

have been tested for their optical activity. All of these preparations were made for use in animal experimentation, and not for the determination of precise physical and chemical constants. It occurred to the writer that this information might furnish a rough index of the validity of Marston and Robertson's criticisms.

The method of isolation was essentially that outlined by Morrow.² The isoelectric precipitations were controlled with Congo red and litmus papers. The student preparations had been precipitated only once from the more or less successfully decolorized solutions, and varied considerably in color and tyrosine content. These preparations were subsequently reprecipitated by the author.

After drying, 1 g. of each of the above preparations was made up to 100 ml. in *N* hydrochloric acid, analyzed for sulfur and polarized at 21°. The accompanying table shows the results obtained.

Sample	S, %	$[\alpha]_D^{21}$	Remarks
158	26.02	-212.3°	Author's preparation
159	26.02	-212.3°	Student preparation
160	26.34	-210.4°	Student preparation
161	25.91	-208.4°	Student preparation
162	26.14	-207.4°	Student preparation
163	26.53	-185.9°	Student preparation
164	26.40	-210.0°	Student preparation
177	26.48	-216.6°	Author's preparation

It is obvious that the variations in specific rotation cannot be explained on the basis of sulfur content. It is highly probable that any of these samples, with the exception of No. 163, is suitable for animal feeding unless it is assumed that inactive cystine is highly toxic. Subsequent treatment of Sample No. 163 indicated that the above variations in specific rotation are partly due to the prolonged washing of certain samples with hot water in order to remove the tyrosine present.

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p-Cymene Studies. XIV. *p*-Cymylhydrazine-2.—This note is an extension of a paper by Wheeler and Thomas [THIS JOURNAL, 51, 3135 (1929)]. Additional salts such as the acetate, oxalate, lactate and benzoate and a condensation product with *m*-nitrobenzaldehyde have been prepared. Unstable products were obtained with formaldehyde, acetalde-

² Morrow, "Biochemical Laboratory Methods," John Wiley and Sons, Inc., New York, 1927, p. 140.

hyde, propional, heptaldehyde, chloral, furfural, *o*-chlorobenzaldehyde, 2,4-dichlorobenzaldehyde, anisaldehyde, ethyl acetoacetate, mesityl oxide, cyclohexanone, carvone and benzoylacetone. The products were reddish, viscous oils which did not crystallize at -30° . No reaction seemed to take place with *p*-hydroxybenzaldehyde, piperonal, vanillin and camphor. *p*-Cymylhydrazine cannot therefore be regarded as a good reagent for the carbonyl group.

Experimental.—The frequent appearance of tar, causing varying yields of cymylhydrazine, led to the observation that the acid concentration in the reduction process is very important. The proper acid concentration was obtained by running the sulfur dioxide into the sodium hydroxide solution until it was neutral and then continuing the passage of the gas for a period equal to one-tenth of the time required for neutralization. The free base did not change color in well-stoppered bottles.

TABLE I
PREPARATIONAL DATA

	Salt	Crystal form	Solvent	M. p., $^{\circ}$ C.	Action with H ₂ O
1	Acetate	Needles	Chloroform	63–64	Unstable
2	Lactate	Plates	Dil. CH ₃ OH	134.5	Stable
3	Oxalate	Plates	Ether-alcohol	167	Unstable
4	Benzoate	Needles	Ether-gasolene	72.5	Unstable

TABLE II
ANALYTICAL DATA

	Formula	Calculated for, %	Found, %	
1	C ₁₂ H ₂₀ O ₂ N ₂	CH ₃ COOH	26.8	27.1
2	C ₁₂ H ₂₃ O ₂ N ₂	N	11.03	11.44
3	C ₁₂ H ₁₈ O ₄ N ₂	(COOH) ₂	21.50	21.53
4	C ₁₇ H ₂₂ O ₂ N ₂	C ₆ H ₅ COOH	42.66	42.71

m-Nitrobenzaldehyde-*p*-cymylhydrazine-2, C₁₀H₁₃NHN:CHC₆H₄NO₂.—Two grams of the aldehyde was dissolved in a very little petroleum ether–alcohol (1–1) and mixed with 5 g. of cymylhydrazine in 5 cc. of petroleum ether. A bright red precipitate formed at once. The product crystallizes beautifully from glacial acetic acid, alcohol or benzene, hot solutions on cooling giving abundant yields of rectangular prisms which melt at 143° . The crystals are very rich red, though yellow by transmitted light. Ether or acetone solutions may be precipitated by heptane. The compound is stable toward hot water.

Anal. Calcd. for C₁₇H₁₉O₂N₂: N, 14.14. Found: 14.23.

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