Oligocene, without any information concerning their relative ages, he would hesitate to declare which was the older. At the same time, the amber ants do show some relatively primitive features, and *Prionomyrmex,* from the amber, is absolutely the most primitive of known ants. The nearest living relative of *Prionomyrmex* is the Australian *Myrmecia.* It must also be noted that the amber ants have not so far shown any marked soldier types, like that of *Pheidole.*

Some years ago I had occasion to study the bees of Baltic amber and found all the genera to be extinct, although the fossorial wasps from the same material, so far as seen, were strictly of modern genera. It is certainly true that different genera and families of insects differ greatly in their antiquity, and some of those which we might naturally suppose to be relatively recent are in fact very old. Such studies as this of Dr. Wheeler's supply a firm foundation of facts to take the place of guesses, and are of inestimable value to students of evolution.

T. D. A. Cockerell
University of Colorado,
May 5, 1915

The Examination of Hydrocarbon Oils and of the Saponifiable Fats and Waxes. By Dr. D. Holde. Translated by Edward Mueller, from the fourth German edition. John Wiley and Son, Inc. 1915. Pp. 483.

To present in the limited space of this book even a brief description, and standard methods of examination of the great variety of petroleum products and fats, demands a comprehensive knowledge and critical judgment. In the last edition of Dr. Holde's work this object has been well accomplished.

Petroleum and its products, the most voluminous part of the subject, occupy the larger space, yet the saponifiable fats and their products are quite comprehensively included.

In its general plan the book presents brief descriptions of properties and composition, general reactions, behavior towards reagents and standard quantitative physical and chemical methods of examination. There is a great condensation of subject-matter by means of the 97 tables that are interspersed throughout the book, and that summarize much valuable data in connection with the subject in hand.

Products recently brought into commercial use are described with methods of control. The physical examination of the hydrocarbon oils and their derivatives includes specific heat, heat of vaporization, viscosity, calorific power, coefficient of expansion and optical properties. Rotary power of mineral oils receives attention, more especially in European oils where it is apparently more general than in American crude oils, or their products. The recently proposed formolit reaction (formic aldehyde and concentrated sulphuric acid) on mineral oils is described, and some other recently proposed methods. Large space is properly devoted to lubrication, lubricants and greases, asphalts and tars. With the marvelous expansion in the use of motor power, the several recent methods for increased output of gasoline from inferior oils and the general replacement of kerosene for lighting, it appears that gasoline and lubricants will soon be the principal products refined from petroleum. Much serviceable information is presented concerning non-drying oils and solid fats, vegetable semi-drying oils, and drying oils, animal oils and oils from marine sources. The chapter devoted to technical products derived from fats and oils, blown oils, soaps, soap powder, turpentine wood oils, boiled oils, resins and allied products both in description and methods will be found useful.

Certain looseness in statement appears here and there. Caustic soda is of equal necessity with sulphuric acid in refining to remove sulphonic acids and particles of sludge that permeate the oil after the acid treatment. Fuller's earth is used only after acid treatment to remove color. The two general types of petroleum suggested are not inclusive. The writer has a barrel of Russian crude oil that distills to less than one per cent. below 350° at. pres. California, Wyoming, much Kansas, and southern crudes do not fall within this classification. Mercaptans are not contained in American crudes so far as known. On page 63 it is mentioned that the method of Carius

is not suited for the determination of sulphur in kerosene, since even a poor oil must not contain more than a few tenths of one per cent. of sulphur and only a small amount of the oil can be used. Probably by tenths was intended a few hundredths of one per cent. Of course the simplest way for sulphur in kerosene is the lamp method that has been used by the Standard Oil Company for many years. But sulphur to thousandths of one per cent. in any crude petroleum or in any of its products, except perhaps the most volatile gasoline, may be expeditiously determined by combustion in oxygen and titration. This standard method in use for years is not mentioned.

Neither Texas, Ohio, nor other American crudes, except those in California, contain any large proportion of nitrogen compounds, and these compounds so far as examined are not of the pyradine series but, including Baku-crude, they are derivatives of the hydrochinolines.

However, those minor inaccuracies do not detract from the usefulness that this book offers to all workers in these broad fields.

CHARLES F. MABERY

THE ADOPTION OF THE MISSOURI SYSTEM OF GRADING AT GOUCHER COLLEGE

AT Goucher College the faculty has recently adopted the "Missouri System" of grading. It may be of interest to some who are contemplating the introduction of this system, or to others interested in the theory and practise of grading, to learn a few of the details of this proposed application of the system.

Four passing grades and two grades below passing are defined. Grade C is to be assigned to approximately the middle 50 per cent. of each class. Grades A and B together are assigned to those above C, grade A being that of approximately the uppermost 3 per cent. and B that of about the other 22 per cent. In the opposite direction, grade D is to be assigned, in required courses, to approximately the 15 per cent., and in other courses to about the 22 per cent., just below C. Grade E is to indicate incomplete work or unsatisfactory work that can easily be made up, such as is customarily marked "conditioned." Grade F denotes failure to receive any credit for the course. Grades E and F together are to be assigned, according to the discretion of the instructor, to approximately the lowest 10 per cent. in required courses, and to the lowest 3 per cent. in other courses.

These percentages are summarized as follows:

	Passing Grades				Not Passing
	A	*B*	*C*	*D*	*E* and *F*
In required courses	3	22	50	15	10
In other courses	3	22	50	22	3

It will be seen that grade A is intended to mark work of unusually good quality which it seemed desirable, in the absence of any other system of "honors" in the college, to distinguish from that accomplished among so large a group as the upper fourth. The difference in the percentages of conditioned and failed (E and F) in required and not-required courses, is intended partly as a check upon entrance; it also takes into account the fact that under the usual conditions of admission to colleges, there should be a considerable elimination of the poorest students during the first years of the college course, when the proportion of required courses is high. Moreover, this arrangement recognizes that students are guided somewhat in their choice of elections by the advice of instructors and by their tendency to elect work in subjects which experience has shown them fitted to continue.

Theoretically the elimination of the poorest students in the required work early in the curriculum would affect slightly the sizes of all the remaining groups in the advanced or elective courses, but in practise this effect would probably not extend beyond the lowest passing grade; hence grade D is enlarged in these courses, while the middle and higher grades are not altered. Whether this will result in justice on the whole, can be determined only after experience with the system.

The size of the upper grades A and B is not increased in the most advanced or major courses, for the simple reason that to do so would in effect be applying the standard of