If there are no openings in wall, where called for, note "NONE" or "NON".

3. **Fire Doors** (a) Fire doors are used principally to protect openings in non-combustible division walls and in walls of vertical shafts. Fire doors are classified as standard and non-standard according to their construction and hangings. They are to be shown by symbols.

(b) Standard Fire Doors:

1. Standard fire doors are of horizontal and vertical sliding, swinging and counterbalanced types. (For illustrations, see Diagram No. 4.)

2. Standard fire doors must be of closing type. There are two methods of closing:

(a) Self Closing, that is, arranged with springs or counter weights to close themselves every time they are opened.

(b) Automatic, that is, arranged with fusible links or thermostatic devices so they will close automatically when subject to heat of fire.

3. All hardware and hangings must be of metal construction. No combustible materials to be used on doors, hangings or hardware. Lintels and sills must be of non-combustible materials. Horizontal and vertical sliding doors must overlap openings at least four (4) inches. Swinging doors must fit into rabbet in the wall.

4. Types of fire doors:

Metal clad—wood core, sheet metal covered

Tin Clad—wood core, tin covered

Steel, rolling

Steel-plate

Hollow metal

5. Construction of standard fire doors are technical in nature. Detail of construction is very hard to determine, especially in case of metal clad and tin clad doors. To give list of specifications would serve no purpose.

6. Do not show any door by standard symbol which has not the stamp of underwriters laboratories or similar approval. This label may be on outside, inside or edge of door.

4. **Fire-resistant Shutters** (a) There are two classes of shutters: automatic rolling shutters (interior shutters), and swinging shutters.

(b) Details regarding fire doors apply also to shutters.

(c) No shutters are to be shown as standard.

(d) Use the symbol for shutters outside whether shutters are exterior or interior.

5. **Wired Glass** (a) Glass is about $\frac{1}{4}$ " thick and has imbedded in center a wire netting with meshes about $\frac{3}{4}$ " in diameter. Glass may or may not be transparent.

(b) Show by symbol wired glass windows with metal frames. Do not neglect to note "W. G." on symbols. If wired glass windows have wood frames, give no credit for wired glass and use ordinary window symbols.

(c) No wired glass windows in metal frames are standard fire-resistive windows because of the inherent limitations of glass, which transmits radiant heat and flows at temperatures often reached in fires.

(d) Show wired glass skylights in metal frames. Be certain of this, however, as a wire screen over ordinary glass may give the effect of wired glass when looking at it from underneath.

6. **Ventilators** (a) Pipes or flues extending through roof are classified as ventilators. Do not show small ventilators but large ventilators should be shown, especially in roof of stage sections of theatres, auditoriums, etc. (See Key of Symbols.)

7. **General Notes** (a) Do not show proposed fire doors, fire-resistive shutters or wired glass windows. We can only show what is in existence at the time of survey.

(b) Wired glass panels are not permitted in standard fire doors for openings in division walls. Small wired glass observation lights are permitted in standard doors of elevator shafts or stair halls.

(c) Do not show fire doors or fire-resistive shutters which through neglect, weather, etc., are worthless, i. e., metal or tin clad covering may be broken or rusted through, iron doors or shutters may be rusted through, warped and would not close, etc.

(d) If self-closing devices are only temporarily out of order, this is no defect in a standard fire door.

CHAPTER VIII

FIRE PREVENTION EQUIPMENT

1. **Automatic Sprinklers** (a) The automatic sprinkler is by far the most important of all fire protection devices, so be very careful to indicate by proper symbols just which part or parts of a building are sprinklered or partially sprinklered.

(b) Use the symbol  in all buildings completely equipped with automatic sprinklers.

(c) If a building is only partially equipped, indicate the extent by symbols with notes, for example,

  etc.

(d) Any building or division of a sprinklered risk that is not sprinklered should be indicated by the symbol .

(e) Indicate automatic chemical sprinklers by the symbol .

(f) Note outside open sprinkler, or sprinklers, as follows: OPEN SPKLR., OPEN SPKLRS., OPEN SPKLRS. 1st, etc. Place this information along the outside of wall or window symbol to which it applies.

(g) Small hand hose, attached to sprinkler piping, should be noted in general report, i. e., "hose att'd to sp'kl'r syst.".

(h) There are several types of automatic sprinkler systems such as: "Deluge" systems for extremely hazardous occupancies; "Preaction" systems for properties subject to severe water damage; "Class B" systems for institutions and public properties; "Junior" systems for basements of dwellings, etc. Make no distinction for such systems, merely use the symbols.

2. **Standpipes
(Vertical
Pipes)**

buildings.

(b) Indicate the location of a standpipe by symbol (see **Key of Symbols**), and note hose, i. e., V. P. 50' 2" HOSE EA. FL., V. P. 75' 2" HOSE 3 & 4, V. P. NO HOSE. Mark such hose connections in one-story buildings as hydrants.

(c) Outside standpipes are dry pipes for fire department pumper and hose connection, and are shown by special symbol as noted on **Key of Symbols**.

3. **Fire Dept.
Connections**

(a) Outside connections which enable a public fire department to furnish an auxiliary supply of water to sprinkler and standpipe systems should always be shown as per **Key of Symbols**.

(b) Connections for fire boats should be noted as such in addition to the symbol.

(c) Connections to the ammonia tanks in refrigerating plants should be noted as such in addition to the symbol.

4.

**Water
Pipes**

(a) All water pipes over 2" in diameter must be drawn by colored lines in the middle of such streets that have them, and elsewhere, except through building diagrams, in their approximate location. Smaller water pipes are only to be shown when connecting mains of larger size or supplying fire hydrants. Do not break lines for street names or description that may be on sheets. The Waterworks Superintendent, or some city official, generally has a map showing this information.

(b) Note the size in inches at each extremity of a water pipe on a sheet except in marginal streets where it is only necessary when pipes change in size.

(c) Where pipes change size, mark an "X" and note the sizes on each side.

(d) Intersecting lines which do not actually connect should be drawn thus:



(e) Use a blue line for all water pipes except those of a "high pressure fire service" or private pipes supplied from private sources.

High pressure fire service pipes are those used exclusively for fire service and have no connection with other service pipes. Such pipes must be colored red and noted (H. P. F. S.) in addition to the size.

Private pipes supplied from private sources in streets or on grounds of manufacturing plants and

institutions must be colored brown and noted (PRIVATE) in addition to the size. (This does not apply to private pipes supplied by public system.)

When a public water system maintains low service, high service, etc., note on the pipes in addition to the size (L. S.), (H. S.), etc., as the case may demand.

5. **Fire Hydrants** (a) Outside hydrants must be shown as per **Key of Symbols** in their actual location.

If connected to H. P. F. S. mains, such hydrants are to be marked H. P. F. S. in addition to type of hydrants.

(b) Inside hydrants must be indicated by an open circle and note.

(c) Hydrants and hose enclosed in small houses are commonly found on premises of institutions and manufacturing plants. Do not draw such houses but carefully note hydrant and the amount and size of hose.

(d) Hydrants need not be connected to water pipes except where there are two systems on the same street, or where they adjoin pipes of different sizes, then connect hydrants to proper supply pipes.

6. **Fire Alarm Systems** (a) 1. Municipal outside boxes of a public fire alarm system must be shown as per **Key of Symbols** in their actual location.

2. Inside boxes must be indicated by the same symbol but place it on the outside with note "INSIDE BLDG.".

(b) Private Systems maintained by large manufacturing plants, etc., should be noted in the report only.

7. **Automatic Fire Alarm Systems** (a) Note **A. F. A.** only in buildings equipped with fire detecting devices which automatically turn in an alarm to a central fire station.

(b) There are two different classes of fire detecting devices:

1. Fixed-Temperature type, designed to operate when the temperature reaches or exceeds a certain degree.

2. Rate-of-Rise type, designed to operate when the rapidity of the temperature rise exceeds a certain pre-determined rate.

8. **Watchman Service** (a) Be particular to note if any building or group of buildings maintains a watchman, and a system of verifying his activities.

(b) The systems are:

1. Central Station Service, reporting to central office of outside interests.

2. Proprietary Service, reporting to a plant station (applicable to large plants).

3. Stationary Time Recorder System.

4. Portable Watch Clock.

(c) Note in the report of any building or group of buildings so equipped:

"Watchman—Central Station Service"

"Watchman—Proprietary Service"

"Watchman—Stationary Time Recorder System"

"Watchman with clock"

"Watchman—No clock"

Make no mention of the number of watchmen.

9. **Miscellaneous** (a) Indicate the location of pumps used to supply water for fire purposes by the **symbol** only.

(b) Perforated water pipes are sometimes used along eaves and ridges of roofs for protection via water curtains. Make special note of these.

(c) Note the existence of live steam jets which are often used in dry kilns, picker rooms and other hazardous places.

(d) Smothering systems are used to extinguish or prevent fire primarily by excluding air from the burning surface and are adaptable to oil refineries, tank farms, chemical works, etc., including among others, Foam Extinguishing, Carbon Dioxide, Carbon Tetrachloride, Inert Gas, Steam and High Pressure Water Spray Systems.

Note "Protected by Smothering System" in the report or on the building of any property permanently equipped with such a system.

(e) Hose carts and the amount and size of hose carried should be noted.

(f) Chemical extinguishers of 20 or more gallons capacity should be specifically noted.

(g) Note the existence of hand chemical extinguishers, fire pails, barrels, etc., only for buildings necessitating a complete report. Do not specify the number, merely note "CHEM. EXT'G'RS", "FIRE PAILS", etc.

