

section of the analytical chapter on linear arches is chiefly a concession to the mathematical students.

The final chapter is devoted to the graphics of the continuous girder, as an appropriate conclusion to the graphics of the arched rib of which the former is a special case.

The topics are frequently illustrated, calculus in its simplest form is employed, the equations are carefully described, and special attention is given to a proper defining of the values and character of the various data used.

A general view of the book as a whole leads to the opinion that the line of treatment has been clearly thought out by the author, and each topic logically developed in its proper place. In that respect it is worthy of all praise, but the impression is at the same time created, that, as a text-book for technical schools, it is too elaborate. For those who make a special study of its branch of engineering, it is admirable; for the average student, who has many other topics to share the attention and time of his course, much pruning would be necessary, to the detriment of his understanding of the subject as a whole.

Chips from a Teacher's Workshop. By L. R. KLEMM. Boston, Lee & Shepard. 16°.

MR. KLEMM has put together the most practical little book on education that has recently come from the press. It is scrappy, to be sure, but it is comprehensive. If the style is jerky, and at times harsh, it is also concise. The contents of the book are not wholly new. Many, if not most, of the chapters have appeared as articles in educational journals. But the author is quite right in believing them worth reproducing in book form. Too frequently the teachers of the country are written *at*: Mr. Klemm does not write *at*, but *to* them. He is most successful when handling and illustrating the details of schoolroom-work. His more elaborate essays are not so good. His chapter of 'Open Letters to a Young Teacher' will appeal to thousands, and ought to appeal to tens of thousands, of readers. They all ask the very questions, at some time or other, that Mr. Klemm answers. They would turn in vain to the encyclopædia, or the formal book on pedagogy, or the psychology text-book, for any hint as to how to overcome chronic tardiness or uncleanness in pupils. Mr. Klemm's experience furnishes some excellent suggestions as to how to proceed. We have never seen more ingenious and effective devices for arousing interest and making instruction comprehensible than his board for teaching numeration, his use of paper-folding in teaching fractions, and his original illustrations, from the boundary-lines of the several States of the Union, of the proper way to connect the teaching of history and geography.

We must bear in mind that the teaching force is largely distributed in rural districts. It is far from lectures and libraries, and remote from the centres of civilization. It wants to know how it may improve practically. It wants both knowledge and skill. It needs devices, not essays. It wants to be guided, not preached at. Mr. Klemm knows these facts, and has written this book accordingly. It is especially adapted to the needs of the country teacher.

NOTES AND NEWS.

THE agricultural experiment station of the University of Tennessee, Knoxville, has been re-organized, with the following officers: director, Charles W. Dabney, jun.; assistant director, in charge of field and feeding experiments, Charles S. Plumb; botanist and horticulturist, F. Lamson Scribner; chemist, Winthrop E. Stone; entomologist, Henry E. Summers; assistant in field and feeding experiments, Charles L. Newman.

— On Monday evening, April 16, 1888, after the adjournment of the regular business of the New York Academy of Sciences, the members interested in mineralogy held a meeting for the purpose of establishing a section on mineralogy. This section will meet when enough interesting material presents itself before the New York Mineralogical Club to insure a full evening of business, and will publish all papers presented before the Mineralogical Club in the Proceedings of the Academy. Mr. George F. Kunz was elected president, and Mr. J. H. Caswell secretary, of the section.

— Several years ago the Danish Government sent out a number of expeditions into the interior of Greenland. These were followed by Nordenskiöld's and Peary's expeditions. In the coming summer Dr. Frithjof Nansen of Bergen will make an attempt to cross the desolate ice-covered highland of Greenland, starting from the east coast. He intends to start from the neighborhood of Cape Dan with three companions, and will attempt to reach the Danish colonies on the west coast. It is doubtful whether he will succeed in reaching the coast in time, as a wide belt of pack-ice prevents ships approaching it. From former experiences, it would seem that Cape Dan, where the coast makes a sharp bend, is the place where approach is easiest; but the whalers who will convey Dr. Nansen to Greenland do not penetrate the heavy masses of ice lying close to the coast of Greenland. The ice generally opens late in the season, and it is to be feared that travelling on the inland ice will be very difficult at that season. Nordenskiöld's and Peary's experiences show that early in spring, before the commencement of the thaw, is the best time for such an enterprise: therefore it would seem that success is most probable for a traveller who would winter in Greenland.

— Of late years the Portuguese have made attempts to increase their influence in the countries adjoining the colony of Benguela. For this purpose Major de Carvalho was sent into the empire of Lunda, from which journey he returned in October, 1887, after an absence of three years. A number of stations were established east of the Kuango, and, in consequence of prolonged stays at such stations, the new capital of the Muata Yamvo was reached in December, 1886, after two years of travel. The expedition was unable to proceed farther eastward, but it appears from the available reports that it succeeded in establishing Portuguese influence in the empire of the Muata Yamvo more securely. The expedition was probably undertaken on account of the encroachment of the Kongo-Free State and the Germans upon that part of southern Africa which the Portuguese considered their property for a long while. The English are also endeavoring to establish their dominion in southern Africa as firmly as possible. A treaty has recently been made with the chief of Amatonga Land; and thus the whole coast of South Africa, from Orange River to Delagoa Bay, has become English.

— The English are incessant in their endeavors to open a trade-route from India to China. One of the preliminary steps to reach this object is the establishment of a railroad from the valley of the Brahmaputra to the upper part of the Irawadi, by which means they expect to strengthen their position in Burmah. The region to be traversed is extremely mountainous, and the road will have to cross the Patkoi Mountains. Recently an expedition has been sent out to ascertain the feasibility of building the road, of which Messrs. Michell and Needham were in charge. They found that the Patkoi Range, which was formerly considered an insurmountable barrier for the trade between Assam and Burmah, can be crossed on a number of passes not exceeding 2,500 feet in height. They succeeded in crossing it on one of these passes with five elephants, and state that a road can be built without great difficulties. Thus the recent reports of Colqhoun and Woodthorpe are confirmed. At the present time the trade between China and Burmah is carried on by caravans consisting of from 200 to 2,000 animals, which cross the range during the dry season, i.e., between the months of November and May. They cross the territory of the Kachins, who exact heavy payments from them; nevertheless the caravans are subject to frequent attacks, and must be protected by an escort of armed men.

— In 1877 Frey succeeded in obtaining very small crystals of artificial rubies. In 1887 he resumed his experiments, and, with the assistance of Mr. Verneuil, has succeeded in obtaining beautiful and comparatively large crystals. *La Nature* describes his experiments according to the report given to the Academy of Sciences of Paris, illustrated by cuts, which we reproduce here. On Feb. 27, Frey and Verneuil presented to the academy these crystals, which were obtained by the action of fluorides upon aluminium. Fluoride of barium was made to act upon aluminium containing traces of bichromate of potassium. The regularity of crystallization, which was obtained after numerous experiments, was found to de-