Chapter XII

MAPS AND PINS

PIN MAPS have not been much used in the past, chiefly because a map pin which would give satisfactory service has not been available for common use. Until recently the map markers obtainable have been little more than old-fashioned carpet tacks having chisel-shaped points which cut the surface of any map into which they were pushed. Tacks with rough steel shanks cannot be pushed far into a map if the tacks are to be pulled out again. Also, rough steel is likely to rust so as to cause the whole tack to deteriorate rapidly.

Cloth heads on the map tacks make it possible to have tacks in distinct colors and plaids. The cloth tops, however, fade in the sunlight and collect dust so that in a short time the different colors of tacks on any map, exposed as a wall map must be, cannot be easily distinguished. The crudeness of the cloth-covered tack makes it unsatisfactory for many kinds of map work. Cloth-covered tacks are long, and long tacks which can be pushed only a short distance into the surface of a map are not satisfactory, for they are likely to drop out or be knocked off by any slight disturbance.

Wall maps with long projecting tacks are not practical for office use unless protected by an expensive frame with a glass cover. As it is usually necessary to open up such a glass map-case to change the position of the tacks frequently, the construction of the case becomes unduly expensive. Without a glass cover a wall map with long projecting tacks is likely to be damaged by the feather duster of the janitor.

Even when maps with long projecting tacks are safeguarded by being placed in separate drawers of a cabinet made for that purpose, there is still a probability that some of the tacks will come loose from the mounting and rattle around inside of the map drawers. This is a point not realized by most men who install map and tack systems, but it usually sooner or later sounds the death-knell of the tack system.

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Generally the tacks are placed in the maps one by one as agencies are established or as data are obtained from correspondence. After the correspondence by which each tack was located has gone to the correspondence files, there is ordinarily no list showing the geographical location of the tacks. If a single tack is found loose in the bottom of a drawer of a cabinet system, or on the floor of an office where there is a wall map, it causes distrust of the whole tack installation. When there is no list showing the geographical location of different tacks, the one tack which is out of place cannot be put back without checking over correspondence and records which may extend back for years. Even when a list of tack locations is at hand, the loose tack cannot be replaced without checking the location of all the tacks on the map one by one to determine by a process of elimination where the loose tack came from. In the ordinary course of human events it is not likely that a tack falling out of a map would be found to give warning that the map record is no longer accurate. The tack system using long projecting tacks may therefore contain unsuspected inaccuracies just because tacks may have come loose. The unpleasant suspicion that a map record may be inaccurate, because of the long tacks falling out, sometimes causes a man to abandon the tack system entirely, believing that it is not reliable enough to give data on which important decisions must be based.

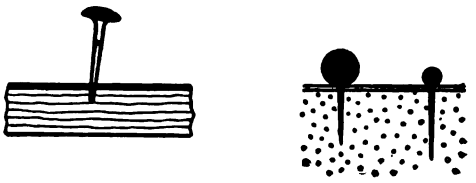

Fig. 186. A Contrast Between Long, Cloth-covered Map Tacks which are Likely to Fall Out, and Glass-head Map Pins Made with Short Needle-points so that the Pins May be Pushed in until the Heads Touch the Map

Map and pin systems are of such tremendous assistance that they should not be condemned simply because the map pin itself has not been satisfactory. By using a short pin with a needle point and by having a backing for the map such that the needle point can be pushed in until the spherical head touches the map, we can secure a map system which is absolutely trustworthy. Since the pin is pushed in to its full length, a blow cannot dislodge it. The spherical head in contact with the map gives a very neat appearance, yet the spherical shape permits the fingers to remove the pin by straight pulling without any difficulty whatever. The smooth needle-point of good quality steel does not rust easily and it does not cut the surface of the map. When a pin must be removed, the hole is so small that it is scarcely noticeable.

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Pins having spherical glass heads may be used on wall maps without any danger of the heads fading from sunlight. The glass surface is so smooth that dust cannot collect sufficiently to affect the color appearance of the pin head. Even if the map does get dusty, it is perfectly safe to use the feather duster on a wall map having pins which are pushed in so far that the spherical heads are in contact with the map surface. Dusting of such a map will not loosen the pins in any

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Fig. 187. Location of the Plants Affiliated with the University of Cincinnati, College of Engineering. Every Star Represents a Plant Where Co-operative Engineering Students are Employed

A wall exhibit like this is easily made by using a red legal seal and red stars such as can be purchased at many good stationery stores

way. A wall map on which pins with spherical glass heads are used can be very cheaply mounted, it needs no glass cover, and the pins can be put in or taken out instantly, thus giving a location record which is at all times in plain view, yet thoroughly accurate.

Another great advantage of the pins with spherical glass heads is that they may be obtained with small-diameter heads, which permit the use of numerous pins on maps of small size. In portraying many

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classes of information, it is impracticable to use the cloth-head tacks because the heads are so large that the tacks touch each other in all thickly populated regions.

Photographs taken of a map containing tall pins or tacks give an inaccurate effect, since the angle of the lens causes the head of the tack to appear at one side of the point in which the tack itself is located. Thus, in a photograph of a map of the United States the head of a long pin or tack set at Providence, R. I., might well show near Boston, Mass. There is no way of avoiding this error if projecting pins and tacks are used. The only safe plan is to use the spherical pin head which is in contact with the map surface itself. Photographic views of a sphere are the same from all directions, thus causing all pins to appear exactly the same size and shape on the photograph. Photographs taken of a large map with flat-headed tacks show the heads in the center of the picture as circles, while the heads towards the edge of the picture look of much smaller size, because they appear flattened out as ellipses. The visual effect for points toward the edge of the map is lessened when the tacks are flat headed, and an unnecessary visual error is brought into the picture.

A very cheap yet satisfactory mounting for a wall map to be used with glass-head map pins is made with three or more layers of corrugated straw-board. The straw-board used should be about $^3/_{16}$-inch thick with a facing on either side of the corrugated portion. Three thicknesses of straw-board are sufficient to give strength for any map up to one yard long. The two outside layers of straw-board should be so arranged that the corrugations will run with the length of the map, thus giving the greater strength in that direction. The middle layer should have the ribs running crosswise of the map so that the map mounting will be safeguarded from bending in either of the two different directions. Where very large wall maps are desired, six or more layers of straw-board may be used to give sufficient strength. If single sheets of straw-board cannot be found as large as the map itself, the map mounting can easily be built up of small sheets of straw-board, provided the joints in the straw-board are so placed that they will not be over each other to weaken the finished structure.

The straw-board backing for a map to be used with pins is not the best obtainable if the pins must be put in and taken out frequently. When, however, the pins are to be placed in the map and left there, the straw-board is just as satisfactory as any other backing for a

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map. A layer of the cheapest kind of muslin placed over the face of the straw-board will prevent the pins from tearing the surface of the map if they happen not to be pushed in exactly straight. The use of cloth over the straw-board also permits of changing the pins many more times than would be feasible with straw-board without the cloth reinforcing.