(h) Show all water tanks used for fire protection supply, particularly in connection with sprinkler systems. Note material of tank, supporting structure,

capacity and elevation of base above ground or building. Omit service tank shown on or in buildings. Note location and capacity of pressure tanks in connection with sprinkler systems.



CHAPTER IX
REPORTS

Make all reports as brief as possible, but do not omit any essential details.

1. TOWN REPORT

- (a) Name of town:
- (b) County:
- (c) State:
- (d) Population:
- (e) Prevailing winds:
- (f) Paving:
(In a general way—miles paved.)
- (g) Ground elevations:
"As shown". If not shown, describe as "level" or "nearly level". If shown on detail sheet, note source of datum.
- (h) Public lighting:
(Note only when other than electric.)



2. WATER WORKS REPORT

- (a) How owned:

- (b) Source:
- (c) System:
- (d) Reservoirs:
(Their capacity and elevations.)
- (e) Pumps:
(Make and capacity. Omit size.)
- (f) Standpipe, Reservoirs and Gravity tanks:
(Capacity and elevation of base above business section.)
- (g) Auxiliary systems:
(Such as high pressure, etc.)
- (h) Miles of pipe, number and types of hydrants:
- (i) Average daily consumption:
- (j) Domestic and fire pressure at some corner of business section:

3. FIRE DEPARTMENT REPORT

- (a) Fully paid, partly paid or volunteer:
- (b) Chief:
(Fully paid or otherwise.)
- (c) Number of assistant chiefs:
(Fully paid or otherwise.)
- (d) Number of men:
(Fully paid or otherwise.)
- (e) Number of fire stations:
- (f) Apparatus in same in detail for each station on Town Maps only, such as:
Fire Station No. 1—Apparatus
Fire Station No. 2—Apparatus
(Summarize apparatus on all BOUND MAPS.)

- (g) State if not motorized or if partly motorized:
- (h) Fire alarm system:
- (i) Number of boxes:
- (j) Any other means of giving alarms:
- (k) If electric fire alarm system, give location and construction of buildings occupied as fire alarm headquarters:
- (l) Show data in regard to fire-resistive roofing ordinance:

FIRE-RESISTIVE ROOFING ORDINANCES.

At foot of Town Report make note of any ordinance in existence, prohibiting wooden shingle roofs. If there is no ordinance state that fact.

FOR EXAMPLE.—The note should read as follows:

FIRE-RESISTIVE ROOFING ORDINANCE.

Ordinance prohibiting wooden shingle roofs, adopted October 25th, 1926.

All such roofs to be replaced by fire-resistive roofing by 1941.

Surveyors should use care and judgment in ascertaining whether the shingle roof ordinance includes the entire or a portion only of the area within the corporate limits. Any exceptions should be noted. Cases may be found where wooden shingle roofs are prohibited in only certain sections of the city, such as the mercantile district and the dwelling district immediately adjoining.

(m) On all classes of work, Town, Water Works, Fire Department and Roofing Ordinance Reports should be made on separate paper and pinned to key sheet.

4. **General Report**

- (a) Note reports for manufacturing plants, special hazards, large mercantile establishments, and for all buildings which have special fire equipment, etc.

(b) In making reports, use judgment and make them as brief as possible, still containing all essential points. For example, do not necessarily lengthen sentences, such as, "Fire pails distributed throughout". Simply say, "Fire pails".

(c) When a plant has a different name than one noted on previous survey, old name should be dropped except on distilleries (**see Chapter VI, Article 5**), and coal mines, where old names must be repeated in brackets.

(d) FORM FOR REPORT:

1. Firm name and character of manufacturing or business. Use care in noting name of firm. Where firm names are abbreviated as A. T. S. Co., make marginal note in long hand of meaning so the name can be properly classified in type index of specials. Where there are two different designations for a plant, note both, as for example: Globe Rolling Mills, John Sweet, Proprietor; American Biscuit Company, Chas. Brown Bakery, etc.

2. Watchman. Note watchman and service used. (**See Chapter VIII, Article 8.**)

3. Heat. Note heat for any building where com-

plete report is necessary except in public and institutional buildings; note heat only when other than steam or hot water.

The hazard of hot air heat, either directly from furnace or from air heated by steam, is the air ducts which convey the heat throughout the building. The use of fans to blow the hot air, increases this hazard. Note either "HEAT: HOT AIR DUCTS", or "HEAT: HOT AIR DUCTS & BLOWER".

4. Light. Note only when other than electric. I. E. P. should be noted as heretofore.

5. Power.

6. Fuel.

7. Blowers or pipes to carry off waste. (State disposition of waste.)

8. Water supply. If private, source of supply and complete report as to pumps, etc. Gravity Tanks; capacity, how elevated and height of base of tank above ground.

9. Number of feet and size of hose, private hydrants, etc.

10. Fire pump. Make, capacity and water supply.

11. Special equipment to reduce fire hazards, such as fire pails, sand pails, various kinds of chemical extinguishers, smothering systems, private fire department, etc.

12. Do not note light and power on small manufacturing plants, printing plants, etc., where no complete report or name is given unless other than electric.

13. Air Conditioning. Air conditioning systems

differ from ordinary systems of heating and ventilating ducts in that they are generally equipped with cooling coils or apparatus, filters or water sprays for washing the air, and operate under positive mechanical draft provided by fans, although fans are also employed in some ordinary ventilating systems which do not include equipment for conditioning air. Note "Air Cond." in buildings so equipped except residential buildings.

14. F. I. A. or Mutual Risks: (Not applicable to Pacific Department.)

Many industrial plants are insured through the Factory Insurance Association or in Mutual Insurance Companies. It is important that this information be shown on the map. They should be noted "F. I. A." or "Mutual Risk". Mutual risks are just as important as any other risks and the same effort should be made to obtain admittance as elsewhere. In risks of this character, plans are very often on file at the office. Make an effort to obtain these plans and after you have copied them, make an inspection to verify them and also to insert any changes or new buildings.

If admittance is refused one of two notations should be used:

- (a) Admittance refused. Data from plans in office.
- (b) Admittance refused.

15. Additional information in general reports for certain classes of risks:

- (a) COTTON GINS.—Note system (name of ginning); round or square bale press. Lint flue, how protected. If not, note "lint flue unpro-

tected". Common protection for lint flues is live steam jet.

(b) FLOUR OR GRIST MILLS.—Capacity in barrels.

(c) GRAIN ELEVATORS.—Name of party owning or operating in addition to special designation. This applies particularly to small elevators and warehouses found along railroads. Do not note name of local manager, or superintendent, on small elevators of a group or chain of elevators. Make distinction between grain house and cleaning house. Year when built, capacity in bushels, whether or not cribbed construction (cribbed construction means walls of bins are of timber or planking laid flat). Give height in feet to eaves and of Head House or Texas. Give construction of Head Ho. or Texas.

(d) SAW MILLS.—Date built; amount of clear space between mill and lumber; amount of lumber on hand; capacity of mill; distance to forest if immediate exposure; note whether mill and yards, either or both, are on filled ground, and if latter, character of filling.

CHAPTER X

CORRECTIONS FOR PASTERS

1. **Use of Sheets** Clean surveyor's copies are a practical aid in interpreting them as they become old. Use the sheets carefully, always remembering they are to be in use for a long number of years. Care on your part in the use of the sheets will add many years to the serviceability of them.
2. **Outline and Data Required**
 - (a) Survey sheets in order commencing with No. 1, so that a consecutive lot may be sent in if requested.
 - (b) Each block must be thoroughly gone over, all new buildings or additions shown, as well as changes in numbers, story heights, roof symbols and other details.
 - (c) What has or what has not been incorporated by slips in previous revisions is no precedent. Field work must be complete as to all changes and detail.
 - (d) When correcting business sheets it is advisable to obtain an unobstructed view of the blocks from some tall building. Structural alterations, etc., are often more easily detected in this manner, particularly in blocks without alleys.

(e) All mercantile risks must be inspected within the building for openings, occupancies, fire protective equipment, interior changes, etc.; and outside for all exterior changes. Specials must be gone through and all improvements and changes noted. Be careful to check firm names and reports of such risks.

(f) It is not necessary to verify wall figures, fire walls, skylights and construction, but be alert at all times for possible errors in this class of work.

(g) Openings in solid walls in business section must be carefully checked. If an underwriters' bureau exists in the city, go there and ask for permission to check up your corrected business sheets with theirs. The bureau is usually up-to-date on these points, but such changes as they have must be verified on the field. Do not rely on their information to the exclusion of your own field work.

(h) Where new buildings replace old ones, carefully scratch out all lines and other information, which should be eliminated with separate and distinct wavy lines (do not use eraser or knife), then draw the new risk complete in its proper position. If this is not perfectly clear, make an accurate tracing of survey and pin it (never paste) on sheet. (See Diagram No. 5.) In all cases, however, draw the new building or buildings in complete outline on the original sheet. If a tracing is made, put on it the name of the map, (volume, if bound), sheet number and date of survey.

Do not make unnecessary tracings.

(i) The report of water works, size of mains, hydrants, and report of fire department must always be carefully compared with the latest official reports and

changes, if any, noted in the report and on detail sheets. The town report, if changed radically, should be made entirely new on a separate piece of paper and pinned to the map rather than attempt to correct it by leaders and notes.

(j) Be careful to check distance on both sides of new buildings. An error of, say, one lot of 25' either way, may not be discovered for several revisions.

