

ever admirable they may be as specimens of mathematical reasoning, they are of little or no use in practice. I take the whole matter of stone arches, of retaining walls, of dams, of the pressure of earth-work—the results of the higher analysis are for the most part of no practical value whatever and serve only to confuse and disgust the student with what, treated in a simple and practical way, may be made both useful and interesting."

"Not many years ago," says the same Author, the custom was very general in our colleges to oblige all students to go through the differential and integral calculus. This was done purely on the ground of discipline, for no one ever claimed that it was to be of any use to the student. It was found, however, after many years that except in rare cases the student utterly failed to get any return at all commensurate to the amount of time given to this study. For the greater number it was merely an inducement to shirk duty and a means of getting slovenly habits of study. It is now almost universally abandoned as a required study in college."

"Much time," says Mr. Thomas C. Clark, "is wasted in our colleges and technical schools over the higher mathematics. Every engineer will agree with me that the cases where the use of the higher calculus is indispensable in our practice are so few that its study is not worth the time expended on it; and we have the highest authority for saying that unless its use is constantly kept up we become too rusty to use it at all."

"Practical engineers," says Mr. Charles Bender, himself an accomplished mathematician, "generally do not place much confidence in long formulæ and if they once have studied mathematics thoroughly, they lose the taste for their studies after some time of practice since they have convinced themselves of the futility of ultra-refined theoretical speculations."

"In our experience of nearly half a century as an engineer," says Mr. J. W. Adams, "we have rarely found that engineers possessing this peculiar faculty for minute mathematical analysis, with the consequent reliance upon its infallibility which usually accompanies it, were safe guides, either in the design or execution of novel projects."

"We often hear it stated," says Mr. Vose, "that the business of the school is not to deal with details but with what are somewhat vaguely termed general principles. I believe there never was a greater fallacy."

No general principle can possibly be applied to engineering construction except by means of practical details; and in many cases the details are more important than the principles. I believe that just as

engineering practice preceded engineering science, so in our course of instruction we must have a soil of practical conceptions in which the theoretical plant can grow. To give a young man an exhaustive theoretical discussion in the school and to tell him that by-and-by he will run across the practical details, is very much like setting out a plant upon a brick side walk, and trusting to luck to get some earth about its roots at some future time."

The opinions above quoted emanate from men who stand high in the engineering profession and are worthy the consideration of every student in Applied Science. Fortunately for Canada, the men upon whose skill reliance is placed for carrying on the present engineering enterprises do not mentally dwell in ethereal regions where none of the difficulties of defects in materials and workmanship enter to mar their beautiful theoretical calculations. They are eminently practical men and to such our graduates apply for situations. In the interests therefore, of the Faculty which we shall ever endeavor to uphold, it behoves every undergraduate in Science to prepare well for the particular work which he intends to pursue by giving most of his time to those studies which will be of greatest benefit to him in after life.

FREE SPEECH.

A CORRESPONDENT, who for some inexplicable reason signs himself "Free Speech," attacks us for censuring the Arts Faculty which has lately aimed a successful blow at that very privilege of free speech, which the people of this country are supposed so highly to value. As his letter has been framed with a good deal of misleading ingenuity, we purpose to discuss it point by point. He says: "the rule of submitting the questions for debate to the Faculty is not a new thing." True! the rule is not new. The members of the Undergraduates' Society have known of this rule ever since the society came into existence; they have twice before, if not oftener, been called upon to comply with that rule. Once they discussed it, and it will be within the memory of our correspondent that the society then determined to disband rather than submit; the other time, or times, they quietly ignored the ukase of the Vice-dean. What did the Faculty do? Their wisdom on those occasions was truly commendable. They allowed themselves to forget they had ever issued the decree.

"The Faculty have a perfect right to a direct control over the proceedings of the U. L. S., when they both provide the hall in which its meetings are held and are responsible for the general conduct of its members as students," says "Free Speech." Have