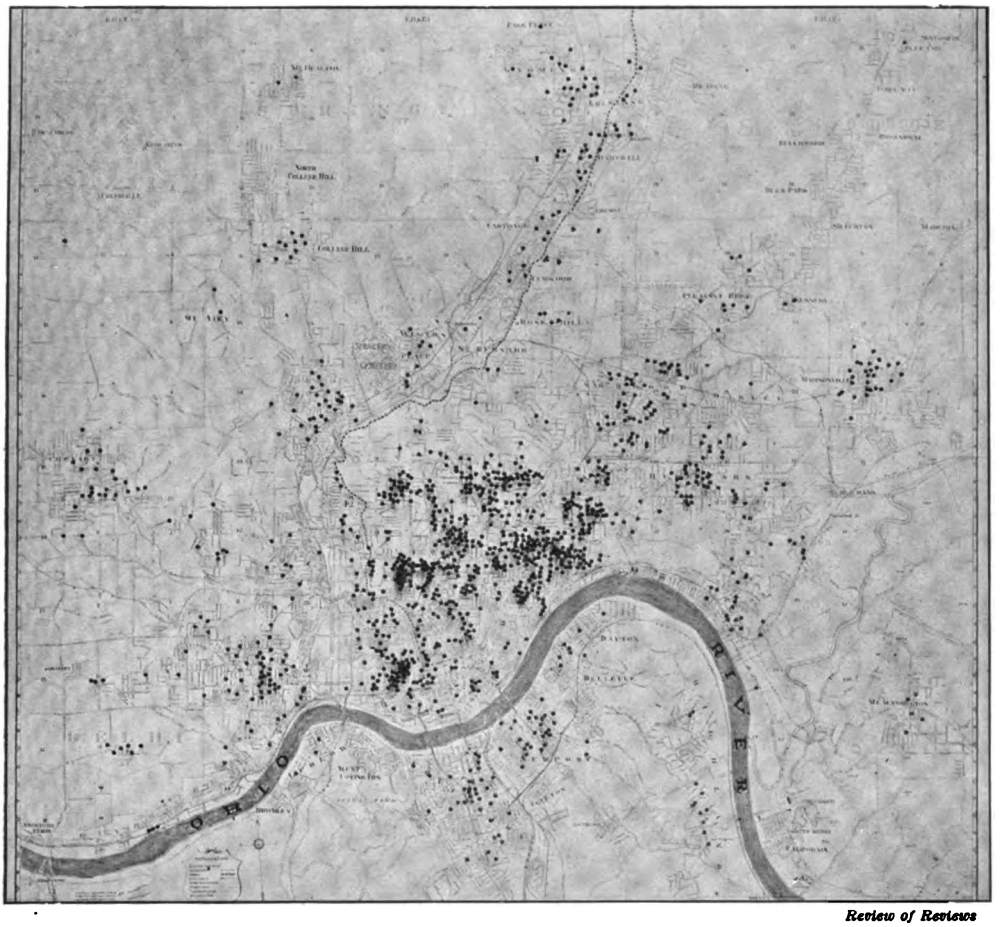

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Fig. 188. Every Pin Dot on this Map Marks the Home of a Student of the University of Cincinnati

By using a map printed in colors which do not photograph as black, the pins show up distinctly on the map as a background

Before mounting a map the colors should be tested to make sure that they will not run in water. The map should then be wet all over, preferably by laying it flat for a time in a large tray. Use a flour-and-water starch paste, paper-hanger's paste, or library paste of the kind used in mounting photographic prints. Carefully remove

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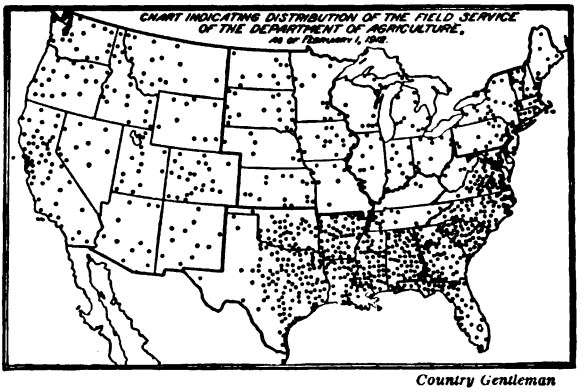
all wrinkles and press the excess paste out from under the edge of the map. Shrinkage of the map and of the moistened straw-board surface will almost certainly cause the straw-board mounting to warp unless care is taken to prevent warping. At the same time the map is pasted on the front of the straw-board, paste a sheet of wet wrapping paper on the back of the straw-board mount. The shrinkage of the wrapping paper on the back will equalize the shrinkage of the map on the front of the mount. Place the mounted map on a flat table surface or on a smooth floor, and stack books or other heavy articles upon the mount over night or until thoroughly dry so that any tendency to warp in the drying may be overcome by the weights.

Finish the four edges of the corrugated straw-board by using gummed cloth tape or paper tape neatly folded over the edges in the manner ordinarily used with passe-partout pictures. To hang up the finished map use two combination clamps and rings such as may sometimes be obtained in stores selling window shades. These metal-clamp fixtures are of neat appearance and of strength sufficient to hold a map of any size. If two nails or hooks are used in the wall to support the map, the ring hangers allow the map to be instantly removed to a desk when additional pins must be put in.



Country Gentleman

Fig. 189. Distribution of the Field Service of the Department of Agriculture, February 1, 1912

A pin map cannot be excelled for conveying information like this. Note the great activity of the Agricultural Department in the South

If pins are to be put in and taken out of a map repeatedly, it should be mounted on good quality cork composition. Exhibition-board, compo-board, wall-board, or any of the various boards generally used for wall surfaces may be used as a backing to give strength to the cork. Care should be taken to get a good quality of board which will not warp seriously. The cork composition can be glued to the wall-board and then the map pasted on the cork. A piece of wrapping paper should be pasted on the back of the wall-board at the time the map is mounted so that the shrinkage of the map may be equalized. The edge of the cork mounting may be bound

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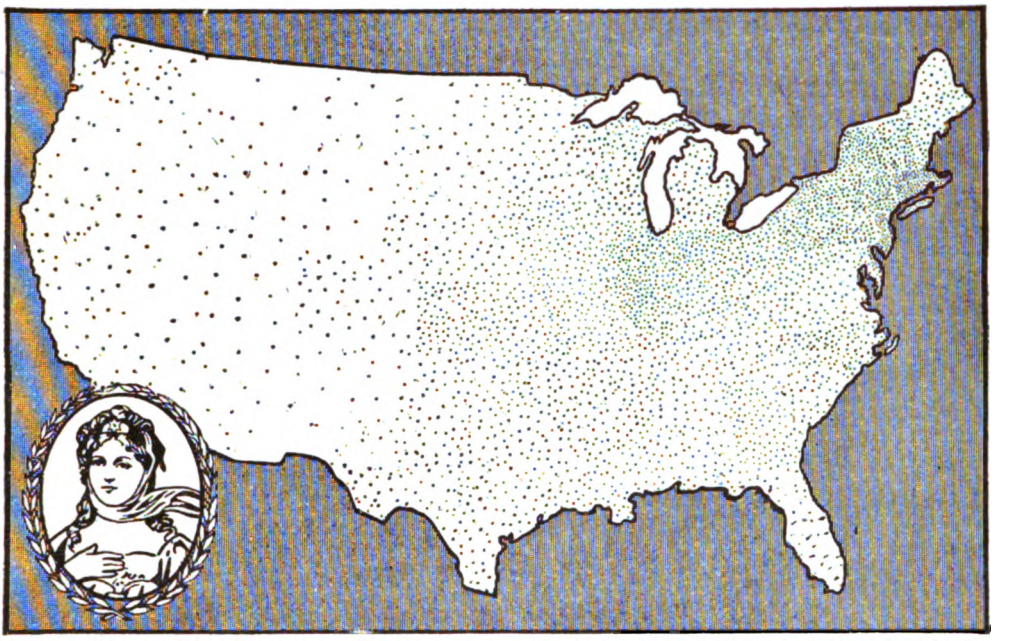

Fig. 190. The Use of Pin Maps in Advertising

A large shoe manufacturing company used this illustration in an advertisement announcing that 3,800 merchants were ready to show the latest fall and winter models of shoes

In order to make the dots stand out distinctly it would appear that agencies in any State have been shown as uniformly distributed over the State. Actual exact locations would be almost impossible to show unless a much larger map were used

with a cloth tape as suggested for straw-board mounts, or the whole built up combination may be framed with picture framing but without using any glass covering. The cork composition used should be $^3/_8$-inch thick. Maps backed with cork composition and used with glass-head pins having needle points will permit almost unlimited puncturing from frequently moved pins. If the map is mounted on cork composition the sharp-pointed pins are easily pushed in and removed, yet the record is always accurate because the pins cannot be knocked out.

Numerous wall maps can be very conveniently used if they are mounted on vertical swinging-leaf display fixtures similar to those shown in Fig. 219. The two surfaces of each swinging leaf should be covered with corrugated straw-board and muslin, or preferably with cork composition in order to get a good surface into which to insert the pins. As adjacent leaves are likely to strike and break the glass heads of the pins, projecting bumpers should be placed on every other leaf to allow enough clearance for opposite pins when the leaves come in contact. The rubber-covered bumpers used to prevent door

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knobs from striking plastered walls can be placed at the top or bottom of alternate leaf surfaces. If these rubber bumpers are not available, a narrow strip of wood at the top and bottom of each leaf will serve.

When employed with glass-head pins having needle points, the drawer cabinets for maps used to route salesman, etc., can have a layer of cork composition fastened in the bottom of each drawer. The maps are then glued to the surface of the cork composition. The drawer cabinets regularly found on the market have sufficient drawer depth to permit placing a $\frac{3}{8}$-inch layer of cork composition in the bottom of each of the regular drawers and still allow room for the pins. Map pins may be pushed into the cork composition so securely that no pin will ever be misplaced even if a book or other heavy object should happen to drop upon the map and the map pins. Pins in cork composition are so easily inserted and removed that they can be handled more rapidly than if stuck into any kind of a board surface. When ordering maps from any map manufacturer or map store for use with glass-head pins care must be taken to specify either a cork-composition backing or a corrugated straw-board backing, else the map will probably be shipped mounted on compo-board or some other surface entirely too dense to permit of pushing the map pins in until the heads touch the surface of the map.

