scribed in questionable Latin, but the education it is supposed to certify. Take them all in all, the Professors of the Ontario University possess quite as high attainments as the Professors of the old country universities. As for apparatus, it is but a tanciful delusion to think that costly implements are required for the teaching of chemistry and science. The simpler the apparatus, the more effective the teaching illustrated and enforced by it, and a clever professor can make the greater part of his own apparatus As for museums, students have little time to loite in them, and great libraries, while undoubtedly valuable, are chiefly filled with antiquated rubbish, and the undergraduate has enough to occupy him in his own books without exploring their dusty shelves. The insinuation that pervades most of the newspaper articles on university confederation conveys the idea that the degrees of the Toronto college of a higher "value" than those of sister Ontario colleges, and that the latter should be levelled up. As for Queen's it is safe to assert that the standard is higher than that of any other university in the Province, its tests are rigid to a degree and its Principal and Professors take high rank for educational ability and scholastic attainments."

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THE following letter appeared in the *Globe* lately :—

"I was much pleased with an editorial in Thursday's *Globe* discussing the question of "university affiliation." You say very truly, and hundreds of the graduates of the outlaying colleges will agree with you, "it is more than idle to expect outside colleges to send up their students to the University of Toronto so long as professors in University College are appointed examiners to the university." I am certain that the friends of Queen's, Albert and Victoria would gladly make sacrifices in order to, in any way, raise the standard of higher education, but it would be an insult to the professors employed in these colleges to ask them to send their students to Toronto for examination, or even to hint at affiliation, so long as the Senate of the great National University professes to conduct high and clean-handed examinatians, and yet appoints the professors of its solitary college to vacant examinerships. The *Mail's* apology for the appointments is a childish one. It is that graduates do not generally keep up their reading in Natural Science, Chemistry and Moral Philosophy, and consequently are not competent to examine in these departments. Very true; but why not extend these appointments to professors of these subjects in the outlaying colleges? Prof. Murray of McGill, was last year, I believe, examiner of Metaphysics and Ethics; and members of the Senate probably known best why he was not re-appointed. I am told that he did his work ably and satisfactorily, but that the remuneration was altogether out of proportion to the labor involved in conducting the examination, and that he declined reappointment. If this be so, and if a competent and independent body of examiners cannot be obtained otherwise, it would be well, as you suggest, to abolish the whole system of scholarships, and expend the $3,000 or $4,000 thus saved in securing the services of men of undoubted scholarship, to conduct not only the university examinations but also those of the Education Department. The present mode of awarding bursaries is indefensible, and should be discontinued.

One point more. The outside colleges have a different standard for *pass* from that required at Toronto. Queen's for example, asks 40 per cent. in each subject, while Toronto University exacts only 33. This latter is so ridiculously low that a student may know absolutely nothing about a subject and yet succeed in "making a pass" every year. The questions set at Toronto are difficult enough, but it is sublime nonsense to talk about keeping up a high standard at her examinations so long as only 33 per cent. are exacted as requirements for passing."

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## IRON MANUFACTURE.

THE following letter from the pen of Mr. Samuel D. Mills, M.E., appeared in a recent issue of the *Daily News* relating to the ores of the County of Frontenac :—

"As the question has been several times raised respecting the suitability of our ores for making iron by the Wilson deoxidising process, it may be well to state that any kind of ore can be used in that process, provided it does not contain more than about five per cent of titanic acid, two per cent. of sulphur, or .05 per cent. of phosphorus. No particular mixtures of ores are required as in the blast furnace system, for the simple reason that the iron is not reduced to a fluid state, and it is in order chiefly to facilitate the melting of the metal in the blast furnace that it is desirable to have certain proportions of different ores mixed, and also, because in the blast furnace the ore is necessarily used as it comes from the mine, so that any rock associated with it has to be melted. The mixtures of different ores is an assistance in this respect, as they have generally different kinds of rocks associated with them which assist the operation by their mutual action as fluxes upon each other, and deficiencies in this respect being made up by the addition of lime, alumnia, etc., as required, these substances are termed "fluxes" by the furnace men. Now, in the Wilson process the ore is crushed and "jigged" so as to free it from any admixture of rock before it is placed in the deoxidiser. The mixture of ores for fluxing purposes is for this reason also unnecessary. The popular impression respecting iron ore appears to be that the iron in each variety of ore exists in different qualities. Now, the fact is that all economic ores contain the iron either as oxide or carbonate, and the quality of iron produced, if freed from the effects of the influence of other minerals associated with the oxide or carbonate of iron, would be identical in all cases; it is, however, in practice, impossible to obtain the iron free from these foreign substances, and to this circumstance we owe the many different grades of iron in use. In the Wilson process the iron is not melted, but first is brought to the state of a metallic sponge in the deoxidiser and then heated in the hearth to a higher temperature so as to fuse the slag (of which there is always a small amount formed from impurities not removed by "jigging") and bring the "sponge iron" to a welding heat, after which it is consolidated into a bloom and the slag all squeezed out by repeated blows from the steam hammer. It stands to reason that in this case, where the iron never becomes fluid, there is not the same opportunity for these foreign substances to become mixed or enter into combination with the iron as there is in the blast furnace, where the entire contents of the furnace become liquid, the iron separating from the bulk of the other matter by its greater specific gravity, and carry down with it any substances with which it can combine under the existing circumstances, which substances remain in it when solidified into pig iron. In the Wilson process the difference of fusibility of these compounds assists in their separation from the pure portion of the bloom when subjected to the squeezing action of the hammer.

The presence of sulphur in ores is chiefly objectionable in the Wilson process on account of its combining with a portion of the iron and forming a very fusible slag causing a considerable loss of iron.

The titanium owing to its extreme infusibility enters to a large extent into the finished iron, but there is a consi-