(k) Do not make a correction slip to extend beyond the boundaries of a sheet which will necessitate folding.

(l) Check the street number of new buildings with adjoining or opposite buildings. If it does not conform, make note. It sometimes happens that a building has been moved from another street or a new system is started with this particular building.

(m) The width of a building is not so important as the distance between buildings.

(n) Where buildings are duplicated, any changes must be made on both streets.

(o) Do not make any corrections merely for railroad tracks in yards.

(p) Keep unpaved street information up to date.

(q) Verify heat and light as shown in all public buildings.

(r) Red marks are not to be used where changes are perfectly obvious but do not fail to use them where corrections are obscured or liable to be overlooked.

(s) Do not correct a congested district map, graphic map, skeleton sheets, or index. The Publishing Plant will make the necessary correction.

(t) Obtain, where possible, most recent copy of city map and send it in with completed sheets.

(u) Do not use **solid coloring or ink** on corrections for pasters.

(v) Verify information concerning **vacant** and **not in operation**.

(w) Information relative to location of city records, etc., should be noted on back of key map.

(x) The key map must also be kept up to date on each revision in regard to new streets, hydrants, fire and corporate limits, etc.

3. **“Spotting In”** on **Key Maps** Spot in, with reasonable accuracy, on key maps all buildings not shown on the mapped area, being particular to note **in long hand** the type of risks represented by

the “spotting in”. Use colored pencils in this work—**red** for residential buildings, **blue** for other classes of buildings. The information this conveys is useful to your Home Office as a reference, as well as determining the character of future operation.

4. **Additional and Expansion Sheets** No additional or expansion sheets are to be made except on approval of the management. In making additional sheets to maps, the plotting of the new work should be made

correctly regardless of how it matches with the old. There are cases when a large special hazard outgrows a 50' scale sheet and then a new sheet can be made to advantage at the scale of 100' to the inch, to cover entire plant. The same might apply to territory comprising a light dwelling sheet on edge of town, where map already comprises too many sheets.

5. **Removing of Risks** Do not remove a risk from a sheet merely to make a better arrangement. Transposition of a risk from one sheet to another should

only be done as an extreme measure to show this particular risk in its entirety, or to show expansion of some other risk on that sheet. Where such transfer is made, note must be made on old risk or previous location of risk of new location and old risk should not be covered by any other item until the next revision after the one in work except where expansion of adjoining detachment requires such space.

6. **Reports** If making a complete new report (Town, Fire Department, Water Works and Roofing Ordinance), it should be made on a separate piece of paper and pinned to key sheet.

CHAPTER XI

SPECIAL DATA FOR VARIOUS LOCATIONS

EASTERN DEPARTMENT

1. Massachusetts—Boston

Use "L" (Lowery) on hydrants to distinguish them from standard hydrants.

2. New York—New York City, Manhattan and Bronx

(a) Buildings of fire proof construction are not written "fire proof construction". The color denotes same.

(b) Buildings of non-combustible material, but with certain defects, are colored brown and marked SEMI-.

(c) Roof structures shown dotted and where constructed of different material than the main structure are colored around the edge only and not solid.

(d) Set backs in buildings are shown with dot and dash lines and not dots.

(e) Walls out on any floor are shown as for "set backs".

(f) Independent walls shown by heavy lines.

(g) Buildings of $1\frac{1}{2}$ stories are marked 1A.

(h) Basements are shown on all mercantile and apartment buildings regardless of ceiling height above curb level and marked "F. P. to 1st." where found.

(i) Basement section extending outside main building at grade level having vault lights are marked "Vaulted Yard".

(j) Mansard roofs are shown by symbols thus
 iron,  frame.

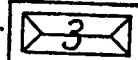
(k) Store divisions are shown by line about $\frac{1}{4}$ inch long from the building line at right angles and using one S.

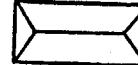
(l) Buildings occupied as store and dwelling are so marked.

(m) Height in feet shown on all buildings and is written above story height and not in center.

(n) Occupancies of buildings written at right angles to building line and not parallel.

(o) Blue color shown for stone faced buildings.

(p) Skylights lighting more than one floor .

(q) Greenhouses shown  and colored.

(r) Stairways in buildings now marked "Stairs". "Fire Towers" are so marked.

(s) Public Schools—no interior partitions are shown.

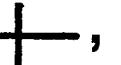
(t) Elevators are shown with vertical E enclosed in heavy lines for brick and thin lines denoting frame or open shaft.

(u) Hatchways and dumbwaiters are shown  heavy and thin lines denoting brick or frame.

(v) Hoistways are shown  and if trapped marked TR.

(w) Vents, chutes and incinerators shown by heavy and thin lines denoting brick or frame and marked VT, CH, and INC.

(x) Reports as to watchman service shown only on large plants or where a full report is considered necessary.

(y) Water pipe connections at intersections are shown  , not connected  .

(z) The term "Not Open" also means impassable to fire apparatus.

(aa) Hydrants: No designation as to single, double or triple is noted. High pressure hydrants are marked H. P.

(bb) Outside fire department connections are shown  .

(cc) Fire engine houses shown on Key Map solid with numbers given.

(dd) Fire alarm boxes shown on key maps.

(ee) S. F. (L) light manufacturing. S. F. (M) medium manufacturing. S. F. (H) heavy manufacturing. Light, medium and heavy now omitted and written as F.

3. **Brooklyn** ("e" to "i" inclusive do not apply to Volumes Nos. 5, 7 and 9.)

(a) Wall figures denote variation in wall thickness.

(b) Building department shaft (B D S): Well hole or dumbwaiter shaft, built of fire-resisting material in accordance with laws of Building Department.

(c) Well hole with frame sides  .

(d)  Indicates fire proof stair house--concrete floors and roof and tin clad doors (kalamine).

(e)  Vertical pipe with 50' $2\frac{1}{2}$ " hose at each connection (any difference in, or omission of equipment as above specified is stated).

(f) Street numbers close to buildings are taken from official records, outside numbers are wrong numbers actually on buildings.

(g)  Frame elevator in brick building.

(h)  Brick elevator; any other than brick noted.

(i)  Outside A S or steamer connections.

Volumes Nos. 1 to 4 Inclusive

(j) Semi F. P. = Semi-fire proof construction (Beams, columns or girders) not protected or other defects.

(k) F (L) Light Manufacturing
 F (M) Medium Manufacturing
 F (H) Heavy manufacturing { Loft on
other Vols.

(l)  Mansard roof (double and single).

(m)  W G Windows frame sash.

(n)  Hatchway or dumbwaiter or hoist.

(o)  Fire alarm box for high pressure service.

(p)  Single hydrant

 Double hydrant

 Triple hydrant

 Quadruple hydrant

(q) Solid walls shown solid 1st only, or not reaching roof.

(r) H. P. Boilers shown.

(s) Outline of ovens, furnaces, tanks, etc., shown.

(t) Buildings with set backs shown by dot and dash lines.

4. Queens

(a) Bank names are shown on detail sheets when name of building, even though smaller than size required by Manual for mercantile names.

(b) Street names—Old names continued—not dropped after first correction.

5. Pennsylvania—Philadelphia

(a) Buildings with unprotected steel or other details not satisfactory, but otherwise of fire proof construction are noted "Semi-Fire proof Constn".

(b) Blue strip around fire proof buildings having stone facing on street sides.

(c) "F" now in use for manufacturing building unless a specially hazardous occupancy. "F" not used for Flats. Buildings housing three or more families are marked "Apts." "S. F." Store and Factory.

(d) On certain volumes in Philadelphia, the small frame extensions in rear of brick rows, except when connecting across two or more buildings, are not shown.

(e) "F. W. M. S."—Fire Water Main Service. Stations or private telephone service connecting directly to pumping stations and repair stations of the High Pressure Fire Service.

(f) A small arc drawn around the end of party wall in brick rows indicates a narrow passage on ground level from front to rear under the wall. These passages do not rise to the second floor level.

(g) Ward numbers are prominently noted on the detail sheets.

6. Pittsburgh

The term "RANGE" printed across adjoining frame buildings indicates such buildings are only six inches or less apart.

7. Southern States.—In the following states note thickness and coping of parapets beside the parapet symbol: Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas and Tennessee.

8. **Odd Sizes of Sheets** In the Eastern Department, there are two sizes of paper used in surveying maps.

The standard size paper is 20 $\frac{3}{4}$ "x24 $\frac{3}{4}$ " and is referred to as square bound paper. All town and bound map publications are surveyed on this paper with the exceptions listed below.

Paper $18\frac{1}{2}'' \times 27\frac{1}{2}''$ is referred to as long bound paper. The following bound volumes are surveyed on this size paper:

MASSACHUSETTS—	Boston	Entire series
	Brookline	
NEW YORK—	Brooklyn	Entire series
	New York City	" "
	Queens	" "
	Troy	" "
NEW JERSEY—	Hudson County	" "
	Newark	" "
PENNSYLVANIA—	Conshohocken	
	Delaware County	Entire series
	Montgomery County	" "
	Philadelphia	" "
MARYLAND—	Baltimore	" "
	Washington Suburban	
DIST. OF C.—	Washington	Entire series

general layout of a city, or type of territory to be mapped, makes it practical to survey the district at other than standard scales.