If numerous glass-head pins are to be put into a map at one time, the eraser in the end of a lead-pencil should be used to push the pins down until the heads touch the map. Pins can be very quickly located if only their points are pushed into the map by hand, leaving the main pressure to be applied by the lead-pencil eraser after a number of pins have been located. The pencil-eraser method saves time and it also eliminates the discomfort which may be caused if thousands of pins are pushed into a map by using the thumb and forefinger only.

Line cuts, sometimes called zinc cuts, may be made directly from pin maps if glass-head map pins of suitable color are used. At the point on the map where each pin head is located there will be a black dot on the print made from the zinc cut. As light is reflected from the surface of the glass heads of the pins, there are sometimes shown in a photograph high lights which must be retouched with a pen or a fine brush so that the whole spot shall be black, rather than black with a white center, as seen in Fig. 191. Anybody can do this retouching very quickly. It is mentioned here only as a caution that the photograph be inspected before the zinc engraving is made from it.

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Photographs for line cuts must have a good contrast of white and black, or colors which photograph as black. Photographs or original drawings containing shades of gray will not produce good line cuts and frequently cannot be used at all for the zinc engraving process. When line cuts are to be made from pin maps it is best to be certain that the glass-head pins are selected in colors which will photograph as black. Red, orange, and black pins can be used without any question, since negatives made from these colors give a dead black on the photographic print. Line cuts can also be made from dark green and some of the other colors. Where it is necessary to make photographs and line cuts from a very expensive and elaborate pin map, it is wise to consult the engraver before the pin colors for the map are finally decided upon. The color blue should be carefully avoided if photographs or line cuts are to be made, since blue almost totally fails to show up on a photograph.

If half-tone engravings can be used to illustrate the pin map, many more different colors of pins may be used on the original map than when zinc cuts are the means of printing. Another advantage of half-tones is that different colors of pin heads are represented in the half-tone by different shades of gray, as can be seen in Fig. 191. On the left half of Fig. 191, fourteen different colors of glass-head map pins were used. The photograph was not retouched in any way. Fig. 191 thus represents about what can be expected of different colored pin heads for contrast in half-tone illustration. Note the high lights which give white spots on the circles of the darker pin heads. It is spots like these which should be retouched by hand on any photograph from which a line cut is to be made.

Tacks and pins have been used on maps to locate agencies, salesmen, customers, etc., more than for any other one purpose. The various possibilities in applying tacks and pins to sales-department work cannot be thoroughly covered here, but if a few general methods are known, each sales manager can work out for himself the pin scheme which best suits his own conditions.

Fig. 191 was photographed, without any retouching, direct from a section of the United States Geological Survey topographical maps. These contour maps, having a scale of about one inch to the mile, may be obtained from the Geological Survey at Washington, for most of these sections of the country which are thickly settled. The maps are very low in cost and yet are remarkably accurate. Fig. 191 was

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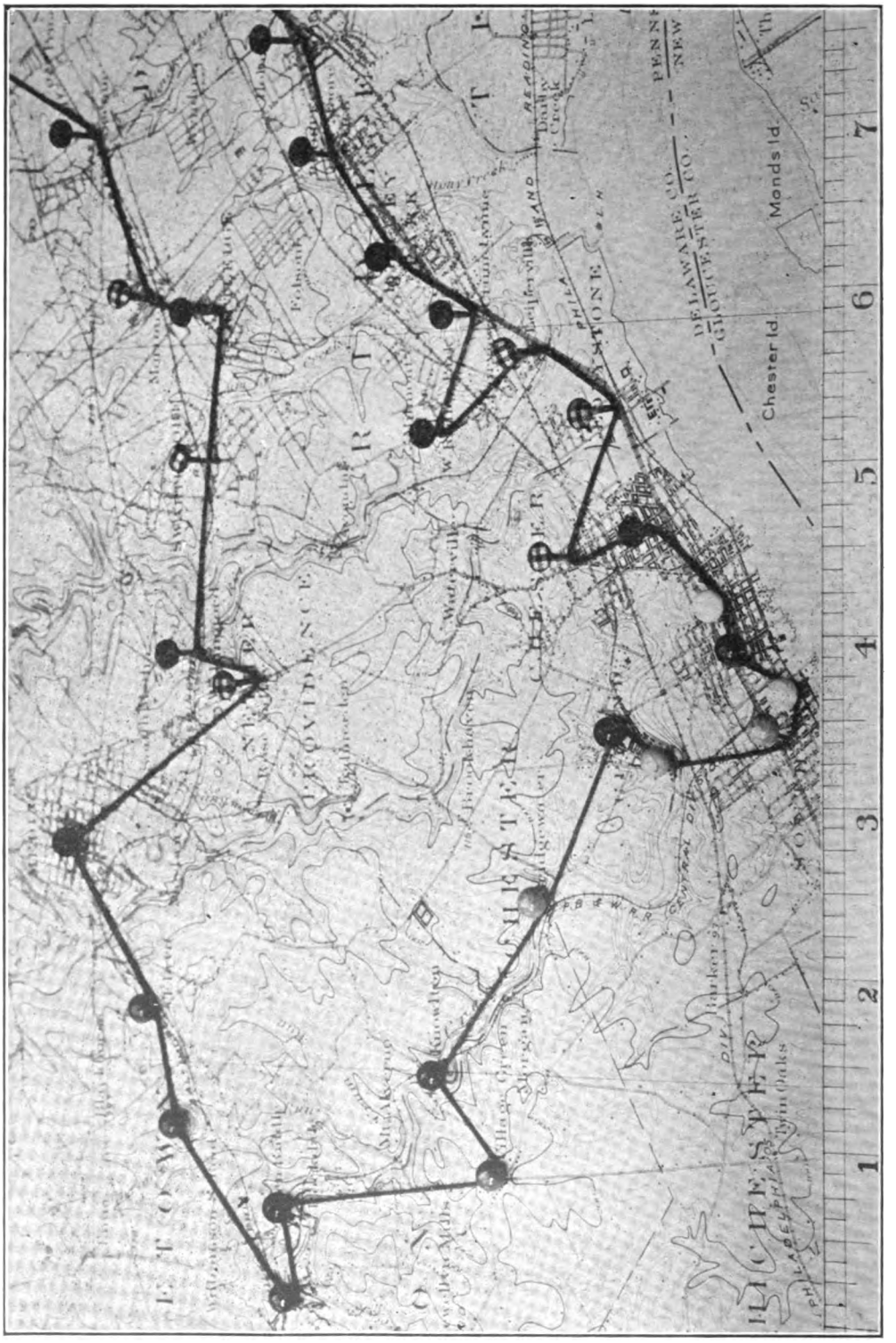

Fig. 191. Possible Route of a Salesman Traveling by Automobile to the Small Towns Southwest of Philadelphia

This illustration was photographed full size from one of the U. S. Geological Survey maps having a scale of about one inch to the mile. A ruler was included in the photograph to show inches. On the left half, glass-head map pins; on the right, cloth-covered map tacks. A red string between pins shows the route

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purposely photographed at an angle of about 45 degrees. As the upper part of the illustration is out of focus because of the angle, the illustration does not do justice to the Government maps. Another reason why the map does not come out clearly is that brown ink is used to print the contour lines and these lines accordingly show only faintly in the half-tone.

When it is necessary to show the routing to various points on a map the best method is to use a fine red string or thread between map pins as seen in Fig. 191. If the routing must be changed the thread can be almost instantly moved to connect the pins in some new order. Lines could be drawn on a map in ink to show routing, but the map would be ruined if any change in routing should ever be necessary.

In the preparation of illustrations for reports, advertising, etc., whether maps with or without pins are used, great care must be taken in the selection of the map itself. Map manufacturers have a very annoying custom of purposely making maps in such manner that the maps cannot easily be duplicated by photographic processes. Maps printed in blue ink are almost hopeless for use in making zinc cuts. Maps on which large areas as States, or counties, are differentiated by the use of colors red, orange, green, etc., do not produce either good line cuts or good half-tones since the colored areas on the original maps are likely to show as solid black areas and blot out all detail on the photograph. If an illustration must be made from a map it is well to be sure that the map is printed in black, red, or orange outline so that the resulting photograph will have distinct contrast. Maps should contain as little detail as practicable, to make certain that the pin heads or other representations of specific data will show up as distinctly as possible. Fig. 192 is a good example of the kind of map to use for reproduction when pins are employed. Notice in Fig. 192 a heavy border for the country as a whole, and the outlines for each State. Towns and rivers are not shown. Each dot on the map may thus be seen with great clearness.

