The features to which attention is especially called are the set of samples which serve to accentuate the main points of each chapter, the tables of actual weights of modern bridges published here for the first time, the articles on maximum shearing forces and bending moments, the flexure of long columns and the theorem of their moments

It is essentially scientific in phraseology and notation. There is no guess work, and nothing is left to rule of thumb which is so important an appliance in the hands of men who are fond of calling themselves practical. Yet Mr. Bovey is frank enough to admit that the deductions of things do not always coincide with experimental results, and he is very careful to define his assumptions with precision. For example, in the twisting of shafts and the bending of beams, the assumption is made that plane sections before distention are plane after the operation, that the material is homogeneous, and that elementary layers expand and contract freely under tensile and compressive forces Such suppositions are far from the truth, but he shows in how far the results are affected thereby and therefore their exact value.

The graphical determination of stresses in every description of framed structure is most valuable by reason of the excellence of the diagrams and the clearness of the notation. In this connection this discussion of the practically indeterminate effects of wind pressure, weight of snow, ice and other accidental loads is very interesting, including as it does a table of the weights of different roof coverings. The effect of rolling loads is very thoroughly considered in the chapter on Shearing Forces and Bending Moments the method of determination of the maximum bending moment and shearing forces being original with the author.

Upon the subject of internal stresses the difficult question of retaining walls is treated theoretically and practically. The basis of the one is Rankine's theory of earthwork and of the other the experience of the most capable engineers.

The chapter on the transverse strength of beams contains Mr. Carus-Wilson's article on surface loading read before the Physical Society. The results are at variance with those commonly accepted by engineers and the matter requires further elucidation. The subject is continued in the following chapter where the most theoretical aspect is considered.

The method of treating the equation of bending moments and its interpretation at pages 433 to 435 is a beautiful example of analytic reasoning, where it is proved that the curves representing deflection, slope, and bending moment are connected in precisely the same way *mutatis mutandis* as those for bending moment, shearing force and load.

Every Student of Applied Mechanics owes to Mr. Bovey a debt of gratitude for the extreme simplicity of his deduction of a general proof of the Theorem of three moments. The chapter on pillars also contains original work on the Flexure of Long Columns. The subject of Bridges receives the attention its importance deserves, and pages devoted to it give a peculiar value to the book which will be at once apparent.

The difference in the results of stresses determined by assuming the line load to consist of a number of arbitrary concentrated weights and by the simple assumption that the line load consists of a uniformly distributed load, as determined by Waddell, amount to only two per cent Mr. Bovey treats the question according to both assumptions.

The tables of stresses in the different members of the truss will be found most useful. Details are fully dealt with, such as Nicholson's efficiency of rivetted joints.

Suspension bridges receive a separate consideration.

The difficult subject of arches and arched ribs will warrant a diligent reading at the hands of the advanced Student or Engineer.

The book is an original one in the commonly accepted sense, but credit is given where credit is due to Messrs. Nicholson, Carus Wilson, Findlay, Dawson, Peterson, Macdonald and J. M. Wilson. The reputation of Mr. Bovey is enhanced and the prestige of the University increased by the appearance of this admirable volume

CONTRIBUTIONS

THE UNIVERSITY OF FRANCE.

France had twenty Universities under the *Ancien Régime*, it has now but one. A short historical sketch will explain that transformation to our reader.

I

The name of *Universitas* was for the first time in the twelfth century specially applied to the community of masters and scholars of Paris. Philippe-Auguste gave to it its rules in 1200. Constituted as a kind of Republic in the *Quartier Latin*, it enjoyed a privileged situation. The students could be arrested only by royal officers and were judged by ecclesiastical courts. Philippe de Valois granted to its members an exemption from all taxes.

In 1215, the University included four Faculties,—theology, arts, law, medicine. The students were divided into four *nations*: France, Picardie, Normandie, England; for the last one was substituted the nation of Germany under Charles VI.

Endowed by the kings of France, the higher clergy and many *grands seigneurs*, the University of Paris became a great institution. Her power increased with her wealth. Every reader of history knows the contests which she was enabled to sustain against either Kings or Popes. She always took the defence of the Gallican liberties in opposition to ultramontainism. Luther had offered, at the beginning of his quarrel with Rome, to abide by her decision. But she sided with the Catholic party, and condemned the Reformation. She used to send *députés* to the œcumenical councils and to the *Etats Généraux* of the kingdom During the religious wars, she endangered her position by taking the part of the *Ligue*, allied with Spain, in defiance of the royal authority. From the time of Henry IV, she lost her political power.

Her scientific influence decreased from other causes