

After which the first paper of the evening, on Acrolein-urea, was read by Dr. A. R. Leeds. After some questions by Mr. Elliott, the second paper of the evening. Note on an earthy ferric sulphate, by Charles E. Wait followed. Mr. Darton's paper on the determination of tannic acid was then read by title.

The following papers were announced for the next meeting:

1st. Use of the tannometer in tan yards, by Nelson H. Darton.

2nd. On the determination of phosphorus in iron ore, by E. Waller.

3rd. Report on the progress of industrial chemistry, by Dr. E. E. Brennan.

Dr. Waller moved that when the meeting adjourns, it shall be adjourned to the next conversazione. Seconded and carried.

Dr. Doremus moved that all papers read before the society shall become the lawful property of the society till thirty days from the date of reading. After a number of suggestions by different gentlemen, Dr. Doremus' motion was carried. The meeting then adjourned.

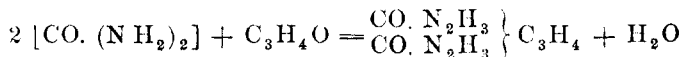
JAMES H. STEBBINS, Jr.,

Recording Secretary.

XII. ACROLEIN-UREA.

BY ALBERT R. LEEDS.

In the *Annalen der Chemie und Pharmacie* for 1869, (vol. lxxv p. 203), Hugo Schiff has described, under the name of acrylureid, a condensation product formed by the union of two molecules of urea with one of acrolein, in accordance with the reaction:



Without being aware of Schiff's labors, and whilst studying the aldehyde compounds with quite different objects than those followed by Schiff, I obtained the same compound, but had assigned to it a quite different formula. The explanation of these differences becomes apparent on studying the method by which Schiff prepared the compound, since this method did not and could not yield the substance in question. He mixed a concentrated aqueous solution of urea with acrolein, and after his acrylureid had gradually precipitated as small white needles (?), he washed it merely with ether and water, and dried *in vacuo*. He likewise states that powdered

urea unites with acrolein directly. "The mixture swells up, and is converted into a white brittle mass, which in some places has an entirely crystalline appearance. By far the greatest portion is intimately mixed with a white porcelain-like product, formed by decomposition of the acrolein." The analysis of this body gave, as might readily have been expected, no satisfactory results. Schiff further states that in various preparations, some of which were prepared at ordinary and others at higher temperatures, he obtained carbon varying between 44 and 47 per cent., and hydrogen between 6.9 and 7.1 per cent. The formula of diacryltriureid requires 42.2 per cent. carbon and 6.3 per cent. hydrogen. That of acryldiureid, which Schiff adopted, but 38 per cent. carbon and 6.3 per cent. hydrogen.

Throughout his investigation Schiff worked upon impure substances, and in that way obtained not only varying results, but results which would support no rational formula, the one which he finally adopted,—that of diacryltriureid, being altogether erroneous.

In the first experiment made by the author, the acrolein obtained by heating anhydrous glycerin with potassic bisulphate was allowed to distil over directly into an alcoholic solution of urea. A precipitate formed at once, and after a time a considerable amount was obtained, the urea however being still in excess. The filtrate was of a reddish color, and on evaporation yielded a resinous or gummy mass, which could neither be sublimed or crystallized from solvents. The precipitate left on the filter was of a yellow-white color, but after repeated treatment with alcohol became quite white, and lost all of the gummy or thick oily substance at first adhering to it.

Its analysis showed that it had been formed by the union, not of two, but of one molecule of urea, with one of acrolein, a molecule of water being eliminated, and the resulting compound having the formula $C_4H_6N_2O$ or $CO(NH)_2C_3H_4$.

	Found.	Theory.
Carbon	49.01	48.98
Hydrogen	6.3	6.12

Not only as originally prepared by repeated purification with alcohol, but also after treatment with carbon disulphide, chloroform and ether, in all of which it is only slightly soluble, every attempt to obtain it in a crystallized condition was unsuccessful. It did not melt nor sublime, and when strongly heated underwent decom-

position. It was readily attracted by nitric acid, but the products of the decomposition were not studied. From its solution in alcohol no precipitate was obtained on the addition of bromine. On treatment with hydrochloric, tartaric and acetic acids no salts were formed.

The alcoholic extracts were collected, and yielded, after successive solutions in alcohol and precipitation with water, a white substance similar to that above described, and having a melting-point of 185° . Since sufficient of this material could not be obtained to admit of its satisfactory purification and analysis, a much larger amount of urea in alcoholic solution than that used in the foregoing experiments (40 grms.) was treated with acrolein in successive portions in a closed vessel, until after long continued warming the odor of acrolein ceased to disappear. In this case, unlike the foregoing, no precipitate was formed, nor did any take place until after the addition of water, when a very abundant white amorphous substance was thrown down. This was boiled with alcohol a great many times, each extract affording a white precipitate when diluted with water, and the portion of pure material obtained eventually was not more than that procured in the first instance, when but a small amount of urea was used and the acrolein was not added in excess. The composition of the substance thus obtained was $\text{CO. (NH)}_2. \text{C}_3 \text{H}_4$, and it was identical in all respects with the substance formed in the first case. From the alcoholic extracts no other substance could be obtained, and the explanation of the small yield of the pure acrolein-urea in the second case, was eventually found to be due to the presence of the oily or gummy substance, formed as a by-product. The amount of this by-product was apparently much greater in the second case, and explained the non-precipitation of the acrolein-urea until after the addition of water to the original solution of the urea in alcohol. And the tenacity with which it adhered to the acrolein-urea on precipitation with water, and carried it into solution again on each successive boiling with alcohol, explains the very small eventual yield of the pure material. It was also due to the small adherent traces of this oil, that the second body, the one soluble in alcohol, had a melting point of 185° , and was supposed to be something else than the acrolein-urea.

The presence of this oil, which I was unable to isolate, explains all the above difficulties and the erroneous results obtained by Schiff. In conclusion, it may be safely stated that besides the small amount of this oily by-product, the only compound formed by the

action of acrolein on urea, was that containing the residue from one molecule of urea, the compound $\text{CO}(\text{NH})_2 \cdot \text{C}_3\text{H}_4$.

XIII. NOTE ON AN EARTHY FERRIC SULPHATE FROM ARKANSAS.

BY CHAS. E. WAIT.

Several weeks ago a sample of earth was sent to me for examination, from Southern Arkansas. It is a friable, yellowish substance, partly soluble in water, streak uncolored, taste astringent.

Upon analysis I find it contains the following :

	PER CENT.
Insoluble in cold water.....	12.61
Soluble in cold water.....	87.39
	<hr/> 100.00

The soluble portion consists of

$\text{Fe}_2 \text{O}_3$	21.82
SO_3	33.81
H_2O	31.76
	<hr/> 87.39

By assuming the following arrangement,

$\text{Fe}_2 \text{O}_3$	21.82
SO_3	33.81
H_2O combined.....	22.41
$\text{H}_2 \text{O}$ hygroscopic.....	9.35
	<hr/> 87.39

we are able to deduce a formula consistent with that of the native persulphate of iron, viz.: $\text{Fe}_2 (\text{SO}_4)_3 (\text{H}_2\text{O})_9$.

If all the water be considered as belonging to the compound, the formula will be $\text{Fe}_2 (\text{SO}_4)_3 (\text{H}_2\text{O})_{13}$.

It is said an unlimited supply of this substance may be obtained.