As maps are very carefully copyrighted by most map publishers, maps which are copyrighted should not be reproduced without consideration of the copyright. For maps which are photographed down with comparatively little change, permission should be requested from the map publisher, to make certain that unpleasant complications such as damage suits or the holding up of a publication may be avoided.

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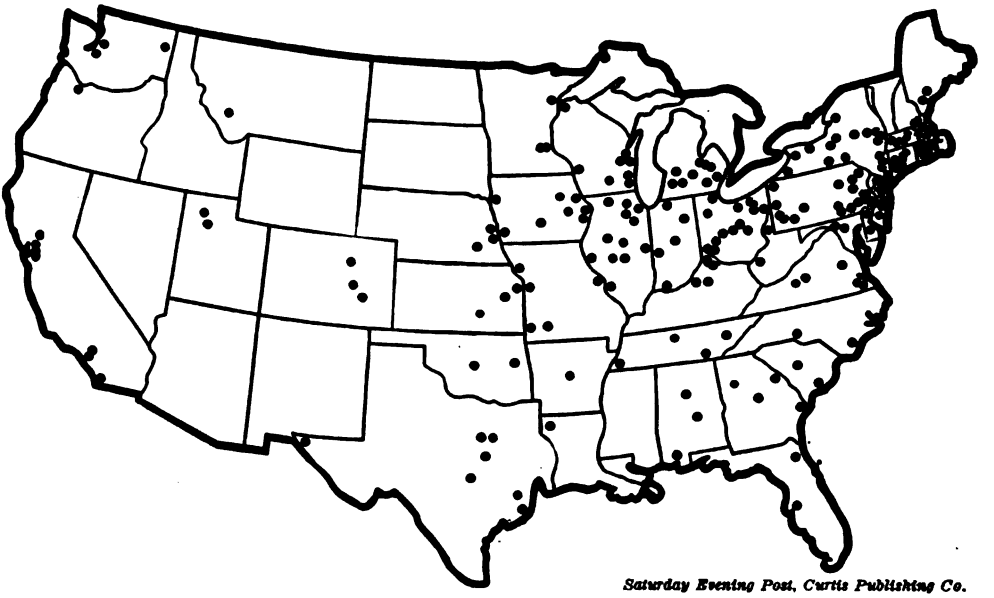

Fig. 192. The 228 Principal Trading Centers in the United States

This illustration was taken from an advertisement proclaiming that a certain magazine's circulation was mainly in the 228 chief trading centers of the country, and that, accordingly, the magazine must be effective as an advertising medium for merchandise

Note that in the east the dots are so numerous they are shown as crescents. The crescent scheme is a good one as it permits the use of a much larger dot than would otherwise be possible

The amount of detail which may be permitted on any map in which pins are used depends on the size of the resulting illustration and the size of the pin heads. If the pins are so numerous that the map must be very large, there is danger of reducing the map so much in size between photograph and final illustration that the pin heads will appear as indistinct dots on the complex surface of the map. In Fig. 193 a map was used in which there was more detail than really necessary or desirable for a clear illustration. In justice to the *General Electric Review* it must, however, be said that the map shown in Fig. 193 has been reduced in size and made smaller than it was in the original print. This map could not be reduced further without danger of completely losing the pin heads in the gray background resulting from so many lines on the map.

In producing an illustration like Fig. 193 considerable ingenuity must be used to make two or more classes of pins show out distinctly in zinc cuts which can be printed in only one color. The pins on the

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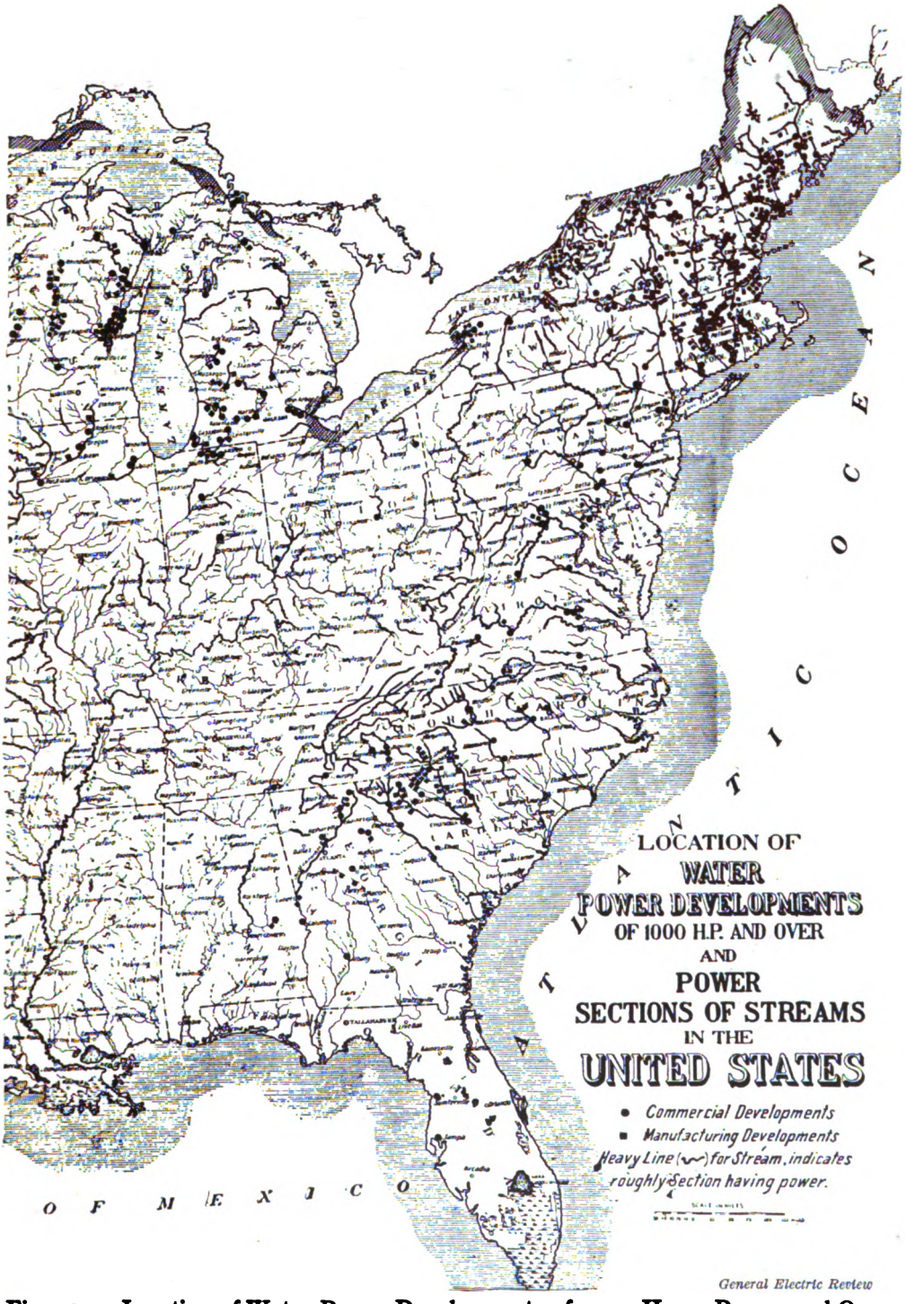

Fig. 193. Location of Water-Power Developments of 1,000 Horse Power, and Over, and Power Sections of Streams in the United States

The original of this map would have pins in two different colors. The photograph taken from the map would be retouched by the use of a pen so that squares would replace dots for one of the two colors of pins. The illustration shows a contrast of dots of two shapes rather than dots of two colors

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W. S. Gifford, Statistician, American Telephone & Telegraph Company

Fig. 194. Pin Map Showing the Location of Every Telephone Exchange Point in the United States in 1912. Only One Pin is Used for Towns Having Several Telephone Exchanges

The original map is 40 inches wide and 66 inches long. It contains 19,500 pins in five different colors showing the exact competitive condition in the telephone service. This is probably the most elaborate pin map ever made

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original map can be in different colors. After a photograph has been made of the pin map it is best to compare the photograph with the original, and then to make squares out of those circles which represent a certain color of pin on the original map. Squares are easily made by using a fine pen on a photograph considerably larger than the cut itself will be. When the final dots are not too small in size it is possible to make shapes with the pen such as triangles, outline circles, etc., which can be distinguished from one another.

