

ception. He begins by pronouncing electricity as the greatest agent of agricultural problems, of vital importance to the city dweller as to the farmer. He devotes a chapter to the idea of central station service for farms and another to the generation of electric power by water steam, internal combustion, wind, storage battery, etc., and its distribution, turning then to the subject as viewed from the application of electric motors. A chapter on costs gives in concrete form of valuable information for farmers, basing his data on a farm 100 acres in size. The manufacture of farm by-products, the preservation of farm products in general and their transportation are fully treated from the standpoint of electrical power utilization. The manipulation of farm machinery and divers applications is followed by a similar treatment respecting the household, such as electric heating, lighting, etc. An interesting chapter is that concerning electric power in irrigation and pumping system, and one even more interesting is the closing chapter devoted to the stimulation of vegetation by electricity, which, although it deals only with light experimental work and contains little practical information shows an application of electricity not generally known, but highly absorbing.

The book is well illustrated, and, although a great many of the cuts are reproduced from periodicals, the choice is very creditable.

#### **Elementary Principles of Reinforced Concrete Construction.**

—By Ewart S. Andrews, B.Sc., Lecturer in Theory and Design of Structures at Goldsmith's College, New Cross, London. Publishers, Scott, Greenwood & Son. Cloth;  $4\frac{1}{2}$  x 7 inches; pages xi. + 195; 57 text figures. Price, \$1.00 net.

Of the various elementary texts in reinforced concrete this is one of the best. The author has the faculty of being able to state the essentials of his subject in a clear and convincing manner to those whose knowledge of mathematics is limited. This is partly due to simplicity and directness of statement and partly to the excellent word-illustrations of the joint action of concrete and steel in a reinforced member. Numerous numerical examples are also given which will undoubtedly reassure the beginner in his application of the formulas to actual problems.

The introductory part of the book comprises a brief historical review of the use of reinforced concrete, and a lengthy statement of the notation employed—that of the Concrete Institute—after which the author proceeds with a discussion of the properties of concrete and steel, loads, working stresses, bending moments, and the distribution of loads on slabs. The latter is covered particularly well for a short text book. After this, direct compression and bending on reinforced concrete members receive full attention, adequate consideration being given to double reinforcement, an important feature of arch ribs, walls and chimneys. Chapter IX. contains an interesting and somewhat novel graphical treatment of reinforced concrete beams, based on the methods of Professor Mohr. While only of academic interest in the case of simple sections, it will be found of use in handling irregular or unusual ones. The closing chapters concern shearing stresses, deflections, columns, leading systems of construction and twenty typical exercises. A few common mathematical tables are also included.

Apart from the disadvantage of a notation differing considerably from that now regarded as practically standard on this side of the ocean and the characteristic British terminology, the book is thoroughly acceptable. Some slight errors exist, as in the use of the word "strain" for "stress" on page 22, the numbering of two figures the same (22), and a few misspelt words. On the whole, the author's work ought to prove very useful and helpful to the young designer in reinforced concrete.

**Steel Rails.**—By William H. Sellen. Published by D. Van Nostrand Company and Constable & Company. 523 pages;  $7\frac{1}{4}$  x  $10\frac{1}{4}$ ; 361 illustrations and 33 folding plates. Price, \$12.50 net.

#### **Reviewed by T. R. Loudon.**

Since the introduction of the use of the steel rail, no other steel commodity has received so much attention, both by the railway companies and the steel manufacturers. It is not so long ago that the worst possible confusion existed as to the proper section of rail for a given traffic condition. Of late years, however, more or less uniformity has been reached, but this state was not brought about without a tremendous amount of discussion. At the present time, so heavy are the traffic conditions that the question of proper rail specifications is again giving rise to another important series of discussions. All this discussion, past and present, is so widely distributed throughout the technical literature that it is an almost insurmountable task to begin to follow any given phase from the beginning up to the present time. To those familiar with the manufacture of the steel rail, this is only too well known. To pick and choose and intelligently synopsise the above referred to discussions is a work that is worthy of note. This is a task that has been undertaken and carried out in an extremely creditable manner by the author of this book. From the historical standpoint alone the information compiled in this book is invaluable.

The first chapter is written with the evident purpose of tracing the evolution of the present-day rail section. The purely historical data is interesting. Apart from this, the matter is so put together that the reader sees very clearly the reasoning that has led to the use of the modern rail section. In summing up this chapter, the author points out very properly that the ability of a rail to resist the loads to which it is subjected is dependent as much upon the character of the metal as upon the section. The point is very properly made, coming, as it does, in the first chapter. These last two paragraphs could stand being more prominently set up.

Chapter II. deals with the pressure of the wheel on the rail. In this section of the book the author goes into the additions that must be made to the static wheel loads in order to arrive at the actual load under running conditions. The effects of the various factors, such as the lack of balance in the reciprocating parts of the locomotive, of irregularities in the track, rocking of engine, flat spots on wheels, are considered in detail. The data given is exceedingly extensive and well presented. While it is always possible to arrive at a definite figure for the unbalanced forces due to reciprocating parts of a locomotive, it is not very easy to arrive at a definite method of analysis of the other known causes of excess pressure on a rail. The author quotes the various theories and tests in a very interesting manner. The information given on electric cars and upon ordinary cars is extremely up to date.

Chapter III. is devoted to supports of the rail. The first part of this chapter is taken up with the description of the various forms of ties used. The descriptions are brief, and the reasons for and against the use of the various forms of ties are to the point. A large portion of this section is devoted to the discussion of the ordinary wooden tie. Some interesting data is given on forestry as applicable to the production of railroad ties. A comparison of the half-round ties, which are used a great deal in Europe, with the American form of tie is made, and it is quite clearly shown that not only from the standpoint of desirability for track support, but also from the standpoint of economical production, the half-round should be used. Descriptions of various forms of tie-plate and fastenings are then given. The last part of