BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 82, Number 4, July 1976

Methods of optimization, by G. R. Walsh, John Wiley and Sons, London, New York, Sydney and Toronto, 1975, x + 200 pp., $19.95.

The book is concerned with the very large number of computational methods that have been developed in recent years to deal with what is, in theory, a rather simple problem of elementary calculus–finding the maxima and minima of a function of several variables, with or without constraints. It is customary to assert that this is a new problem, never considered by Euler or Lagrange, because the constraints are now inequalities as well as equalities. (In other words, these mathematicians were unable to solve the equilibrium problem for a table standing on the floor, because the table was free to fly up into the air!) However what matters is that most of the methods are new, and they are what the author is concerned in making intelligible.

The book is based on undergraduate lectures in the practical North of England. Therefore "methods" are understood to be practical methods for solving no-nonsense problems, and the author's main purpose is to teach the reader to use them by providing him, at the end of each chapter, with many problems, most of which can be solved without the aid of computers. The problems are usually already expressed in mathematical symbols, but towards the end of the book they concern potato growing, minimal paths in networks (traffic), and policy problems relating to allocation of resources. All the problems illustrate methods given just before, so that the student is spared the embarassment of having to choose which method to apply. However–for problems encountered presumably elsewhere than in the book itself–some rather noncommital advice is given in regard to the choice of a method. "Steepest descent is not recommended because of poor convergence." Another method "works particularly well if . . . ", however it "may fail to converge, and may pose formidable computational problems".

A mathematician will be disappointed to see, in this no-nonsense book without frills, theorems purposely misstated, and the necessary qualifications given only at the end of the "proof", where we are suddenly informed that all is invalid if . . . , and that the theorem is then false. However, since the irritatingly simplified presentation is enlivened by alternatively homely and exciting terms, such as hemstitching, the golden section search, and penalities, one is left with the hope that it may go some way towards dissipating the terror inspired by the word "optimization" and by the image it conjures up of a surrender of vital human decisions to a yes-no mechanism feeding on the soulless triviality of mail-box trash, that claims to take only a few minutes of one's time.

L. C. YOUNG