CONCLUDING REMARKS.

The student in sheet metal pattern cutting who has followed this work will have become convinced that a considerable number of pattern demonstrations has been presented. Problems which are of more or less frequent occurrence in the sheet metal shop.

It is not to be expected that a work of this character can be made to embrace all subjects which may come before the operator. However, principles and methods are pointed out which may be employed to secure the patterns for a far greater variety of forms than can be reasonably included in any one volume.

Study is one important factor in securing an understanding of the art of pattern cutting, and must be indulged in by those who wish to become proficient. Pattern cutting is a branch of science which cannot be acquired in a day. There are fundamental principles which must be followed to secure results. A broad understanding of those principles reduces intricate problems to but simple operations.

The author, believing that it is far better to reason than to remember, has in this work pointed out those principles involved in that branch of pattern cutting where triangulation is applied.

An understanding of mechanical or geometrical drawing involves an understanding of the more difficult portions of sheet metal pattern cutting. Those who have had the advantage of securing that understanding, will find this work a series of suggestions. Those who

have been denied that advantage, will find a study of mechanical or geometrical drawing a material aid.

Chapters 9 and 10 have been devoted to the fundamental principles of Orthographic Projection, commonly known as mechanical drawing. Diligent application to these will secure surprising results; however, one should hardly expect to find this subject exhaustively treated in a work on pattern cutting.

Practically all problems which demand Triangulation are in close relation. At first sight some appear simple, while others appear complex. The complex example is usually one in which the work in prolonged simply for the reason that a pattern must be developed for each component part of the object for which a pattern is required. Many times the pattern for a component part of a complicated form is as simple of development as many of the so-called simple forms. The trouble experienced by many of our pattern cutters is due solely to their inability to make a proper analysis of the problem in hand, or to their inability to make a correct geometrical representation of the object.

There are two qualifications necessary to make a successful pattern cutter: these are a good understanding of orthographic projection and a good power of conception. The man who possesses these will have little difficulty in his work. We frequently meet a man who has an excellent power of conception, but who has devoted very little time to the study of the underlying principles, relying upon his ability to find an untrodden path by which he could secure his patterns in record time. This often leads him into embarrassing positions. There are underlying principles, an understanding of which is as necessary to the professional pattern cutter as the un-

derstanding of his notes is necessary to the professional musician.

He who wishes to excel in the art of sheet metal pattern cutting should devote time to the study of orthographic projection. While this may seem useless work and lost time in the beginning, it will be found that the end amply justifies the means, since he will have placed himself in a far better position to simplify his problems. In proof of the above we may ask: Who would be better prepared to simplify a mathematical problem than an expert mathematician?

He who attempts to develop the patterns for a variety of forms to be constructed of sheet metal without giving the underlying principles some attention is a man groping in the dark. Many such instances have come before the author's notice in his long period of observation.

The author has long been a close student of sheet metal pattern development, and has developed patterns for a great variety of forms which have been made from all gauges of material, from light tin plate to 3/16-inch iron—patterns for fittings which could be placed in the coat pocket, and patterns for fittings the weight of which would exceed a ton. There is no difference in the principles involved, while no doubt a somewhat greater power of conception is required in the larger work, since it is a difficult matter to secure a sufficient surface upon which complete diagrams may be drawn to represent to object upon the required plane.

We may in some instances reduce the required surface by employing a scale drawing, say one-quarter size or 3 inches to one foot. This requires every measurement to be multiplied four times when placed upon the material. It should be understood that any inaccuracy is thus magnified fourfold.

In the lighter stock some inaccuracy may be easily remedied, but in the heavier material this becomes much more troublesome. In forms where the component parts are assembled by double seaming, or by the use of the bench machine, proper allowance can be easily determined. In the heavier work, where holes must be punched in the flat and coincide when the object is assembled, considerable accuracy must be maintained, and the thickness of the material reckoned with in every instance. In practically all examples throughout this work, to avoid confusion, circles have been divided into sixteen parts. This is in no sense a recommendation for the universal use of that number as explained in Chapter IV.

The subject matter included in this work represents an honest endeavor on the part of the writer to place before the mechanic or student, something worthy of attention by those interested in Triangulation as Applied to Sheet Metal Pattern Cutting.