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TABLE OF CONTENTS.

<p>On Teaching Natural Science in Schools. (<i>Continued from our last</i>)..... 185</p> <p>Intellect in Agriculture..... 186</p> <p>Prize Essay on Teaching Elementary Geography. (<i>Concluded</i>).. 187</p> <p>Poetry: Autumn Winds..... 190</p> <p> Christmas Carol..... 190</p> <p>Civil Engineering at the time of Christ..... 191</p> <p>Official Notices: Appointments.—Erection of School Municipality.—Diplomas Granted by Boards of Examiners..... 191</p> <p>Editorial Department: To our Readers..... 193</p> <p>Report of the Minister of Public In-</p>	<p>struction for the Province of Quebec for 1868, and in part for 1869. (<i>Concluded from our last</i>). 194</p> <p>Provincial Association of Protestant Teachers of the Province of Quebec..... 197</p> <p>Obituary: Death of an Eminent Sulpician.—Mr. A. S. Ritchie.. 198</p> <p>Current Exchanges Received..... 198</p> <p>Miscellany: Education..... 199</p> <p> Literature..... 199</p> <p> Meteorology..... 199</p> <p>Advertisements: Wants..... 200</p> <p>The Dramatic Reader..... 200</p> <p>The Journal of Education..... 200</p>
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On Teaching Natural Science in Schools.

By J. M. Wilson, M. A., F. G. S., F. R. A. S.

(*Continued from our last.*)

The art of the schoolmaster is a maieutic art now as it was in the days of Socrates; it is still his business to make his boys bring their notions to the light of day, to the test of facts; constantly to require verification; but as often as possible to give them the pleasure of discovery. He may guide them to the treasure, but let him unselfishly give them the delight of at least thinking they have found it. This is the charm that tempts them on, and is the highest reward they can win. At first the seeming progress is slow, but it soon accelerates, and the avidity for learning soon compensates for the apparent poverty of the results at first.

I insist upon this point because I am convinced that it is very important, and very likely to be overlooked: and as Botany seems the best subject for beginning to train boys in scientific methods, and as no English work (1) is thoroughly to be recommended as a guide to botanical teaching, I shall devote a brief paragraph or two to the illustration from Botany of what I hold to be the true method of *beginning* to teach science. It is a subject, however, for an essay of itself.

(1) Oliver's Botany is the nearest approach to a good text-book.

Suppose then your class of thirty or forty boys before you, of ages from thirteen to sixteen, as they sit at their first botanical lesson; some curious to know what is going to happen, some resigned to anything; some convinced that it is all a folly. You hand round to each boy several specimens, say of the Herb Robert; and taking one of the flowers, you ask one of them to describe the parts of it. "Some pink leaves" is the reply. "How many?" "Five." "Any other parts?" "Some little things inside." "Anything outside?" "Some green leaves." "How many?" "Five." "Very good. Now pull off the five green leaves outside, and lay them side by side; next pull off the five pink leaves, and lay them side by side: and now examine the little things inside. What do you find?" "A lot of little stalks or things." "Pull them off and count them:" Then show them the little dust-bags at the top, and finally the curiously constructed central column, and the carefully concealed seeds. By this time all are on the alert. Then we resume: the parts in that flower are, outer green envelope, inner coloured envelope, the little stalks with dust bags, and the central column with the seeds. Then you give them all wall-flowers: and they are to write down what they find: and you go round and see what they write down. Probably some one has found six "*storks*" inside of the wall-flower, and you make him write on the black-board for the benefit of the class the curious discovery, charging them all to note any such accidental varieties in future; and you make them very minutely notice all the structure of the central column. Then you give them all the common pelargonium and treat it similarly; and by the end of the hour they have learnt one great lesson, the existence of the four floral whorls, though they have yet not heard the name.

Next lesson-time they come in looking more in earnest, and you give them single stocks and white alyssum, which they discover to be wonderfully like the wall-flower; and you have a lot of flowers of vegetable marrow, some of which are being passed round while you draw two of them on the board. The difference is soon discovered; and you let them guess about the uses of the parts of the flower. The green outer leaves protect it in the bud; the central organ is for the seeds; but what is the use of the others? Then you relate stories of how it was found out what the use of the dust-bags is: how patient Germans lay in the sun all day to wait for the insects coming: and how the ex-