The following list represents bound volumes in the Eastern Department published at odd scales:

NEW YORK—

Brooklyn	-----	{	Entire series, large scale	60'
			“ “ small	120'
Bronx Vols. 13, 18, 19, 20 & 22	-----	{	Large scale, 60'	
			Small “	120' +
Bronx Vol. 21	-----	{	Large scale, 60'	
			Small “	80' +
Queens	-----	{	Entire series, large scale	60'
			“ “ small	120' +

NEW JERSEY—

New Jersey Coast Vols. 1, 2, 3 & 5 { Large scale, 60'
Small " 120'

MARYLAND—

DISTRICT OF COLUMBIA—

Washington-----{Entire series, large scale 60'
" " " small " 100'

CENTRAL DEPARTMENT

10. Illinois—Chicago

(a) DWELLINGS, FLATS AND APARTMENTS.—Buildings designed for dwelling purposes and for not more than two tenants are to be shown as dwellings; if there are more than two tenants, class as flats; if there are more than two tenants to a floor, class as apartments.

(b) HEIGHT TO EAVES.—Note height to eaves on all mercantile buildings regardless of construction.

(c) WALL THICKNESSES.—Show wall thickness on all masonry or concrete buildings.

(d) BASEMENTS.—In connection with story heights note basements for all buildings.

Masonry or concrete basements in frame buildings are to be noted as follows:

BR. Bst. = B. B. Stone Bst. = S. B.
Tile Bst. = T. B. C. B. or Conc. Bst. = C. B.

Do not note construction of basements in masonry or concrete buildings except where basement is frame, in which case note "F. B.".

(e) EXPOSURES.—To constitute an exposure, exposing risk must be of the frame class (brick veneered and stone veneered excepted) or frame class exposing masonry or concrete mercantile or factory building and having a ground area in excess of 600 sq. feet or be more than one and one-half stories in height.

Distances between exposing and exposed risks must be measured from the points nearest each other, whether such points be part of the building proper or bay windows, porches, or other extensions of the building except that overhanging eaves may be ignored in determining the distance.

Tape exposure distances when exposure is between 7' and 13'.

11. Missouri—St. Louis

(a) NUMBER OF FAMILIES IN APARTMENT BUILDINGS.—Note number of families in apartment buildings with fewer than seventeen families, which buildings do not have through division walls indicating on map the number of family divisions.

(b) FRAME FOUNDATIONS.—Frame buildings without continuous masonry or concrete foundations whether supported on wooden posts or masonry or concrete piers should carry the notation "Fr. Found.".

12.

Odd Sizes of Sheets

In the Central Department there are three sizes of paper used in surveying maps.

The standard size paper is $20\frac{3}{4}'' \times 24\frac{3}{4}''$. All Central Department town and bound map publications are surveyed on this paper with the following exceptions.

Paper $18\frac{1}{2}'' \times 23\frac{1}{2}''$ is referred to as Chicago Square. The following bound volumes are surveyed on this paper:

Chicago, Illinois, Volumes 1—South, 1—North, 2—South, 2—North and 3 to 8 inclusive.

Paper $18\frac{1}{2}'' \times 27\frac{3}{4}''$ is referred to as Chicago Long. The following bound volumes are surveyed on this paper:

Chicago, Illinois, Volumes 9 to 36 inclusive and A to K inclusive, Oak Park and Evanston, Illinois; and Minneapolis, Minnesota—entire series.

Chicago Stock Yards, Illinois, is on a standard size paper $20\frac{3}{4}'' \times 24\frac{3}{4}''$.

PACIFIC DEPARTMENT

13.

Exposure Distances

In the states of Arizona, Idaho, Montana and Utah, exposures are charged to private stables.

In territory of Hawaii, exposure distances of 5', 10' and 15' must be taped carefully.

14.

**Roof
Coverings**

open porches are covered with shingles. In other localities, all parts of a building must have non-combustible roof covering to receive credit.

15.

**Division
Walls**

In the State of Arizona, check carefully for frame or masonry division walls in duplex dwellings.

On masonry dwellings, show by yellow color where exterior walls are partly frame.

16.

Parapets

In the State of Arizona, show parapets on dwellings of masonry construction.

17.

**Odd Sizes
of Sheets**

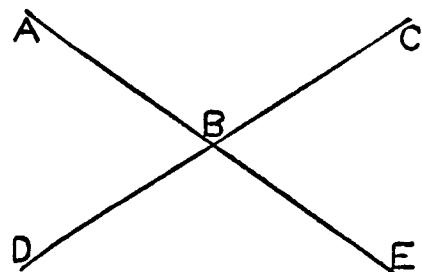
The standard size paper in the Pacific Department is $20\frac{3}{4}'' \times 24\frac{3}{4}''$. All Pacific Department bound and town map publications are surveyed on this size paper with the exceptions listed below.

The "long" survey paper is $18'' \times 26\frac{1}{2}''$. The "long" size volumes are as follows:

LOS ANGELES, CALIF.—Volumes 1 to 40 inclusive
SPOKANE, WASH. — Volumes 1 to 4 inclusive
SEATTLE, WASH. — Volume 2

CHAPTER XII**A FEW POINTS ON
ANGLES, TABLES OF MEASURES, ETC.**

1. Angles are measured in degrees, the standard being a right angle or 90° .
2. An acute angle is less than a right angle.
3. An obtuse angle is greater than a right angle.
4. If two straight lines intersect each other, they form four angles about the point of intersection, which have received different names with respect to each other.
5. Adjacent angles are those which lie on the same side of one line and opposite side of the other, thus:



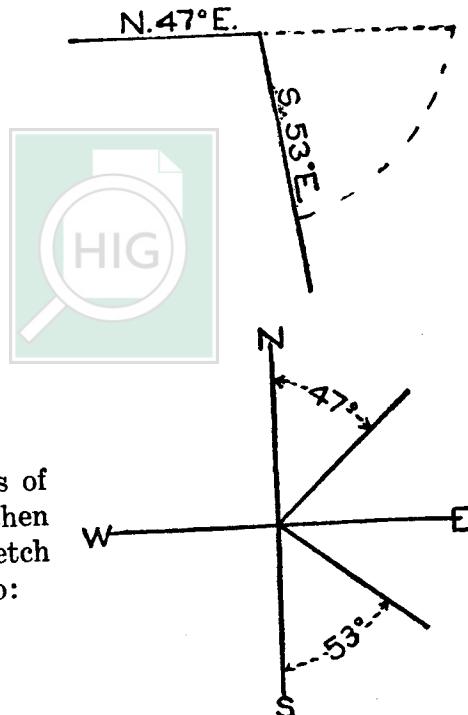
A B C and C B E,
or A B D and D B E
are adjacent angles.

6. Opposite or vertical angles are those which lie on opposite sides of both lines; thus, ABD and CBE or ABC and DBE are opposite.
7. The sum of any two adjacent angles is equal to two right angles.

8. Opposite or vertical angles are equal.

9. A protractor is an instrument in various forms and sizes for laying out angles on paper. The most convenient and popular form is a paper wheel 12" to 15" in diameter and containing 360° or four right angles. Another form is much smaller and generally of metal, containing 180° or two right angles. This is not recommended, as very great accuracy cannot be obtained, especially where the angle affects other sheets than the one it is on. Where angles are not given, but courses are noted on the various lines, the method of calculating angles is easily illustrated.

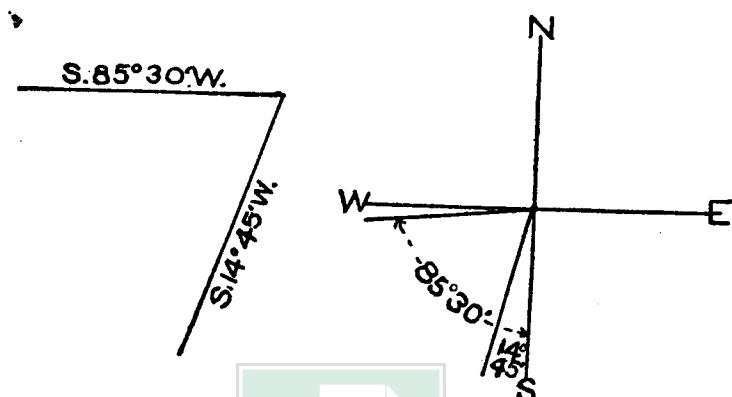
10. Say we have the following:



Draw the points of the compass, and then approximately sketch in these courses; so:

and the angle as shown by the dotted lines in the first figure would be 180° (the distance from N to S) $- 100^\circ$ (the sum of 47° and 53°) $= 80^\circ$.

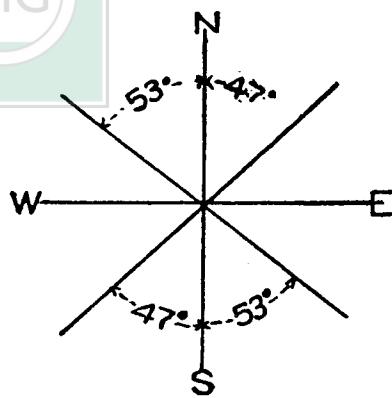
11. Another:



Then the angle would be $85^\circ 30' - 14^\circ 45' = 70^\circ 45'$.

12. In the first illustration, remembering that opposite angles are equal, we can figure the large angle as follows:

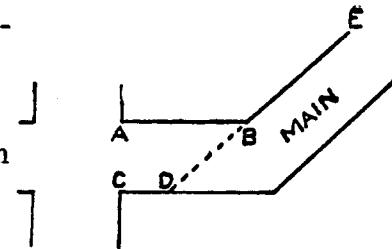
$$47^\circ + 53^\circ = 100^\circ$$



13. Learn to measure angles—do not turn them by sighting your diagram paper along a fence line.

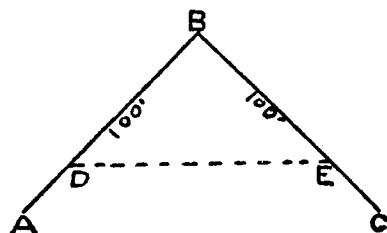
14. We append a few illustrations.

