first, quite rapidly absorbed, the liquid becoming red-purple and finally purplish brown. Upon evaporation of the benzene a dark brown, viscid liquid remained. A few drops were placed upon a watch-glass and several scales of iodine added For a moment no action was noticed. Very soon however a violent reaction set in, considerable of the iodine being vaporized thereby. The result of the reaction was a dark, sticky, resinous mass.

The remaining quantity of the distillate was so small that further tests had to be suspended. But from the examination made it would seem that the blue distillate obtained from this specimen of the oil of milfoil is not identical with that from the oil of chamonile. It is evidently closely related to the terpenes.

The quantities of the other distillates were too small for extended examination.

UNIVERSITY OF MAINE,
ORONO, MAINE.

NEW BOOKS.

THERMODYNAMIQUE ET CHEMIE. By P. DUHEM. 16 x 25 cm. pp. ix + 496. Paris: A. Hermann. 1902.

This is primarily a book on the phase rule, written for the chemist and not for the mathematical physicist. The first chapter deals with work and kinetic energy, the second with heat and internal energy. These two chapters are really introductory thermodynamics. We next have a chapter on heat effects and then one on chemical equilibrium. In the sixth chapter there is a discussion of the theorem of Carnot-Clausius, and of the thermodynamic potential. In the seventh chapter we find the phase rule outlined and ten chapters are devoted to the application to concrete cases. The general order is: multivariant systems, univariant systems, inversion points, displacement of equilibrium, systems with constant boiling- or melting-points, solid solutions, critical states, dissociation of gases. This comprehensive survey is followed by a chapter on apparent false equilibria and by one on false equilibria while the last two chapters are on systems with a non-uniform temperature and on chemical dynamics and explosions.

While one must regret that the arrangement of material is so haphazard, the way the material is treated is excellent and will

quicken interest in the subject. The treatment of indifferent points is especially complete and the reader will also get much profit from the chapters on solid solutions. The cream of the book, however, is to be found in the part on false equilibria and that in spite of one serious blemish. A number of experiments on false equilibria have been made in Duhem's laboratory or under his guidance and most interesting results have been obtained. These results have, however been called in question by Bodenstein who asserts that experimental error and a belief in the theory have led Duhem's scholars astray. This charge has never been met and there is no reference to Bodenstein in the book. This leaves matters in a most unfortunate position. The work of Pélabon, Helier and others is very important, if correct, but not so important otherwise. As matters now stand, many chemists believe that there are reactions which do not start at a given temperature but there are very few who believe that a reaction runs part way and then stops short of a true equilibrium. Duhem's conception of "chemical friction" is a very valuable one, even though the experimental data are not above suspicion. Roloff's work on the cryohydrates appears to have been overlooked.

WILDER D. BANCROFT.

REFRIGERATION, COLD STORAGE, AND ICE-MAKING. By A. J. WALLIS-TAYLOR, C.E. London: Lockwood & Son; New York. D. Van Nostrand Co. Price, $4.50 net.

This practical treatise on the art and science of refrigeration is based on and embodies to a large extent the personal experience of the author. English methods and processes are most fully described. The whole subject is handled in a capable manner and the treatise will be found of service to teacher and student, and mainly to the technical engineer and those actually engaged in the various industries using refrigeration. The chemistry of refrigeration is only very superficially mentioned.

In an interesting table of the principal freezing mixtures, the author gives the reduction of temperature for a mixture of snow 3 to potassium 4 (?) as the maximum, 32° F. to —51° F. The lowest temperature obtainable by such mixtures is for snow 8 to dilute sulphuric acid 10 from —68° to —91° F., the materials themselves having been previously cooled. The subject-matter is classified under five principal heads: