each bin. Metal bins would require some other provision such as a wire or small bolt for fastening the holder.

A similar holder for a card 5" long by 2 1-2" wide is used for rows. Such a card will take two 2" letters, indicating section and row, or three indicating section, row and unit. (see Figure 7). It may be fastened to the aisle end of a row of bins, or hung over the end of a row of platform or floor units for heavy storage. The units composing a row for bulk or case storage seldom need be separately marked.

Permanence.

6. The lettering should be so arranged that in case of expansion the existing lettering will be the least disturbed. If possible, additions to a given layout should make normal and convenient additions to the existing marking scheme and not require the remarking of all or part of the layout.

2. Layout

Standard unit storage area.

1. The standard unit storage area is the basis for the entire layout, just as the standard brick is the basis for a brick wall. To avoid confusion in the lettering, rows of such size as to require the splitting of the standard unit should be avoided, and may be if the unit is properly determined. For instance, if a unit is 3′ long, a row may be 12′ or 15′ long, but should not be 10′ or 14′ long.

If the rectangular unit is not square, it is wise in planning for floor or platform areas to have the short dimensions of the unit parallel the length of the row and the long dimension make its depth; for instance, if the unit is 4′x3′, a row of five such units would be 4′ wide and 15′ long,—the units adjoining each other on their longed (4′) side. A double row of ten units would be two single rows side by side, giving a storage area 8′ wide and 15′ long.

When planning layout for bins, it will frequently be possible to have the outside depth of the bin just half the depth of the unit area; for instance, if the unit area were 38" x 38", one unit area would hold 2 bins (Q. M. C. standard package 38" x 19" x 15") back to back, resting on the 38" x 19" side. A single row of unit areas would thus serve, without loss of space, for a double row of bins opening on the 38" x 15" side. A floor or platform layout for bulk or case goods, planned with such a unit would provide for a double row of units which would make the maximum storage space 76" deep. (see Figure 5).

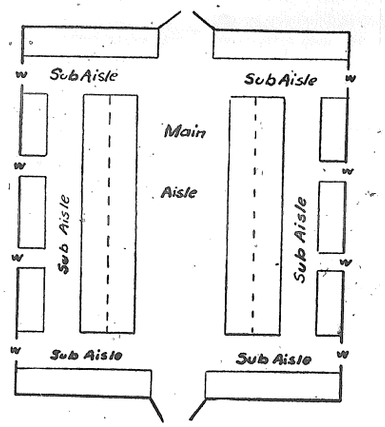

Figure 8

Incorrect layout. Four walls lined with storage space.

Sub-aisles on each side of every double row, whether of platforms or bins, give the necessary direct accessibility to every storage space. In general, a layout planned with standard unit areas is flexible, affording the desirable possibility of using the same space at different times for different purposes without upsetting the existing plan. The ability to adapt a layout to changed condition is always advantageous.

Crosswise rows.

2. Crosswise rows have the following advantages over lengthwise rows in oblong buildings or sections:

a. *Visibility* and ease of locating given rows.

b. *Main aisles* running the length of the section or building are *free for passing*,—all handling of goods being done in the side aisles.

c. *A greater number of separate aisle spaces* for handling goods. In a storehouse 40′ x 300′ the crosswise arrangement gave 64 secondary or side aisles for the handling of materials in the rows, as against 16 secondary or side aisles in a lengthwise arrangement. Under those circumstances, the chance of two men interfering by working in the same aisle at the same time was only one quarter as great in the crosswise

arrangement as in the lengthwise. It is also clear that the crosswise arrangement, by its larger number of shorter sections, gives greater flexibility for storing a variety of items. It also gives opportunity for concentrating large quantities of a single item in the sub-aisles where necessary. For the use of sub-aisles for storage, see Part II.

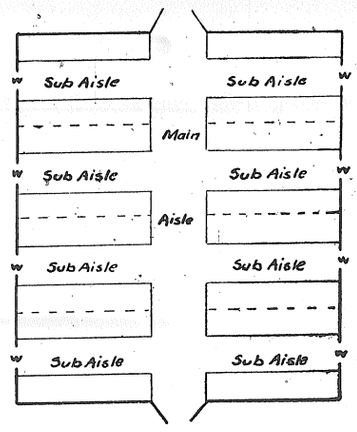

Figure 9

Correct layout. Parallel rows.

d. *Better lighting.* The sub-aisles afford a chance for the greatest effectiveness of windows on the long sides. With goods or bins piled high on lengthwise rows, the first row away from the wall may be well-lighted, but it shuts off the light for the other rows within.

e. *Reduced fire hazard.* The side aisles, giving frequent access to walls, increase the possibility of getting at a fire in it early stages. Fire passages along the walls become of less and sometimes of negligible importance. (See Figure 4 for layout including fire passage along walls.)

Parallel rows in any given section.

3. Any necessary change in the direction of rows should properly determine a new section as it is difficult to number consistently the rows in a single section if they run in different directions. The common tendency to line all four walls or boundaries with storage spaces is to be avoided. (see Figures 8 and 9.) If such a condition is found ready made it should be treated as an "exception" and remedied at the first opportunity. This is not always easy where shelves or racks are built in—another argument in favor of inter-changeable unit bins. If you start with the rows running east and west, all the rows in that section should run parallel to them. This is desirable for the sake not only of ease in numbering, but also for economy of space. Only by uniform parallel rows can the maximum percentage of storage to total area be secured.

Straight lines and right turns for aisles and rows.

4. City block scheme. Uniformity of plan increases economy of space. The less uniform the plan the larger the proportion of aisle space needed to give direct accessibility to each storage area.

Aisles.

5. The determination of the proper width of aisles, of course, depends entirely on the size of conveyors of material and of the bulk of the material itself. Care should be taken to see that main aisles are wide enough for two-way passing while sub-aisles are wide enough only for the work to be done in them, such as for a given truck to turn around. Aisles should not be so wide as to allow "parking space" for trucks. Aisles should always be kept clear for traffic, standing space for idle trucks being provided in regu-

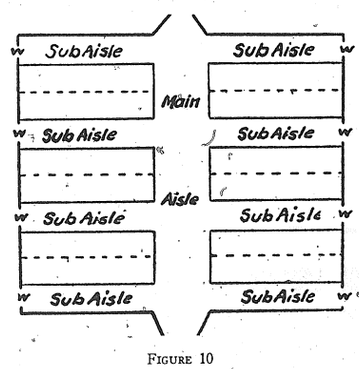

Figure 10

Incorrect layout. Six rows, four narrow sub-aisles.