To find angle of Main Street:



Measure distance AB. Then along the opposite side of the street, distance CD, which would be to where line BE strikes line of Main Street. Then through these points D and B the line BE can be drawn. Or, suppose there were no accommodating opposite side of the street, then we could take, say, one or two hundred feet from B along AB and take a right angle measurement to line BE produced from which point, when located, the line could be drawn through B.

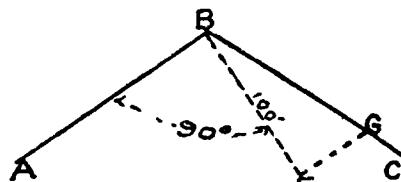
15. To get angle ABC, when side AB is located, but on account of buildings or otherwise it is impossible to extend either side.



Take any convenient distance along AB from B, say 100' at D and a similar distance along BC at E. Then measure the shortest distance between D and E and with this as a radius describe from D an arc and with 100' (or the distance you have taken from B) as a radius, describe from B an arc cutting this other. This will be your point E and a line through it from B would be your side BC.

16. Or another way:

Turn a right angle to line AB at B, and then measure off any convenient distance, say 100', to the point F. From this point turn a right angle to line BF and measure FG, which would be the shortest distance to the side BC. Then from B draw a line through G, which would be the side BC as required.



17. Such measurements of angles should be made with a tape line, as a slight variation in an angle might produce great inaccuracies if the sides are prolonged any great distance.

18. A formula for turning a right angle by measurement is as follows:

The hypotenuse of a right-angled triangle is the side opposite the right angle and the square of it is equal to the sum of the squares of the two other sides. Hence, if we measure a triangle whose sides are 6', 8' and 10' respectively, we must have a right-angled triangle. This would hold, of course, with any equal multiple of each of these numbers.

19. The altitude of a triangle is the perpendicular distance from the vertex of either angle to the opposite side, or the opposite side produced.

20. The altitude of a rectangle is the perpendicular distance between two opposite sides.

21. The area of a triangle is equal to one-half the product of its base and altitude.

22. The area of a rectangle is equal to the product of its base and altitude.

23. The area of a circle is equal to 3.1416 times the square of the radius. The circumference of any circle is equal to 3.1416 times its diameter.

24. To find the cubical contents of any story or building multiply the area of the floor by the height.

25. To find the cubical contents of any form, the

areas of the top and bottom of which are not the same, multiply the average of these two areas by the height or depth.

26. Surveyors can undoubtedly make their work much easier by plotting angles with the help of the tangent of the angle.

The table given herein covers angles of from 1° to 45° and is the ordinary table of tangents multiplied by 1,000. Inasmuch as the tangent of 90° is infinity and that of the angles which are almost 90° are so great that we would have no room, even on our large sheets, to plot them by the first method described here, we can better plot all angles between 45° and 90° from the other side. By this we mean that an angle of $86^{\circ} 15'$ (see Fig. I) must be plotted as an angle of $3^{\circ} 45'$ from the perpendicular.

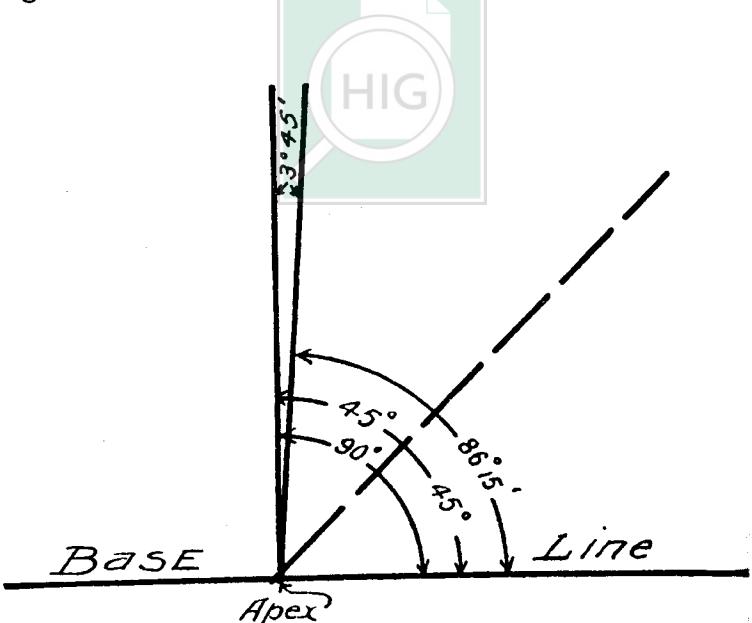


Fig. I

The table must be used as follows: Angle to be plotted is $15^{\circ} 45'$. Our table gives no minutes, but these may be approximated in this way; the difference between the tangent of 15° and 16° (287 minus 268) is 19. $45/60$ of 19 is 14 plus. So 14 is the correction to be added to 268 making 282. Next measure back on the base from the apex of the angle 1,000' at the largest practicable scale. (See Fig. II.) Then turn a right angle and fix a point 282' (at the same scale) from the base line. Connect this point and the apex and the job is done.

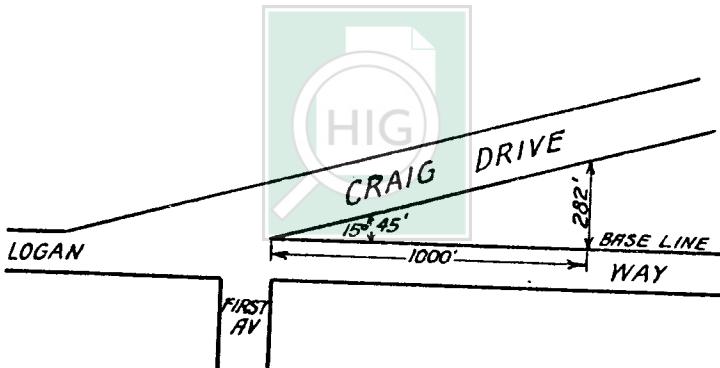
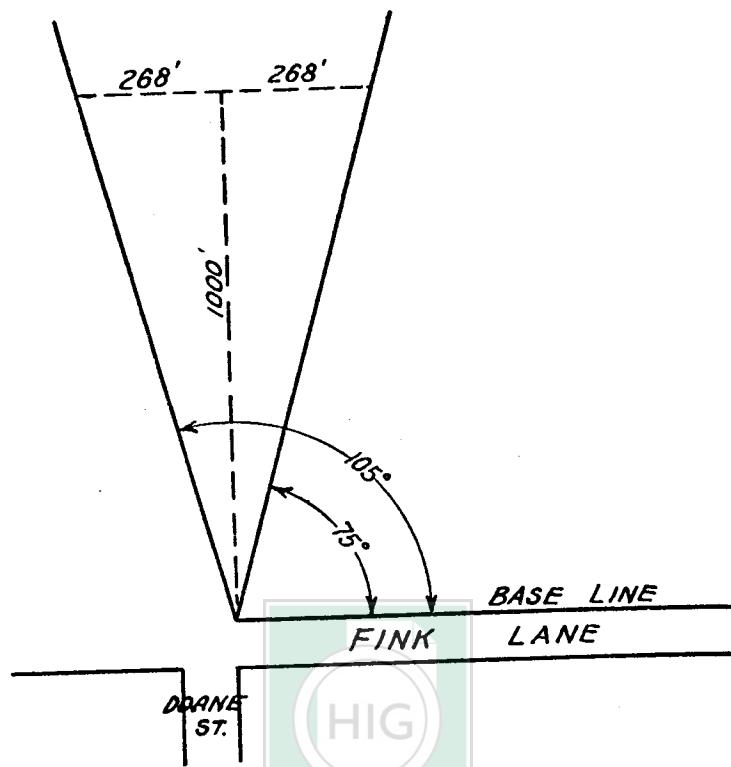


Fig. II

When the angle desired is greater than 45° the first step is to find the difference between it and the nearest number of right angles— 90° , 180° , 270° or 360° . For instance, suppose the desired angle is 75° or that it is 105° . In both these cases the difference is 15° . Extend a line at right angles to the base a distance of 1,000'. (See Fig. III.) From the end of this line measure 268' at right angles to the line. Connect the point so located and the intersection of the 1,000' line and the base line. If the angle is less than 90° locate the point within the right angle; if more, locate it outside.