If a great reduction in size is necessary between the original material and the finished illustration, extreme care must be used to have all the lines on any original drawing wide enough to stand the reduction in line thickness due to the decrease in size. If a drawing one foot wide is photographed down to an illustration three inches wide the lines will be only one-quarter as thick as in the original drawing. Lines on the original drawing must therefore be made very wide—in fact, much wider than is ordinarily considered desirable until experience has been gained from several disappointments in the appearance of finished illustrations. It is not easy to find maps with lines sufficiently heavy to permit of the great photographic reduction usually necessary in making illustrations from pin maps or other map representations. Quite often it is necessary for the person making a map chart to go over by hand all outlines such as borders and the divisions between States, counties, etc., to make those particular lines very much heavier than on any map which can be purchased.

A reducing glass which makes everything seen through it appear smaller is almost essential when many maps or charts must be reproduced. A convenient size of reducing glass has a single lens, about $1\frac{3}{4}$ inches in diameter, and causes objects to appear from one-half to one-quarter the size of the original. The amount of reduction can be varied by holding the glass at different distances from the original drawing. In order to tell how much reduction in size is made by the glass at any given distance, it is possible to look at the original object with one eye and through the reducing glass with the other eye so that by superimposing the two images their length may be compared. When a chart has ruled lines, as co-ordinate lines, it is a simple matter to superimpose the images from the two eyes so that one square of the original equals two, three, or four squares of the image seen through the reducing glass. When the two images are thus superimposed, study can be made of the thickness of lines or other details in the reduced

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size so that a decision may be had as to whether the drawing will safely stand the proposed reduction without having the lines made heavier.

Fig. 194 shows about the extreme limit of what can be done in the making of pin maps. The original map here was 40 inches wide and 66 inches long. Nevertheless, the map shows up satisfactorily in the greatly reduced size of the half-tone because care was taken to have very wide lines and little detail on the original map. Each of the 19,500 pins of five different colors had a head diameter of $^3/_{32}$ inch. It must be remembered, that most of these pins were in the characteristic blue colors commonly associated with the Bell Telephone System, and, because blue is almost impossible to photograph, the pins do not show out as strikingly as they would if other colors were used. The black splotches on the map were caused by the predominance in those areas of pins with dark blue heads. When this pin map was made there was no intention of taking a photograph of it. A much more distinct photograph would have been secured if pins in the contrasting colors of red, orange, black, green, purple, etc., had been chosen. All of these would have shown dark in the photograph, instead of white or light gray like the pale blue pins which in Fig. 194 were used in the greatest number.

Fig. 194 was photographed at an angle. The eastern half of the United States appears smaller than true scale because of the perspective in the picture. The perspective view shows that the glass-head pins had long shanks. This map, costing several hundred dollars to produce, could be injured severely by a few strokes of a janitor's feather duster. If short pins were used with spherical heads in contact with the map there would be no danger of the pins being misplaced. Another disadvantage of the long steel pins is that the steel portion exposed to the atmosphere is likely to rust, especially in cities near salt water. Pins with short needle-points pushed entirely into cork composition or corrugated straw-board have little opportunity to rust.

Fig. 195 shows a convenient map scheme by which different places on the map are numbered so that detailed information regarding each may be obtained from the annexed tabulation numbered to correspond with the pin numbers. In this scheme we have all the advantages of a pin map without the confusion of too many data on the surface of the map itself. The illustration of Fig. 195 was evidently prepared by hand. Such an illustration can, however, be made by using pins like those shown in Fig. 196, or like pin No. 20 in Fig. 199. This latter

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No.			R. R.	Cap. Bbls. per day
1.	Glens Falls Port. Cem. Co.	Glens Falls, N. Y.	D. & H. R. R.	1,800
2.	Hilsborough Cem. Co.	Howe Cave, N. Y.	D. & H. R. R.	2,000
3.	Alsen's Am. Port. Cem. Works	Alsen, N. Y.	N. Y. C. & H. R.	4,500
4.	Hudson Port. Cem. Co.	Hudson, N. Y.	N. Y. C. & H. R.	
5.	Warren Port. Cem. Co.	Warners, N. Y.	N. Y. C. & H. R.	
6.	Catskill Lake Cem. Co.	Portland Point, N. Y.	L. V. R. R.	1,800
7.	Wayland Port. Cem. Co.	Wayland, N. Y.	D. L. & W. / Erie R. R.	500
8.	Hargrave Port. Cem. Co.	Caledonia, N. Y.	N. Y. C.	600
9.	Wendle Port. Cem. Co.	Mellotown, Pa.	Penn. R. R.	1,750
10.	Allentown Port. Cem. Co.	Evansville, Pa.	P. & R.	2,500
11.	New Castle Port. Cem. Co.	New Castle, Pa.	P. & L. E.	2,500
12.	Catskill Cem. Co.	Cementon, N. Y.	N. Y. C. & H. R.	1,200
13.	Jamestown Port. Cem. Co.	Yorktown, Pa.	Penn. R. R.	2,500
14.	Sandusky Port. Cem. Co.	York, Pa.	Penn. R. R.	1,500
15.	Security Cement & Lime Co.	Security, Md.	West M. C. R. R.	2,300
16.	Universal Port. Cem. Co.	Universal, Pa.	Penn. R. R.	*27,000
17.	Lehigh Port. Cem. Co.	New Castle, Pa.	P. & L. E.	*36,000
18.	Crescent Port. Cem. Co.	Wampum, Pa.	P. & L. E.	3,600
19.	Buckhorn Port. Cem. Co.	Manheim, W. Va.	B. & O. R. R.	
20.	Diamond Port. Cem. Co.	Middle Branch, Ohio	Penn. R. R.	1,500
21.	Sandusky Port. Cem. Co.	Bay Ridge, Ohio	L. S. & M. S.	1,500
22.	Alma Cement Co.	Wellston, Ohio	C. H. V. & T.	2,000
23.	Lehigh Port. Cem. Co.	Wellston, Ohio	C. H. V. & T.	*36,600
24.	York Port. Cem. Co.	Portsmouth, Ohio	N. & W.	1,200
25.	Wabash Port. Cem. Co	Stroh, Ind.	L. S. & M. S.	1,500
26.	Bayshore Port. Cem. Co	Syracuse, Ind	Penn. R. R.	1,500
27.	Universal Port. Cem. Co.	Buffington, Ind.	C. I. & L.	*27,000
28.	Lehigh Port. Cem. Co.	Mitchell, Ind.	B. & O. R. R.	*36,000
29.	Louisville Cement Co.	Speeds, Ind.	B. & O. R. R.	2,000
30.	Kosmos Port. Cem. Co.	Kosmosdale, Ky.	L. & N.	1,500
31.	Virginia Port. Cem. Co.	Fordwick, Va.	Southern R. R.	3,300
32.	Norfolk Port. Cem. Comp.	Norfolk, Va.	Southern R. R.	3,000
33.	Dixie Port. Cem. Co.	Richard City, Tenn.	A. C. S. R. R.	4,000
34.	Southern States Port. Cem. Co.	Rockmart, Ga.	Southern R. R.	1,200
35.	Standard Port. Cem. Co.	Leeds, Ala.	Southern R. R.	1,200
36.	Castalia Port. Cem. Co.	Castalia, Ohio	L. S. & M. S.	2,000
37.	Superior Port. Cem. Co.	Superior, Ohio	C. & O.	2,000
38.	Ironton Port. Cem. Co.	Ironton, Ohio	C. & O.	1,000

*Includes all mills owned by company. *Data, Chicago*

Fig. 195. Location of the Portland Cement Plants of the Eastern Portion of the United States in 1911. Below the Map Is a Tabulation Giving the Name, Address, Capacity and Shipping Railroad for Each Plant

A pin map like this can be quickly made up by using pins such as are pictured in number 20 of Fig. 199 or pins such as are used in Fig. 196. An outline map with the pins can be photographed directly to produce an illustration like the above

pin has black figures on a white background, and does not give as striking an effect as white figures on a black ground.

Fig. 196 gives a hint of what may be done to prepare advertising copy with almost no expense. The illustration was made direct from a map on which pins were used having black areas lettered in white. The only hand drawing necessary for this illustration was about one minute's work in darkening the high lights where there were reflections from the surface of the black pins. An illustration of this type to show the location of agencies, branches, etc., makes effective advertising because the black spots are so large in comparison with the size of the map that the whole territory of the United States appears to be well covered by agencies.

Lettered or numbered pins like those in Fig. 196 and in Fig. 199 are frequently desirable to show the daily whereabouts of salesmen, repair men, etc., in order that the nearest man may be telegraphed to in

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case of emergency. One prominent manufacturer of locks for bank vaults uses a map which shows at all times the location of each of some fifty bank-lock experts who are routed from city to city each day by telegraph. The locations of the pins, and the railroad lines represented on the map, show instantly which man can best be sent to any bank which reports trouble regarding the door of its safe-deposit vault. Letters or numbers on the pins indicate the name of each man so that there is no danger of an error such as might occur if the pins were colored uniformly without specific letters or numbers.

