



# THE JOURNAL OF EDUCATION

Devoted to Education, Literature, Science, and the Arts.

Volume XX.

Quebec, Province of Quebec, November & December, 1876.

No. 11 & 12.

## TABLE OF CONTENTS.

<p>Drawing as an element of advanced Industrial Education (concluded)..... 165</p> <p>The Limitations of Education Chinese Schools and Education ..... 167</p> <p>Object Lesson Teaching at the Centennial..... 171</p> <p>The Science of Teaching..... 172</p> <p>The Press on Education..... 173</p> <p>Girls at School..... 174</p> <p>The Art of Deception..... 175</p> <p>Teachers ..... 176</p> <p>Confucius ..... 176</p> <p>School discipline..... 176</p> <p>Firm training of Children..... 177</p> <p>A Few Words on Turkey..... 177</p> <p>Spelling..... 178</p> <p><b>OFFICIAL NOTICES :</b></p> <p>    Appointments—School Commissioners and Trustees</p> <p>    —Erections and annexations of school municipalities..... 180</p> <p><b>POETRY :</b></p> <p>    Don't forget to pray..... 181</p> <p><b>EDITORIAL :</b></p> <p>    Duration of daily attendance in School..... 181</p> <p>    The Teachers Parliament in Session..... 181</p> <p><b>OBITUARY :</b></p> <p>    His Excellency Lieutenant Governor Caron..... 188</p> <p>    Funeral of the late Lt-Governor..... 188</p>	<p>University Intelligence..... 190</p> <p>The Montreal School of Art and Design..... 190</p> <p>Short sight in school children 191</p> <p><b>MISCELLANY :</b></p> <p>    Use of Stimulants by Women 192</p> <p>    To bleach leaves..... 192</p> <p>    Experiments on arsenic..... 192</p> <p>    Clear ice..... 192</p> <p>    Rules for prompt action in case of accidents..... 192</p> <p>    Coloured lights..... 192</p> <p>    Statistical facts about the Centennial ..... 192</p> <p>    Useful recipes..... 192</p> <p>    Tripoli ..... 192</p> <p>    Girls can learn to be house-keepers ..... 192</p> <p>    Teach Children..... 193</p> <p>    The blessing of good wives... 193</p> <p>    Oil yourself a little..... 193</p> <p>    Winter evenings..... 193</p> <p>    Weighing light..... 193</p> <p>    Fine words..... 193</p> <p>    The sufferings of Childhood.. 194</p> <p>    Livingstone's researches..... 194</p> <p>    Anti-Early Rising..... 194</p> <p>    Rapidly and Superficiality... 194</p> <p>    Meteorological facts concerning the Dominion..... 195</p> <p>    The french museum of national antiquities..... 195</p> <p><b>ADVERTISEMENT :</b></p> <p>    Teacher wanted..... 195</p> <p>    Meteorology ..... 196</p>
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### Drawing as an Element of Advanced Industrial Education.—(Concluded.)

BY C. B. STETSON.

#### STEPS IN REPRESENTING SOLIDITY.

The work should begin with the simple forms of solid geometry, the circular being drawn before the plane-sided, as the former present less difficulties than the latter. It is an absurdity of which many are guilty, to base the drawing of circular solids and objects upon

the drawing of the more complicated plane sided ones. After the geometrical solids, objects of corresponding shapes are logically in order; these to be followed by ornament in relief, and by casts of natural forms and of the human figure; the course to conclude with drawing from nature and from the living figure. The first aim should be to represent the objects in perspective outline,—the literal form. When this has been mastered, light and shade can be properly added; and then a steady light must be had, as when it is admitted into a room only from the north or northeast.

Some object vehemently to the use of flat or printed copies in this kind of drawing. Of course the only genuine object-drawing is drawing from the solid itself. But it does not require much pedagogical acumen to discover that flat copies, supplementing the solids, can be made greatly to facilitate progress at the outset. Both the printed copies and the objects should be as beautiful as possible, in order that the taste of the student may be elevated while he is learning to draw.

It will be well here to observe that there is a kind of drawing executed entirely with instruments, which is called linear perspective, and sometimes simply perspective, as it is the only drawing that conforms literally to the meaning of that word. This kind of drawing is often employed, even by those who regard themselves as experts, to explain the principles to be observed in drawing from the round or the solid. But only confusion results from thus mixing the two methods, since they have so little in common,—since they differ both in principles, and in aims. Linear perspective is employed to a limited extent by artists, but is chiefly used by industrial draughtsmen. It is the only means by which the architect, for example, can make from his working-drawings, a pictorial representation that will show, with a near approach to the truth, and in advance of construction, how a building will look when completed. It must, therefore, be regarded as an element of advanced technical instruction.

There are two methods, sometimes called the direct and indirect, of making perspective representations from working-drawings. The processes of the former are the easiest of explanation, at least for one who already has some knowledge of orthographic projection, but are not always the easiest in application.