Consideration of the following will show how to proceed, no matter what the desired angle may be:

$$75^\circ = 1 \text{ right angle} - 15^\circ$$

$$105^\circ = 1 \text{ " " } + 15^\circ$$

$$165^\circ = 2 \text{ " angles} - 15^\circ$$

$$195^\circ = 2 \text{ " " } + 15^\circ$$

$$255^\circ = 3 \text{ " " } - 15^\circ$$

$$285^\circ = 3 \text{ " " } + 15^\circ$$

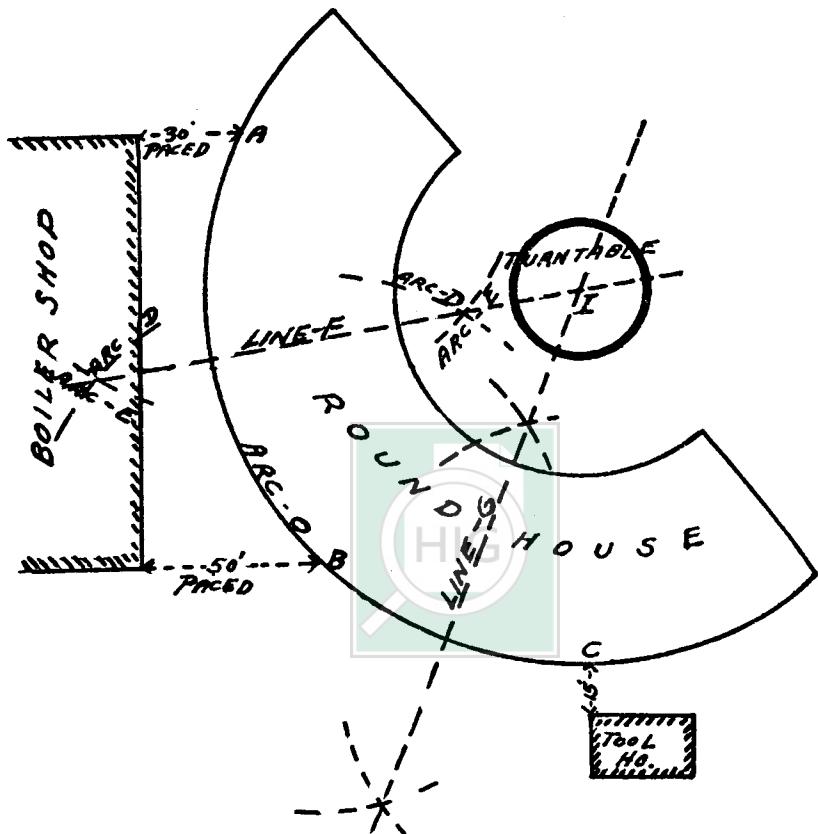
$$345^\circ = 4 \text{ " " } - 15^\circ$$

Table showing in feet the gore opened at a distance of 1,000 feet from the apex by angles of from 1 degree to 45 degrees.

Degrees	Feet	Degrees	Feet	Degrees	Feet
1	17	16	287	31	601
2	35	17	306	32	625
3	52	18	325	33	649
4	70	19	344	34	675
5	87	20	364	35	700
6	105	21	384	36	727
7	123	22	404	37	754
8	141	23	424	38	781
9	158	24	445	39	810
10	176	25	466	40	840
11	194	26	488	41	870
12	213	27	510	42	900
13	231	28	532	43	933
14	249	29	554	44	966
15	268	30	577	45	1000

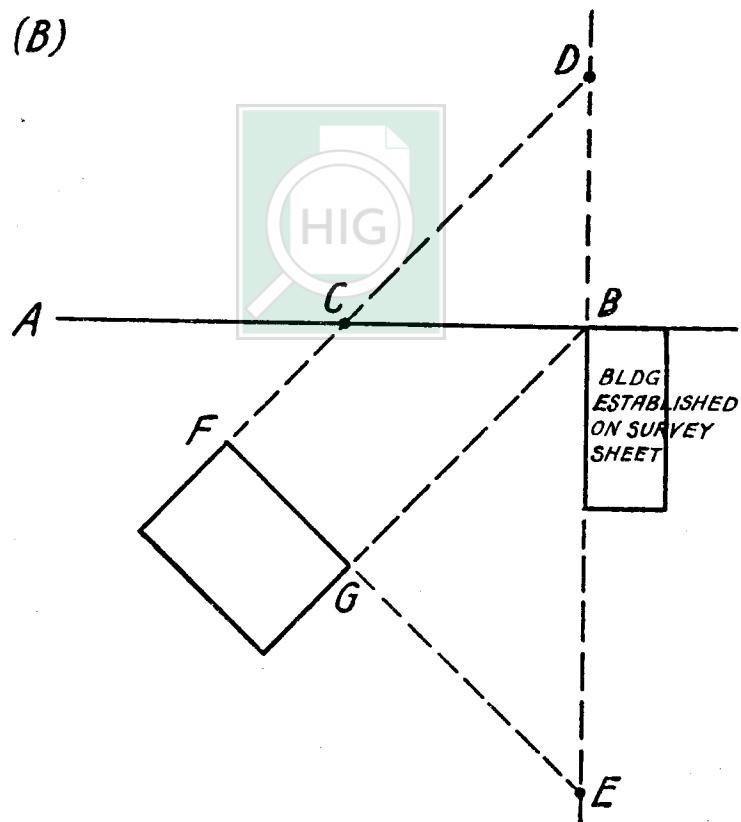
27. Illustrations of Locating Buildings

(a) By geometry, to inscribe an arc through any three given points as A-B-C.



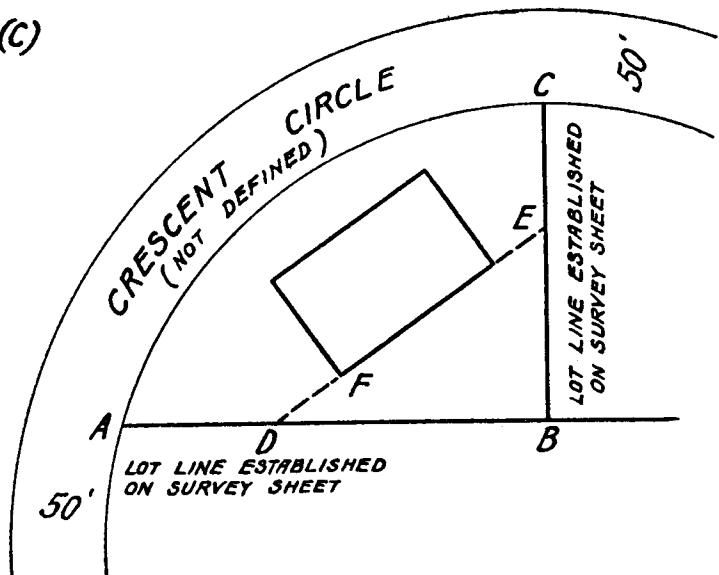
SOLUTION.—Place point of a compass at Point B and inscribe Arc D with a radius of about $\frac{2}{3}$ of the distance between A and B, then place point of compass at Point A (keeping same radius as for Arc D) and inscribe Arc E. Draw a dotted line through the intersections of Arc D and Arc E. Repeat this solution for Points B and C. The intersection of Line F and Line G called point of intersection I, will be the

center of your turntable. As the inner and outer circumference of the roundhouse are simply concentric circles to the turntable, your distances AI-BI-CI are equal or in other words the radius of the outer circle of the roundhouse. Therefore, using "I" as a center and with a radius equal to "AI" inscribe Arc O which will pass through the three established points A-B-C.



Pace distance between Points B and C. Through Point B, extend line to Points D and E. Pace distance between Points C and F and establish Point F. Draw Line E-F. Pace distance F-G and check same by sighting along Line B-G. Complete diagram.

(C)



Pace distances between Points B and D and B and E, draw Line D-E. Along Line D-E establish Point F and complete diagram.

TABLES OF MEASURES

28. Circular Measure

60 seconds	..	..	= 1 minute
60 minutes	..	..	= 1 degree
30 degrees	..	..	= 1 sign
3 signs or 90 degrees			= 1 right angle
4 right angles or 12 signs			= 1 circle

29. Lineal Measure

12 inches	..	..	= 1 foot
3 feet	..	..	= 1 yard
16½ feet	..	..	= 1 rod or pole
4 rods or 66 feet			= 1 chain
80 chains or 5280 feet			= 1 mile

30. Surveyor's Lineal Measure

7.92 inches	= 1 link
25 links	= 1 rod
100 links or	
4 rods or	
66 feet .	= 1 chain
80 chains	= 1 mile

To change to feet multiply by 66.
As, 2.7 chains = 178.2 feet.
 $2.7 \times 66 = 178.2$.

31. Square Measure

144 square inches	= 1 square foot
9 square feet	= 1 square yard
30½ square yards	= 1 square rod or perch
16 square rods	= 1 square chain
10 square chains or	
43560 square feet	= 1 acre
640 acres . .	= 1 square mile
36 square miles	= 1 township

32. Cubic Measure

1728 cubic inches	= 1 cubic foot
27 cubic feet	= 1 cubic yard
1 cubic foot contains 7.48 gallons	
	of water and weighs 62.3 pounds.

33. Liquid Measure

4 gills	= 1 pint
2 pints	= 1 quart
4 quarts	= 1 gallon
31½ gallons	= 1 barrel
2 barrels	= 1 hogshead

34. Dry Measure

2 pints = 1 quart

8 quarts = 1 peck

4 pecks = 1 bushel

35. Avoirdupois Weight

16 ounces = 1 pound

100 pounds = 1 hund'dw't (cwt.)

20 cwt. = 1 ton

2240 pounds = 1 long ton

36. Useful Information and Formulae for Calculations in Connections with Pumps

A gallon of fresh water weighs 8.3 lbs. and contains 231 cubic inches.

A cubic foot of water weighs 62.3 lbs. and contains 1,728 cubic inches or 7.48 gallons.