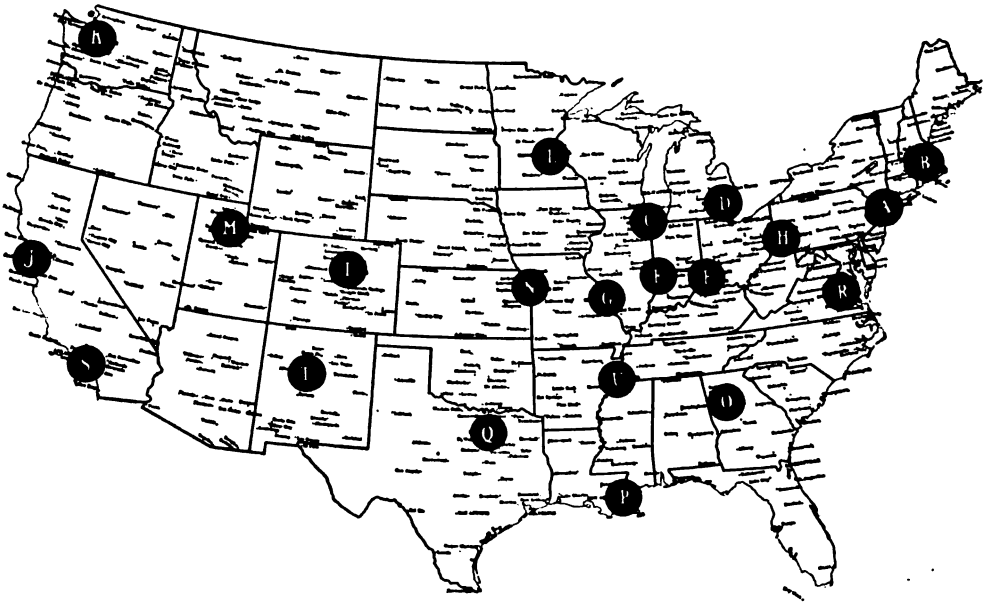

Fig. 196. Map to Show the Location of the Selling Branches of a Large Manufacturing Company

This line cut was made directly by photographing a standard map in which standard map pins had been inserted. Black pins with white letters or numbers give excellent advertising copy with absolutely no drafting work required

The argument of Fig. 197 would have been brought out better if the railroad tracks had been drawn in heavy black lines across the city map. Unless one is familiar with the city of Indianapolis, there would be no way of explaining the heavy soot deposits in that section shown on the lower portion of the map. Even the mention of railroad tracks in the title does not make up for not showing them on the chart.

In preparing Fig. 198 a scale was very carefully selected to use one dot to represent a definite number of people so as to avoid having dots crowd each other too closely on the map. A map of this kind could be made in a very large size, and then be reduced photographically to a

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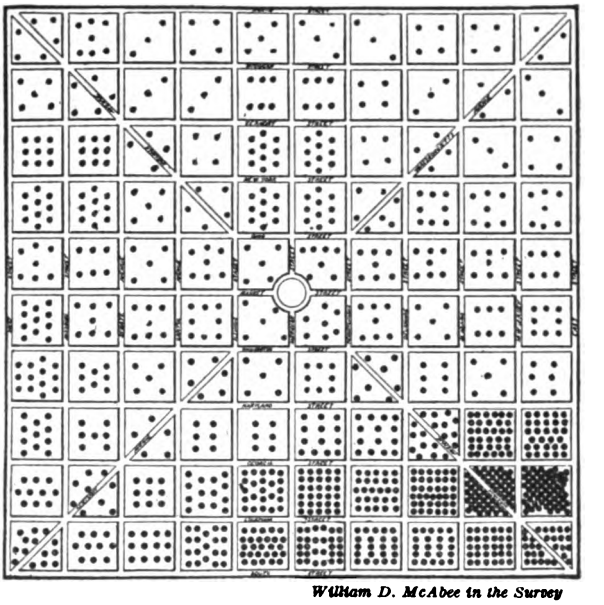
size which could be used in a report or magazine article. The reduction must ordinarily be so great for such a map that considerable forethought and care must be used or the dots will not show up distinctly enough in the final illustration. Anyone wishing to see many maps of this type shown in very excellent manner should consult Volume II of the *Report of the Transit Commissioner, of the City of Philadelphia*, published in July, 1913.



William D. McAbee in the Survey

Fig. 197. Relative Soot Deposits in Indianapolis, March, 1912

The greatest soot fall is in the vicinity of railroad tracks Carefully selected samples of snow were melted and the soot of twenty-four hours weighed after the water was evaporated. Spot maps of this kind can be quickly made by using short map pins pushed in till the pin heads touch the map

In placing dots for outlying districts on maps made by the method of Fig. 198, judgment must be used to have each dot placed at exactly the right point to locate accurately the people represented. In Fig. 198 each dot represents two hundred people. A dot in the suburbs may therefore represent all the people in one square mile of territory. If a map were first made with two hundred dots for the two hundred people, the one dot actually used on the final map would have to be placed not at the geographical center of the area represented, but at the center of gravity of the two hundred dots which it replaces.

In Fig. 199 various combinations are shown of pins, beads, etc., of use in map work. Data for map presentation are frequently so complex that ingenuity is taxed to show the facts on any map of a size commercially available. A great variety of effects may be secured, however, by means of the devices shown in Fig. 199. The exhibits given in the illustration are as follows:

1. Long pin with small size glass head, available in many colors.
2. Long pin of brass wire for use with beads as shown in No. 9.
3. Long pin with glass head used in conjunction with a piece of sheet celluloid cut into the shape of a flag.

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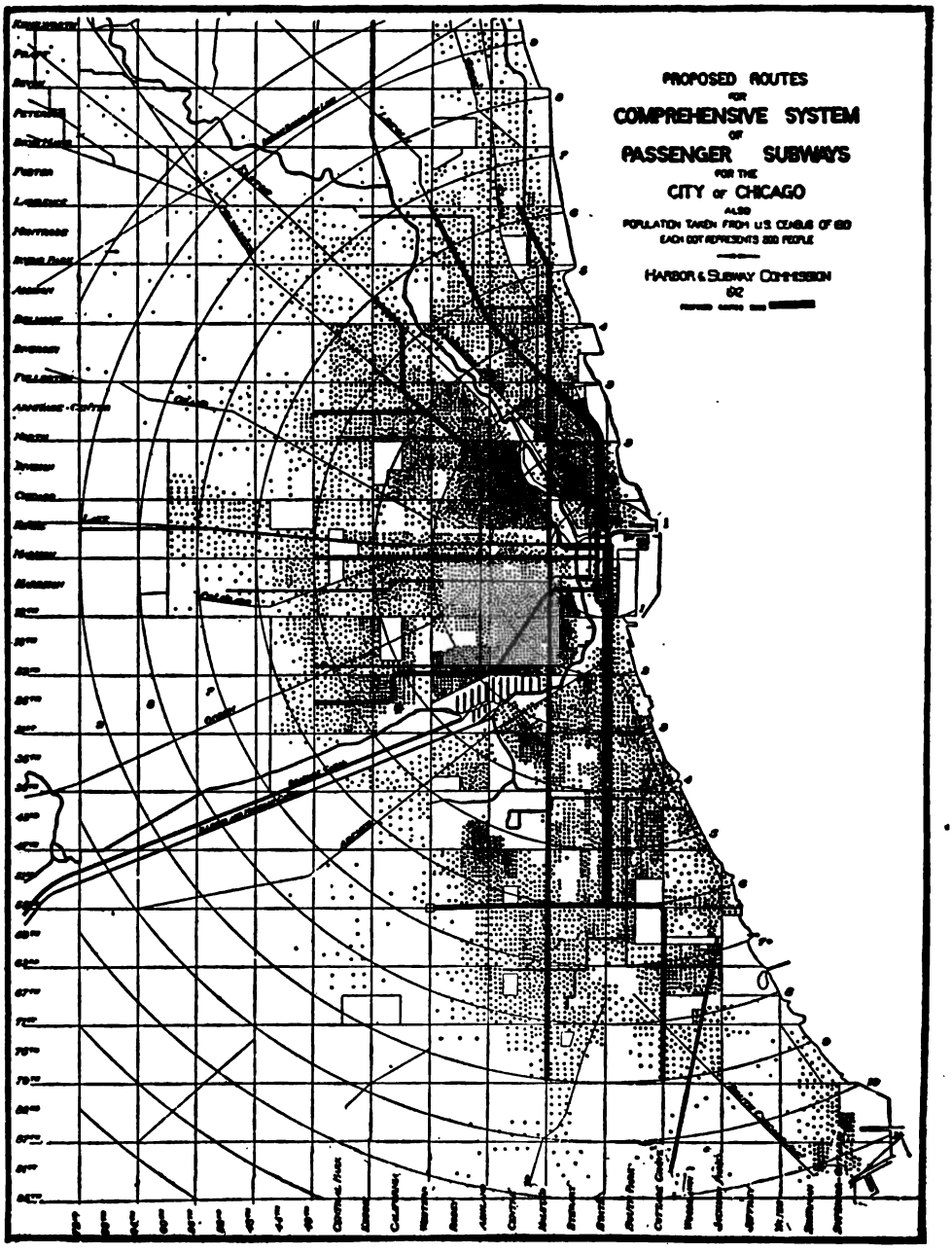

