quite easily. The conditions under which we operated being slightly different from those of Piutti, it is not surprising that our product should be different. We used an excess of the phosphorus haloid and took care that the tube in which the reaction occurred contained chlorine gas. Subsequently we also distilled out the phosphorus oxychloride in a current of chlorine, and did not use carbon dioxide until after the removal of the liquid, and not while the tube was exposed to a gentle heat. The reaction which occurred with us may be, perhaps, represented as follows:

$$2MoO_3 + 8PCl_5 = 6POCl_3 + 2MoCl_5.PCl_5 + Cl_2.$$

With even a larger excess of the phosphorus haloid the same product was found, so that it is hardly probable that we can hope to arrive at the hexachloride of molybdenum through this reaction.

UNIVERSITY OF PENNSYLVANIA,
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SEPARATION OF TITANIUM FROM IRON.

BY CHARLES BASKERVILLE.

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IN the recent literature which I have been able to consult, the separation of titanium from iron by means of sulphurous acid, has been confined to the sulphates of these two metals. This process is long and tedious and often unsatisfactory.

If a neutralized solution of titanium and iron chlorides, of not too great dilution, be boiled with an excess of sulphurous acid, the iron becomes deoxidized at once and a white flocculent precipitate of titanium settles out. By this means the titanium is obtained free from iron and requires no re-solution and second precipitation, as is frequently necessary for purification when precipitated from the sulphate. If the sulphate be changed into a chloride by precipitation with ammonium hydroxide and dissolving again in dilute hydrochloric acid and neutralizing the excess of acid with ammonium hydroxide, the separation is easily effected. The accuracy of the method is shown by the two following analyses:

	Found.	Used.
TiO_2	0.0322	0.0308
TiO_2	0.0317	0.0314

The tedious boiling with sulphurous acid is avoided. A clean precipitate, which settles well and does not cling tenaciously to the sides and bottom of the beaker, filters rapidly and easily washed with hot water, is obtained. Salts of aluminum remain in solution.

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NEW BOOKS.

THE TANNINS. A MONOGRAPH ON THE HISTORY, PREPARATION PROPERTIES, METHODS OF ESTIMATION AND USES OF THE VEGETABLE ASTRINGENT, WITH AN INDEX TO THE LITERATURE OF THE SUBJECT. BY HENRY TRIMBLE, Ph.M. Volume 2, pp. 172. Philadelphia: J. B. Lippincott & Co. 1894. Price, $2.

The first volume of this work which appeared in 1892, was devoted to a general consideration of the subject and to gallotannic acid. The present volume deals primarily with the technically important tannins from the several species of oak bark and in a minor degree with those from mangrove, canaigre. and chestnut.

The tannins are usually dismissed by the chemist with the statement that they belong to a class of compounds about which very little is known and a few qualitative reactions at most, are given as characterizing them. Nevertheless they are of such importance that every one should know something of them. The author has endeavored to make an understanding of them possible by suggesting in some introductory remarks a method of study in which it is recommended to first investigate the sources of a tannin, then its history, method of preparation, properties, and finally a process for estimating it. It is usual for a chemist to begin with the last one of these; namely, the method of estimation and the result is invariably a failure.

With the exception of the historical chapters, this volume is made up almost entirely of the results of original research and the results of this work may best be understood by quoting from the final chapter, entitled Conclusions. "In looking over the composition of these tannins discussed in the volume, and comparing them with what appeared to be trustworthy results obtained in recent years by other investigators, we find that they