D = Diameter of cylinder in inches

S = Length of stroke in inches

N = Total number of strokes per minute

G = Quantity in gallons per minute

H = Height in feet water is elevated

A = Area of cylinder in square inches

Area of cylinder in square inches = $D^2 \times .7854$

Capacity of pump per stroke in cubic inches = $S \times A$

Capacity of pump per stroke in gallons = $\frac{S \times A}{231}$

Capacity of pump per stroke in cubic feet = $\frac{S \times A}{1728}$

Capacity of pump per stroke in lbs. = $\frac{S \times A \times 8\frac{1}{3}}{231}$

Capacity of pump per min. in cubic inches = $S \times N \times A$

Capacity of pump per min. in gallons (G) = $\frac{S \times N \times A}{231}$

Capacity of pump per minute in cubic feet = $\frac{S \times N \times A}{1728}$

Horsepower required to elevate a given quantity of water per minute to a given height, not allowing for friction = $\frac{G \times H \times 8\frac{1}{3}}{33000}$

Pressure per square inch in lbs. of a column of water = $H \times .434$

The figures at the extreme right and left of the table are piston, or plunger diameters; the line of figures across the top are piston, or plunger strokes; the figures in the body of the table are the capacity or displacement in gallons corresponding to a single stroke. To find the capacity for one revolution, multiply the capacity for a single stroke by one, two, three or four for single, duplex, triplex or quadruplex, single-acting; and by two, four or six for double-acting pumps. Knowing the number of strokes per minute, capacity per minute can be easily obtained.

Table Showing Capacity of Pumps of Given Diameter and Length of Stroke.

		LENGTH OF STROKE IN INCHES AND CAPACITY PER STROKE IN GALLONS, OF PUMP CYLINDER WITH GIVEN DIAMETER.								DIA. OF CYL. INS.				
		4	5	6	8	9	10	12	14	15	16	18	20	24
1 1/4	.0212	.0266	.0319	.0425	.0478	.0531	.0637	.0743	.0797	.0848	.0955	.1062	.1274	1 1/4
1 1/8	.0256	.0321	.0385	.0513	.0578	.0642	.077	.089	.0963	.1027	.1156	.128	.1541	1 1/8
1 1/16	.0306	.0382	.0459	.0612	.0688	.0765	.0918	.1071	.1147	.1224	.1377	.153	.1836	1 1/16
1 1/32	.0416	.0521	.0625	.0833	.0937	.1041	.1249	.1457	.1562	.1666	.1874	.2082	.2499	1 1/32
1 1/64	2	.0544	.068	.0816	.1088	.1224	.136	.1632	.1904	.204	.2176	.2448	.3264	2 1/16
1 1/128	2 1/4	.0688	.086	.1033	.1377	.1548	.1721	.2063	.241	.258	.2754	.3096	.4128	2 1/4
1 1/256	2 1/8	.085	.1062	.1275	.17	.1912	.2125	.255	.2975	.3187	.34	.3825	.4542	5 1/16
1 1/512	2 1/16	.1028	.1285	.1543	.2057	.2313	.2571	.3085	.3598	.3855	.4114	.4626	.5142	6 1/16
3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4
3 1/8	4	4 1/4	4 1/8	4 1/4	4 1/8	4 1/4	4 1/8	4 1/4	4 1/8	4 1/4	4 1/8	4 1/4	4 1/8	4 1/4
3 1/16	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2
3 1/32	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4
3 1/64	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8
3 1/128	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16
3 1/256	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32	4 1/32
3 1/512	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64	4 1/64
3 1/1024	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128	4 1/128
3 1/2048	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256	4 1/256
3 1/4096	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512	4 1/512
3 1/8192	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024	4 1/1024
3 1/16384	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048	4 1/2048
3 1/32768	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096	4 1/4096
3 1/65536	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192	4 1/8192
3 1/131072	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384	4 1/16384
3 1/262144	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768	4 1/32768
3 1/524288	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536	4 1/65536
3 1/1048576	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072	4 1/131072
3 1/2097152	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144	4 1/262144
3 1/4194304	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288	4 1/524288
3 1/8388608	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576	4 1/1048576
3 1/16777408	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152	4 1/2097152
3 1/33554816	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304	4 1/4194304
3 1/67109632	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608	4 1/8388608
3 1/134219264	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408	4 1/16777408
3 1/268548128	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816	4 1/33554816
3 1/537096256	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632	4 1/67109632
3 1/1074192560	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264	4 1/134219264
3 1/2148385120	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128	4 1/268548128
3 1/4296760240	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256	4 1/537096256
3 1/8593520480	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560	4 1/1074192560
3 1/17183840960	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120	4 1/2148385120
3 1/34367681920	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240	4 1/4296760240
3 1/68735203840	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480	4 1/8593520480
3 1/13787040960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960	4 1/17183840960
3 1/27574081920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920	4 1/34367681920
3 1/55148163840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840	4 1/68735203840
3 1/11035032640	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960	4 1/13787040960
3 1/22074064000	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920	4 1/27574081920
3 1/44148128000	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840	4 1/55148163840
3 1/8829632000	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640	4 1/11035032640
3 1/17658864000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000	4 1/22074064000
3 1/35317728000	4 1/44148128000	4 1/44148128000												

38. TABLE OF AREAS OF CIRCLES

Dia. in Ft.	Area Sq. Ft.	Dia. in Ft.	Area Sq. Ft.	Dia. in Ft.	Area Sq. Ft.	Dia. in Ft.	Area Sq. Ft.
.012	.012	7 $\frac{1}{4}$	47.17	18 $\frac{1}{2}$	268.80	37 $\frac{1}{4}$	1104.5
.049	.049	8	50.26	19	283.52	38	1134.1
.110	.110	8 $\frac{1}{4}$	53.45	19 $\frac{1}{2}$	298.64	38 $\frac{1}{2}$	1164.2
.196	.196	8 $\frac{3}{4}$	56.74	20	314.16	39	1194.6
.307	.307	8 $\frac{3}{4}$	60.13	20 $\frac{1}{2}$	330.06	39 $\frac{1}{2}$	1225.4
.442	.442	9	63.61	21	346.36	40	1256.6
.601	.601	9 $\frac{1}{4}$	67.20	21 $\frac{1}{2}$	363.05	40 $\frac{1}{2}$	1288.3
1	1	9 $\frac{1}{2}$	70.88	22	380.13	41	1320.3
1 $\frac{1}{4}$	.994	9 $\frac{3}{4}$	74.66	22 $\frac{1}{2}$	397.60	41 $\frac{1}{2}$	1352.7
1 $\frac{1}{4}$	1.227	10	78.54	23	415.47	42	1385.4
1 $\frac{3}{4}$	1.484	10 $\frac{1}{4}$	82.51	23 $\frac{1}{2}$	433.73	42 $\frac{1}{2}$	1418.6
1 $\frac{3}{4}$	1.767	10 $\frac{1}{2}$	86.59	24	452.39	43	1452.2
1 $\frac{3}{4}$	2.073	10 $\frac{3}{4}$	90.76	24 $\frac{1}{2}$	471.43	43 $\frac{1}{2}$	1486.2
1 $\frac{3}{4}$	2.405	11	95.03	25	490.87	44	1520.5
1 $\frac{3}{4}$	2.761	11 $\frac{1}{4}$	99.40	25 $\frac{1}{2}$	510.70	44 $\frac{1}{2}$	1555.3
2	3.14	11 $\frac{1}{2}$	103.86	26	530.93	45	1590.4
2 $\frac{1}{4}$	3.97	11 $\frac{3}{4}$	108.43	26 $\frac{1}{2}$	551.54	45 $\frac{1}{2}$	1626.0
2 $\frac{1}{4}$	4.90	12	113.09	27	572.55	46	1661.9
2 $\frac{1}{4}$	5.93	12 $\frac{1}{4}$	117.85	27 $\frac{1}{2}$	593.95	46 $\frac{1}{2}$	1698.2
3	7.06	12 $\frac{1}{2}$	122.71	28	615.75	47	1734.9
3 $\frac{1}{4}$	8.29	12 $\frac{3}{4}$	127.67	28 $\frac{1}{2}$	637.94	47 $\frac{1}{2}$	1772.1
3 $\frac{1}{4}$	9.62	13	132.73	29	660.52	48	1809.6
3 $\frac{1}{4}$	11.04	13 $\frac{1}{4}$	137.88	29 $\frac{1}{2}$	683.49	48 $\frac{1}{2}$	1847.5
4	12.56	13 $\frac{1}{2}$	143.13	30	706.86	49	1885.7
4 $\frac{1}{4}$	14.18	13 $\frac{3}{4}$	148.48	30 $\frac{1}{2}$	730.61	49 $\frac{1}{2}$	1924.4
4 $\frac{1}{4}$	15.90	14	153.93	31	754.76	50	1963.5
4 $\frac{1}{4}$	17.72	14 $\frac{1}{4}$	159.48	31 $\frac{1}{2}$	779.31	50 $\frac{1}{2}$	2003.0
5	19.63	14 $\frac{1}{2}$	165.13	32	804.25	51	2042.8
5 $\frac{1}{4}$	21.64	14 $\frac{3}{4}$	170.87	32 $\frac{1}{2}$	829.57	51 $\frac{1}{2}$	2083.1
5 $\frac{1}{4}$	23.75	15	176.71	33	855.30	52	2123.7
5 $\frac{1}{4}$	25.96	15 $\frac{1}{4}$	182.65	33 $\frac{1}{2}$	881.41	52 $\frac{1}{2}$	2164.8
6	28.27	15 $\frac{1}{2}$	188.69	34	907.92	53	2206.2
6 $\frac{1}{4}$	30.67	15 $\frac{3}{4}$	194.82	34 $\frac{1}{2}$	934.82	53 $\frac{1}{2}$	2248.0
6 $\frac{1}{4}$	33.18	16	201.06	35	962.11	54	2290.2
6 $\frac{1}{4}$	35.78	16 $\frac{1}{2}$	213.82	35 $\frac{1}{2}$	989.80	54 $\frac{1}{2}$	2332.8
7	38.48	17	226.98	36	1017.88	55	2375.8
7 $\frac{1}{4}$	41.28	17 $\frac{1}{2}$	240.52	36 $\frac{1}{2}$	1046.4	55 $\frac{1}{2}$	2419.2
7 $\frac{1}{4}$	44.17	18	254.46	37	1075.2	56	2463.0