Fig. 198. Proposed Routes for a Comprehensive System of Passenger Subways for the City of Chicago

On this map each dot is carefully located to represent 200 of the population. A spot map of this kind, made to some scale whereby one dot represents several people, is essential to any reliable study of transit facilities. After the spot map is made, the transit routes can be laid out to give the best service possible. Short map pins with heads touching the paper can be used for dots on the original map

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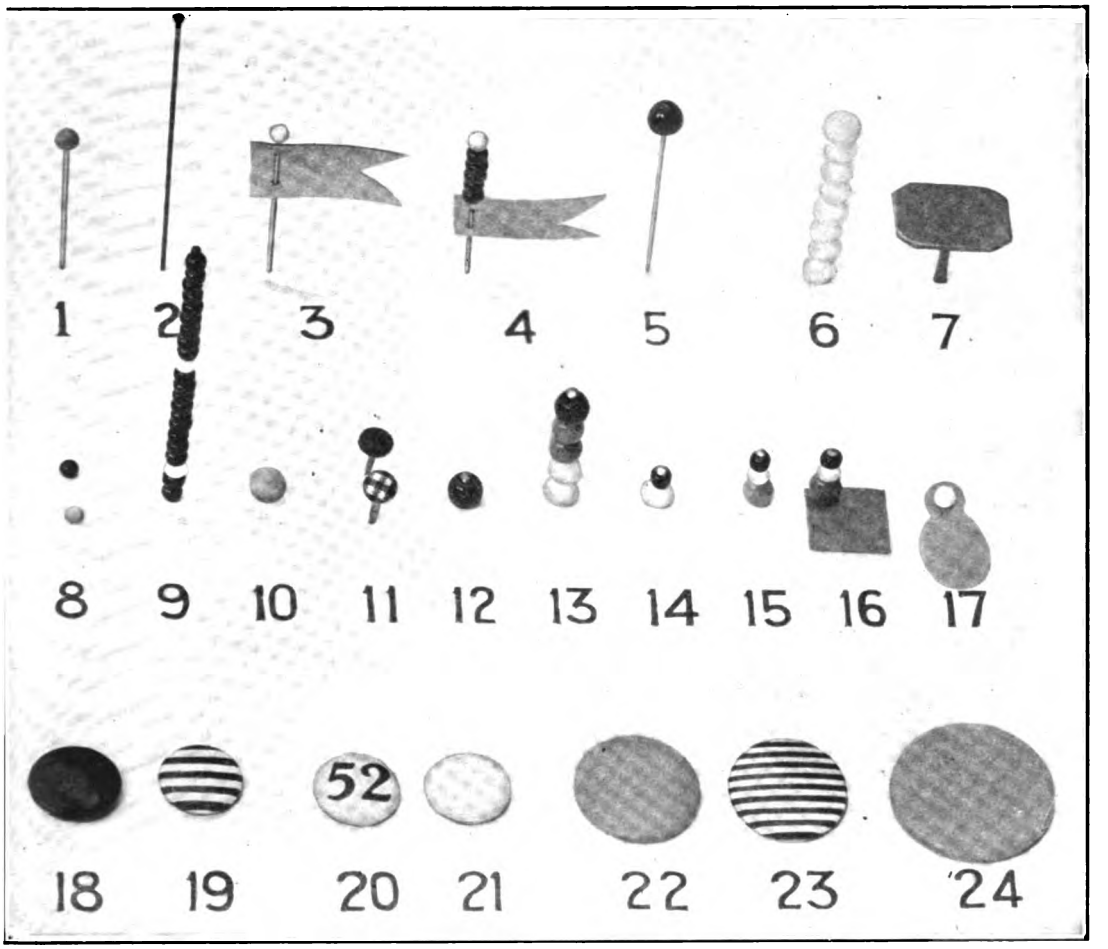

Fig. 199. A Full-size Illustration Showing Some of the Different Arrangements of Map Pins and of Beads Which Can be Used for Map Work

The size of the various beads and pins can be determined by measuring on the above picture with an ordinary ruler, as the articles are shown in their exact size

4. A celluloid flag, with beads above the flag to represent quantity, or beads in different colors to denote various characteristics for the data portrayed. The grip of the sheet celluloid on the pin is sufficient to hold both the beads and the flag at the upper part of the pin.

5. Long pin with large size glass head, obtainable in different colors.

6. Pin like that shown in No. 5 used with beads strung upon it.

7. A brass tack large enough to receive gummed labels which may be written upon with a pen.

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8. Map pins having sharp points and small spherical glass heads in contact with the map. These pins are available in many different colors; the upper one in No. 8 is red and the lower one blue.

9. Beads in various colors of a size to correspond with the map pins in No. 8. Here the beads were red. White beads, used for every tenth position, show at a glance that there are 22 beads on the pin. Note that the color red photographs as black.

10. Map pins having sharp needle points and spherical glass heads in contact with the map. The pin is of the same general style as No. 8 but it has a head of larger diameter. This pin is obtainable in many colors.

11. Cloth-covered map tacks available in plain colors and in plaids.

12. Single bead used with an ordinary pin as a crude substitute for a regular map pin.

13. Beads in different colors corresponding in size with the map pin of No. 10.

14. Beads of two different sizes representing different things but at the same location.

15. Beads of two different sizes and three different colors. Since both sizes and colors may be varied, and almost any number of beads used on one pin, there are practically unlimited possibilities for the showing of complex data.

16. Beads on a pin which holds down on the map a sheet of colored celluloid cut to the exact shape of a small land area to which attention is directed.

17. A sheet-celluloid marker held by a map pin like that seen in No. 8.

18. Celluloid-covered tack, available in different colors.

19. Celluloid-covered tack with stripes of different colors.

20. Celluloid-covered tack with printed numbers from 1 to 99 inclusive.

21. Celluloid-covered tack having a rough surface so made that the surface may be written upon with pencil or pen, yet erased afterwards or rubbed off with a moist cloth. Lettering may be made permanent by means of a coat of varnish.

22. Large size celluloid-covered tack available in different colors.

23. Large size celluloid-covered tack with stripes of different colors.

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24. Very large size celluloid-covered tack.

It will be seen from the foregoing list that the possibilities for ingenuity in map and pin presentations are almost unlimited. The celluloid-covered tacks having large flat heads, shown in Nos. 18 to 24 inclusive, are not as generally used as they might be for map work. Map pins and tacks of this sort placed upon the surface of a map can give a spot map with any desired diameter of spots, no matter what size of map is used or what the amount of photographic reduction may be. It is simply a question of selecting from the spherical heads, 8 or 10, and the flat heads 18, 22, and 24, to determine which size head is best suited to the size of the original map and to the size of dot desired in the finished illustration. Large celluloid-covered tacks 18, 22, and 24 are also valuable to show the location of main offices and different factories, or the locations of particularly important distributing points. The pins numbered 8, 10, 18, 22, or 24, are five different sizes of pins which may be used simultaneously on the same map to show different degrees of importance in the things represented.

When used for photographing to produce an illustration such as is shown in Fig. 196, lettered or numbered pins should have a black background so that the black circle outlining the tack head will show out in clear contrast against the map itself. This requires white figures on a black or red background. Pins having red letters on a black background cannot be used for photographing, as the red letters would photograph black and disappear entirely, leaving a solid black circle instead of a circle with figures. Since pins with a black background and white figures are not commonly obtainable, it may occasionally be necessary to use pins like No. 20 in Fig. 199 having black figures on a white background. Sometimes it may be feasible to draw an ink-line circle around each number which appears in the photograph so that the circles will be on the copy sent to the engraver who makes the zinc plate.

