

ABSTRACTS OF UNIVERSITY OF DELAWARE THESES FOR ADVANCED DEGREES

1945

KATHERYNE CROOK LEVIS. *Preparation of Methyl Cellulose p-Chlorophenyl Carbamates.* M.A.

This study reports the preparation of carbamate esters of cellulose containing 12-15% chlorine. Methyl cellulose p-chlorophenyl carbamates were obtained by the action of p-chlorophenyl isocyanate on methyl cellulose containing free hydroxyl groups. Analyses of products obtained after various time intervals showed that the reaction readily proceeds to completion at a moderate temperature. Viscosity measurements indicated that the products are relatively undergraded.

Three by-products are described, methyl o-chlorophenyl carbamate, methyl p-chlorophenyl carbamate, and di-o-chlorophenyl urea.

JOHN MITCHELL, JR. *5-Alkyl-5-beta-hydroxyethyl Derivatives of 2-Thiobarbituric Acid.* S.M.

This thesis is a continuation of the study of the condensation of alpha-carbethoxy-gamma-butyric lactones with urea, a reaction that was discovered at the University of Delaware. The more important results of this investigation may be summarized as follows:

1. Eight 5-alkyl-5-beta-hydroxyethyl-2-thiobarbituric acids have been prepared by the condensation of alpha-alkyl-alpha-carboxethyl-gamma-butyric lactones with thiourea in the presence of sodium ethoxide.

2. High yields were obtained using molar ratios of sodium, thiourea and lactone of 2:1.5:1, respectively, at maximum temperatures of 35°. These conditions are considerably less drastic than those for the synthesis of the corresponding barbiturates.

3. In two cases the intermediate lactone thioureides have been isolated.

4. A molecular compound of the sodium n-butylthiobarbiturate with sodium ethoxide was obtained.

5. A rapid and simple method for the estimation of conversion is illustrated and a new technique by which six of the eight thio-barbituric acids can be recovered nearly quantitatively is described.

6. Physical properties studied include melting points and solubility in common solvents.

7. Modifications of existing methods of preparation and physical properties of the intermediates are discussed. These include alkylmalonic esters and alpha-alkyl-alpha-carboxethyl-gamma-butyric lactones.

GRACE KWICK KEEN. *A Comparison of the Algebraic Number Realms $k(\sqrt{5})$, $k(\sqrt{-11})$, and $k\sqrt{-13}$* . M.A.

This paper is a discussion and comparison of the three algebraic number realms $k(\sqrt{5})$, $k(\sqrt{-11})$, and $k(\sqrt{-13})$. The integers, bases, discriminant, units, prime numbers, and the validity of the unique factorization theorem in each of the three realms are investigated. It is proved that the unique factorization theorem holds in $k(\sqrt{5})$ and $k(\sqrt{-11})$, but not in $k(\sqrt{-13})$. In order to re-establish the unique factorization theorem in $k(\sqrt{-13})$ it is necessary to introduce the theory of ideals. Such an extension is not made in this paper. The prime numbers of $k(\sqrt{5})$ and $k(\sqrt{-11})$ are classified. The primes of $k(\sqrt{-13})$ cannot be classified because of the failure of the unique factorization theorem in that realm.

Continued fraction theory is used to solve the equation $x^2 - Dy^2 = L$, where L is any rational integer and D is a positive rational integer not a square. From the solutions of this equation the fundamental unit of $k(\sqrt{5})$ is determined.

KEY TO ABBREVIATIONS

DB	<i>University of Delaware Agricultural Experiment Station Bulletin</i>
DC	<i>University of Delaware Agricultural Experiment Station Circular</i>
DEB	<i>University of Delaware Extension Service Bulletin</i>
DMC	<i>University of Delaware Mimeograph Circular</i>
DN	<i>Delaware Notes</i>
DP	<i>University of Delaware Agricultural Experiment Station Pamphlet</i>
FPJ	<i>Food Products Journal</i>
HR	<i>Hispanic Review</i>
JACS	<i>Journal of the American Chemical Society</i>
JED	<i>Journal of Engineering Drawing</i>
JEE	<i>Journal of Economic Entomology</i>
NAV	<i>North American Veterinarian</i>
PBJ	<i>Peninsular Broiler Journal</i>
TAIC	<i>Transactions of the American Institute of Chemical Engineers</i>
TASME	<i>Transactions of the American Society of Mechanical Engineers</i>
TPHS	<i>Transactions of the Peninsular Horticultural Society</i>