39. TABLE FOR CONVERTING FEET HEAD
OF WATER INTO PRESSURE PER SQUARE
INCH

Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.
1	.43	55	23.82	190	82.29
2	.87	60	25.99	200	86.62
3	1.30	65	28.15	225	97.45
4	1.73	70	30.32	250	108.27
5	2.17	75	32.48	275	119.10
6	2.60	80	34.65	300	120.93
7	3.03	85	36.81	325	140.75
8	3.40	90	38.98	350	151.53
9	3.90	95	41.14	375	162.41
10	4.33	100	43.31	400	173.24
15	6.50	110	47.64	500	216.55
20	8.66	120	51.97	600	259.85
25	10.83	130	56.30	700	303.16
30	12.99	140	60.63	800	346.47
35	15.16	150	64.96	900	389.78
40	17.32	160	69.29	1000	433.09
45	19.49	170	73.63	-----	-----
50	21.65	180	77.96	-----	-----

Diameter square multiplied by .7854 = Area or
 Radius square multiplied by 3.1416 = "
 Diameter multiplied by 3.1416 = Circumference
 Circumference multiplied by .3183 = Diameter

40. TABLE OF CAPACITY OF CIRCULAR
CISTERNS, TANKS, ETC.

For every foot in depth a Cistern, Tank or Well
of Circular Shape.

	GALS.		GALS.
2 feet in dia. will hold	23.49	26 feet in dia. will hold	3971.36
3 "	52.81	27 "	4282.67
4 "	93.95	28 "	4605.81
5 "	146.83	29 "	4940.69
6 "	211.46	30 "	5287.31
7 "	287.83	31 "	5645.60
8 "	375.94	32 "	6015.79
9 "	475.85	33 "	6397.64
10 "	587.48	34 "	6791.24
11 "	710.82	35 "	7196.58
12 "	845.91	36 "	7613.74
13 "	992.82	37 "	8042.50
14 "	1151.40	38 "	8483.07
15 "	1321.79	39 "	8935.61
16 "	1503.93	40 "	9399.37
17 "	1697.81	41 "	9875.84
18 "	1903.36	42 "	10362.80
19 "	2120.73	43 "	10862.46
20 "	2349.92	44 "	11373.34
21 "	2590.77	45 "	11896.19
22 "	2843.37	46 "	12431.01
23 "	3107.72	47 "	12977.05
24 "	3383.88	48 "	13535.81
25 "	3671.71	49 "	14105.04
		50 "	14686.98

1. RADIAL SCALES ON KEY MAPS

At	400'	to the inch	$\frac{1}{4}$ mile = 3.3 inches
"	450'	" " "	= 2.93 "
"	500'	" " "	= 2.64 "
"	550'	" " "	= 2.4 "
"	600'	" " "	= 2.2 "
"	650'	" " "	= 2.03 "
"	700'	" " "	= 1.89 "
"	750'	" " "	= 1.76 "
"	800'	" " "	= 1.65 "
"	850'	" " "	= 1.55 "
"	900'	" " "	= 1.46 "
"	950'	" " "	= 1.38 "
"	1000'	" " "	= 1.32 "
"	1050'	" " "	= 1.25 "
"	1100'	" " "	= 1.2 "
"	1150'	" " "	= 1.14 "
"	1200'	" " "	= 1.1 "
"	1250'	" " "	= 1.05 "
"	1300'	" " "	= 1.01 "
"	1350'	" " "	= .97 "
"	1400'	" " "	= .94 "
"	1450'	" " "	= .91 "
"	1500'	" " "	= .88 "
"	1550'	" " "	= .85 "
"	1600'	" " "	= .82 "
"	1650'	" " "	= .80 "
"	1700'	" " "	= .77 "
"	1750'	" " "	= .75 "
"	1800'	" " "	= .73 "
"	1850'	" " "	= .71 "
"	1900'	" " "	= .69 "
"	1950'	" " "	= .67 "
"	2000'	" " "	= .66 "
"	2050'	" " "	= .64 "
"	2100'	" " "	= .62 "
"	2150'	" " "	= .61 "
"	2200'	" " "	= .60 "
"	2250'	" " "	= .58 "

CHAPTER XIII**ABBREVIATIONS AND CONTRACTIONS**

A.	Private automobile house
Abv.	Above
Add'n.	Addition
Agric.	Agricultural
A. F. A.	Automatic Fire Alarm
Air Cond.	Air Conditioned
Apts.	Apartments
Asb. Cl.	Asbestos Clad
Audit'm.	Auditorium
Auto. Spklr.	Automatic Sprinkler
Auto Rep.	Automobile Repairing
Av.	Avenue
B.	Basement
Balc.	Balcony
Bbl.	Barrel
B. C.	Brick Chimney
Bicycle Rep.	Bicycle Repairing
Bldg.	Building
Bl. Sm.	Blacksmith
Bldv.	Boulevard
Br.	Brick
Cap'y.	Capacity
Carp'r.	Carpenter or Cabinet Shop
C. B.	Concrete or Cement Block
C. Br.	Cinder, concrete, or sand lime brick
Ceil'g.	Ceiling
Ch.	Chimney

Chem. Lab.	Chemical Laboratory
Chem. Ext'g'rs	Chemical Extinguishers
Cin.	Cinder
Cin. Bl.	Cinder Block
Cir.	Circle
Clean'g	Cleaning
Clo.	Clothing
Cols.	Columns
Conc.	Concrete or Cement
C. C.	Concrete Chimney (Non-standard)
C. Bl. C.	Concrete Block Chimney
Conn.	Connection
Constrn.	Construction
C.	Coped
Ct.	Court
D.	Dwelling
Dept.	Department
Dilap'd.	Dilapidated
Dr.	Drive
Ea.	Each
Elec. Rep.	Electrical Repairing
Elev'd.	Elevated
Elev'n.	Elevation
Eng.	Engine
Entr.	Entrance
Equip't.	Equipment
Extn.	Extension
F.	Flat
Facil.	Facilities
Fact'y.	Factory
Fill'g Sta.	Filling Station
Fl.	Floor
Ft.	Foot or Feet
Fr.	Frame
Furn.	Furnace
Furn'e.	Furniture
Gal.	Gallon

G. P. M.	Gallons per Minute
Gym.	Gymnasium
Gyp.	Gypsum
Gen'l Stge.	General Storage
Hardw.	Hardware
Headq't's.	Headquarters
Ho.	House
Hwy.	Highway
I. E. P.	Independent Electric Plant
Implts.	Implements
In.	Inch
Ir. Ch.	Iron Chimney
Ir. Cl.	Iron Clad
Lbr.	Lumber
La.	Lane
Mach.	Machine
Mezz.	Mezzanine
Mfg.	Manufacturing
Mfr.	Manufacturer
Movies.	Motion Pictures
Non.	None (as applied to wall openings)
No.	Number
Off.	Office
O. L.	Overlooking
O. U.	Open Under
Paint'g.	Painters Shop
Part'n.	Partition
Pass'g'y.	Passageway
P. C.	Patent Chimney
Photo.	Photograph Galleries
Pilast'd.	Pilastered
Pl.	Place
Plat'm.	Platform
Plum'g.	Plumbers Shop
Lb.	Pound
Press.	Pressure
Prod.	Produce

Pr't'g.	Printing
Priv. Garage.	Private Garage
Pwy.	Parkway
Refrig'n.	Refrigeration
Rest.	Restaurant
Rf.	Roof
Rd.	Road
Rm.	Room
Room'g.	Rooming
S.	Store
Sub. B.	Sub-basement
S. C.	Sub-cellar
Sky'ts.	Skylights
Sl. Cl.	Slate Clad
Sm. Ho.	Smoke House
S. P.	Stove Pipe
S. P. V.	Stove Pipe with Patent Ventilator
St.	Street
Stge.	Storage
Sub.-Div'n.	Sub-division
Susp'd.	Suspended
Syst.	System
Tks.	Tanks
T. C.	Tile Chimney
Tel. Exch.	Telephone Exchange
Teleg. Off.	Telegraph Office
Ter.	Terrace
Transf.	Transformer
Twp.	Township
Upholst'g.	Upholstering
Vac.	Vacant
Vend.	Veneered
Vent.	Ventilator
Vol.	Volume
W. C.	Water Closet
W. Ho.	Warehouse
W. P.	Water Pipe

W. Rm.	Wareroom
W. T.	Water Tank
Whol.	Wholesale
Woodw'k'g.	Woodworking
Wks.	Works

Religious Denominations

Cong'l	Congregational
Episc'l	Episcopal
Evang'l	Evangelical
Luth'n	Lutheran
M. E.	Methodist Episcopal
Presby'n	Presbyterian
R. C.	Roman Catholic
M. P.	Methodist Protestant



SURVEYORS' MANUAL

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