When pins must be used to locate agencies, stores, or other things which are usually concentrated in cities, the limitations are rigid because all pins should be located on the map immediately above the point representing the city. Crowded pins usually have to be spread horizontally over a wide area, and when so spread out it is impossible to tell which of several adjacent cities the various pins may represent. Fig. 200 depicts what was done in one case to get over this difficulty,

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"Modern Philanthropy", W. H. Allen, Dodd, Mead & Co.

Fig. 200. Sources of the First 3,000 Letters of Appeal Sent to Mrs. E. H. Harriman. These 3,000 Letters Asked for $70,000,000

Eight different kinds of pins were used on this map to represent different kinds of appeals. Long pins like those seen here are apt to fall out of the map, and thus destroy the accuracy of the record. Note the area around New York shown on a larger scale at the right

as far as possible, by showing the more thickly crowded district as a separate area on a larger scale placed at one side of the map.

The use of beads in conjunction with pins overcomes the main difficulties encountered when pins alone are used. Beads may be placed one above each other on long pins or wires so that each pin will be exactly in the point on the map for each city, and thus portray numerical data by map location more accurately than possible with other methods. The adjoining cities can be clearly discerned by means of separate columns of beads, whereas if pins alone are used the different groups of pins frequently blend so as to be indistinguishable. If there is only one item to be represented in a town, single glass-head pins may, of course, be used in conjunction with the beads.

When there are several units in a town, the beads strung on a long pin or wire can be counted quickly if a bead of a different color is used for every tenth bead, so the whole column may be counted by tens as possible in Fig. 201. A bead map like Fig. 201 should be mounted on several layers of corrugated straw-board to allow the long pins sufficient depth in the mounting to hold fast. For this

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particular map six layers of straw-board were used, giving a total thickness of about 1¼ inches. Though this mounting made out of corrugated straw board was thick, it was extremely light and very convenient to handle.

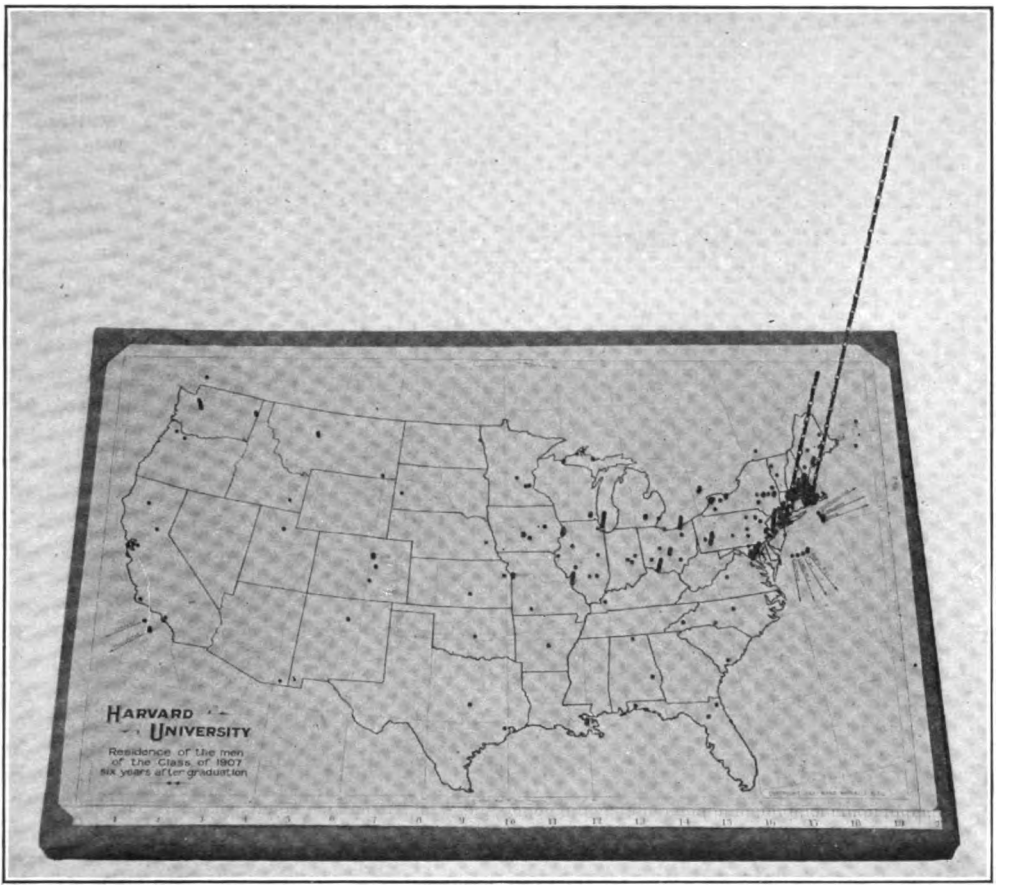

Fig. 201. Residence of the Men of the Class of 1907, Harvard University, Six Years After Graduation. The Bead Wire for Boston Includes All Men Living within Twenty-five Miles of the City Hall

Beads on long pins and wires were used here when there was more than one man in a town. A white bead was used on the wire for every tenth man. Counting from the top by tens, the exact number in any city can be seen from the illustration. 711 men are represented in this illustration less than 5 inches wide, yet the number in each city can be counted accurately

If long columns of beads must be used as in Fig. 201 for New York and Boston, the beads may be strung on piano wire such as may be secured in any good hardware store. The piano wire should be heated in a gas flame so as to remove some of the spring temper. After the wire has been heated it can be straightened and it will remain straight without continually springing back into coil form.

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Brass wire should be used if the holes in the beads are large enough to take wire of a diameter sufficient to give the required amount of stiffness. Brass wire is not as stiff as steel wire. When small beads must be used having small holes, the combination of wire and beads may be given several coats of varnish, if necessary, to make a tall bead column stand up straight. The columns for Boston and New York in Fig. 201 had to be varnished as the wire was very small on account of the fact that the diameter of the beads was only about $\frac{3}{32}$ inch.

The bead map in Fig. 201 gives a great quantity of information in a small amount of space. The illustration depicts the whole United States on a page width of only $5\frac{1}{8}$ inches, yet all the facts represented by the beads are brought out clearly. The men of the group portrayed who reside in foreign countries are indicated by pins near the seacoast with arrows pointing toward the country of residence. The fact that there were large numbers of the men in Massachusetts made necessary an extremely long wire for the beads of the Boston district. Because of the small size of the finished illustration and the size of map available, large diameter beads could not be used, and the bead wire for the Boston district was necessarily very tall and slender. The Boston bead column was about as tall as could be used without the column of beads bending under its own weight, even with the bead column varnished.

Another difficulty in having very tall columns of beads is due to the fact that the bead map must be photographed at an angle of about 45 degrees in order to show a good picture of the map.

If the bead column projects more than a reasonable distance from the map it is impossible to find a camera lens which will keep in focus the whole map and the full length of the bead columns. Either the map or the top of the bead column will be out of focus and there is no way of overcoming the difficulty. When Fig. 201 was photographed the image on the ground glass of the camera showed at once that the tops of the bead columns were out of focus. The bead wires for New York and for Boston were accordingly pulled entirely out of the map and the map was photographed without these two bead wires. The two bead columns were drawn in by hand on the surface of a photograph measuring 8 inches across the base of the map. With a little care, using a fine-pointed pen, bead columns such as these can be drawn in so that the ordinary observer would never notice that

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they were put on after the photograph itself had been taken. The angle at which the tall bead columns should slant can be determined by observing other bead columns in the same vicinity. In the case of Fig. 201, the angle was obtained by observing the bead column for Philadelphia. The reduction in size from the photograph on which the hand drawing was done, to the half-tone (in this case, a final reduction of from 8 inches to 4¾ inches) was sufficient to eliminate most of the imperfections due to hand work.

The use of beads opens up a whole new field for map presentation of statistical data. The Board of Sanitary Control for the Cloak and Suit and the Dress and Waist Industries of New York city made up two bead maps showing the fire risks and the sanitary condition in all the twenty-five hundred factories which come under the supervision of that Board. One bead on the map represents the condition for each factory. On the fire map the height of the multi-story loft buildings in which the different factories may be found is indicated by using one bead for each floor. Thus, in some of the taller buildings, twenty stories are indicated. Different colors of beads according to the fire risk or the sanitary defect to be shown mark the stories very plainly, and the heights of the bead columns show the heights of the buildings so that the bead map itself represents in miniature the sky line so typical of Manhattan Island.

Bead maps carefully made up should be of great use in preparing illustrations for advertising purposes. The accuracy of a bead map, when data for different cities must be shown, is much greater than that of a map on which only pins are used. The bead map makes possible the giving of information in condensed form with that great clearness and accuracy necessary to good advertising. It can safely be predicted that pictures of bead maps will in the future be a common thing in the advertising pages of magazines.

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