on the side of scientific precision without becoming less agreeable to read or less easy to understand.

It would, of course, be absurd to expect a work of the magnitude and scope of the present one to be free from errors of both omission and commission.* The present writer may be permitted to point out one of the former sort which seems particularly serious, viz: the omission of the fundamental proof of Cauchy relative to the continuity of the roots of an algebraic equation. On page 181 of the new edition, as on page 162 of the old edition, the author simply takes it for granted that when the independent variable changes continuously, so will every root of the algebraic equation.

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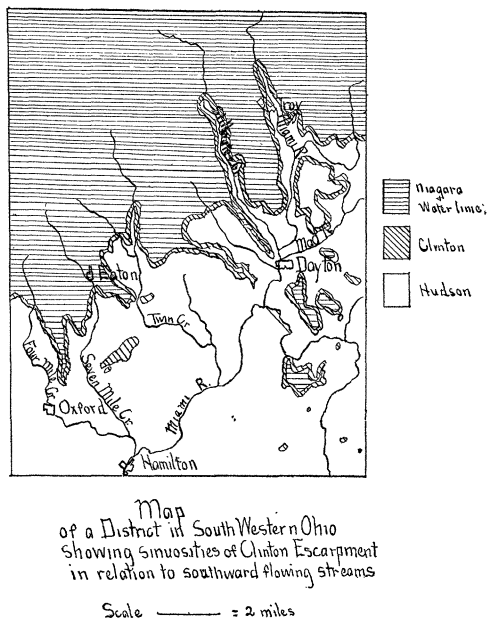
DISCUSSION AND CORRESPONDENCE.

PREGLACIAL DRAINAGE IN SOUTHWESTERN OHIO.

TO THE EDITOR OF SCIENCE: In SCIENCE for August 9, reference is made, in a review of Professor W. M. Davis, to recent papers by Tight, Bownocker, Todd and Fowke upon the subject of 'Preglacial Drainage of Ohio.' In particular Mr. Fowke is represented as advocating for the Licking and Kentucky rivers a continuance of their courses northward by way of a reversed Miami river or some of its tributaries. There seems to me to be an objection to this theory, which will become apparent to any one who will study the relation of the channels of the Miami river and its principal tributaries to the boundary outcrop of the lower and upper Silurian formations in that region. In a district where the dip of the rocks is very slight, not over four feet to the mile to the northward, all the reentrant angles, formed in a retreating Clinton limestone escarpment, look as if they had been formed by up-stream cutting action of southward-flowing streams. Note on the accompanying map not only the major northeastern reentrant of the Big and Little Miami rivers combined, but also the minor reentrants of the tributaries to the Big Miami from the northwest—those of Four Mile, Seven Mile, Twin and Stillwater Creeks, and that of the upper Miami itself. This Clinton escarpment only here and there peeps out from under its heavy mantle of glacial drift. Evidently there has been no retreat of these escarpments since the glaciers themselves retreated. The veneering of glacial drift has stereotyped this preglacial topography. It is true that geological boundary reentrants



Map of a District in South Western Ohio Showing sinuosities of Clinton Escarpment in relation to southward flowing streams

Scale ——— = 2 miles

may point down stream. South of the Ohio, one is seen in the lower course of the Kentucky River—the Trenton—Hudson boundary reentrant. This is accounted for by the average dip of the rocks to the northwest on this slope of the Lexington uplift being 12 feet to the mile, while the fall of the river in the same is only 1.2 feet per mile. In order that the reentrants northwest of the Miami River should have been made by streams in that region having a reversed drainage, the average gradients of these streams could not have been greater than four feet to the mile. Four feet to the mile is about the present southwest fall of the Miami River itself, a much steeper gradient

* For a careful analysis of the first edition see Professor Osgood's review published in the *Bulletin of the American Mathematical Society*, Vol. I. (1894–5), pp. 142–154. Some of the criticisms which appear there apply equally to the present edition.

than the preglacial Miami had, but hardly steeper than the gradients of streams occupying the channels of its present tributaries, whether they flowed north or south.

The accompanying map only shows a portion of the Silurian drainage areas to the north of the Ohio. It might have added force to the above argument, to have shown the drainage from the south as well. It would have been found to present an appearance symmetrical with that from the north. In spite of arguments derived from width-of-channel comparisons, etc., it still looks as if the Ohio River were the parent stream and that its present tributaries, the Miami, the Licking, the Kentucky have never been tributary to anything else, but represent normal lateral stream development.

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A POST-GRADUATE SCHOOL OF BIBLIOGRAPHY.

TO THE EDITOR OF SCIENCE: It will not be difficult for any one familiar with the development of libraries and librarianships in this country to see that we have arrived at a turning-point in their history. The large and even moderate sized libraries are developing and will continue to develop special departments in which acquisition is done by collecting rather than selecting. These departments will need for their care and utilization librarians with special knowledge. The largest libraries will specialize in several departments and consequently will need a staff of reference librarians each a specialist—a 'faculty,' as Mr. Melvil Devey calls it in a very suggestive article in the July number of *The Library*. Lastly, highly specialized libraries, each devoted to some special science or group of sciences, will grow up.

This development will necessitate some very radical changes in the class of men who will take up library work, and consequently in the provision for the education of librarians. We shall see men with university education taking responsible positions in libraries instead of seeking university professorships, and the demands of such men for opportunities to prepare themselves for their life-work without having to go back to the college or even high-school grade must be met. It cannot be met by the present library schools as now constituted. The work these schools are doing in preparing young men and women for subordinate positions in popular libraries is an absolutely necessary one and one that must not be slighted. In addition to these we need special schools for the education of scientific librarians and bibliographers. Perhaps one or the other of the library schools can develop a school of this grade. However that may be, there should be established at the large universities special schools of bibliography of the same rank as the schools of engineering, commerce and history.

The present writer had occasion to bring this question to the attention of the librarians at the conference of the American Library Association in July of this year, as has already been noticed in SCIENCE. The question is certainly of great importance, not only to librarians, but to the scientific and educational world at large, and the purpose of these lines is to invite a discussion of the ways and means for the establishment of such schools. I hope that SCIENCE will open its columns for this discussion and that educators and scientific men and librarians, too, will take part in it.

A school such as here proposed would naturally be open to any one who would take up the study of bibliography or any of its branches, and not exclusively to prospective librarians. These studies have a fascination of their own, just as literary history, philosophy or mathematics, and are just as capable as any of these sciences of inspiring with enthusiasm the searcher after truth.

The curriculum of a school of bibliography should include the following subjects:

1. The literature of bibliography, with practical exercises in the handling of bibliographical repertories and indexes and in bibliographical compilation.

2. History and methodology of the sciences, and comparative history of literature (literature taken in its broadest sense), including the study of the systems of classification of knowledge and their relations to the schemes for classification of books.

3. History of printing and bookselling, with special emphasis on the invention of printing, and exercises in the cataloguing of incunabula.