description, and included all persons of any age who were earning their living: that is to say, all persons engaged in the government service, whether national, state, city, town, or county; all professional people; all persons engaged in domestic and personal service, with the exception of housewives and those who assisted in the housework at home only, and for which they received no stated compensation; all persons engaged in the various branches of trade, in transportation, agriculture, the fisheries, manufactures, and mining; day-laborers; apprentices, and those who for various reasons were unemployed for the entire year; the unemployment being properly classified as regards each occupation in presenting results." The chief purpose of the inquiry was to ascertain, so far as possible, first the depression, if any, in particular trades or industries; and, second, the extent of unemployment generally, without regard to the particular kind of work performed during the twelve months preceding the taking of the census.

The main results, as shown in Mr. Wright's summary, are as follows: the whole number of persons, of both sexes, who were unemployed at their principal occupation during some part of the year represented by the twelve months which preceded the census enumeration of population, May 1, 1885, was 241,589. Of this number, 178,628 were males, and 62,961 were females. As compared with the total population of the State, this shows that for every 8.04 persons there was one person unemployed for some part of the year at his principal occupation; and as regards sex, that there was for every 5.22 males one male unemployed, and for every 16.03 females one female unemployed, at principal occupation during some portion of the time covered by the investigation. By 'unemployed' is meant, of course, unemployed at their principal occupation *during some part* of the twelve months preceding May 1, 1885. As a matter of fact, only 822 persons, less than one-third of one per cent, were unemployed during the entire twelve months. Of the unemployed, 73.94 per cent were males, and 26.06 per cent females. Of the 822 unemployed during the entire year preceding May 1, 1885, 91.61 per cent were males, and 8.39 per cent females. More than 50 per cent of unemployed were from twenty to thirty-nine years of age. Perhaps the pith of the report is given on p. 266, where it is said, "A little less than one-third of the persons returned as being engaged in remunerative labor were unemployed for about one-third of their working time; while, on the other hand, the working population of the State, considered in its entirety, were employed at their principal occupation for a little less than eleven months during the census year." The results of the investigation would seem to indicate, Mr. Wright points out, that all the products of manufactures could have been secured by steady work for 307 working-days, of 9.04 hours each, if this steady work could have been distributed equally among all the persons engaged in manufactures; while all the remunerative work of the State, of whatever kind, if it could have been distributed equally among the entire working population, could have been accomplished in 307 working-days, averaging 8.99 hours per day.

The report is extremely valuable, and one more evidence that Colonel Wright is the right man, in the right place.

*Manual for Instruction in Domestic Science.* New York, Industrial Education Association, 1888.

THE prefatory note of this little volume states that it is a manual "drawn up for the use of the students of the College for the Training of Teachers, and for such teachers as adopt the method of instruction followed at the college by Miss Julia H. Oakley, professor of domestic economy there. It is not intended to be complete or exhaustive. Its aim is to give the outline of a carefully developed course of instruction in cooking, which shall have an educational rather than a technical value, and to furnish notes for the conduct of the same." All persons who are watching the manual-training movement will admit at once that this manual, and others like it for sewing, industrial art, and wood-working, are absolutely necessary, if crude and empirical methods are to be kept out of the schools. They are as essential as good text-books in arithmetic and grammar. This manual is simple and clear, and will be of great assistance to teachers. For each lesson an outline is given, and the principles it illustrates carefully developed, before the recipe for its practical illustration is stated. This prevents mere imitation, and makes the practical work of the domestic science course rational and educational. The manual will doubtless be widely used, and its influence will be wholly for good.

*Mechanics of Materials.* By IRVING P. CHURCH. New York, Wiley. 8°. $3.

THE modern tendency in writing text-books upon the relation of forces, and their resistances as manifested upon and in the materials employed in engineering, appears to be toward a clearer stratification of the various departments of that branch of science.

Dynamics and statics have long been clearly defined, but there are many books at this moment before the eyes of students, in which the science of statics and the properties of materials are too promiscuously treated to leave a clear impression except upon the initiated. The result is, that the average student has but a vague idea of what he has been studying, and of its relation to other branches of science.

Professor Church's plan of treatment is a threefold division into dynamics, statics, and, to quote his own words, "mechanics of materials: a treatise on the elasticity and strength of beams, columns, arches, etc., for students of engineering." The latter title is that of his latest work, now under discussion. It is a book of 320 pages, and might properly be called a treatise upon molecular mechanics, being a discussion of the laws of resistance to externally applied forces of the molecular fibres of materials when used in various forms.

The treatment of the subject is independent of the kind of material — steel, iron, wood, etc. — so far as the development of the formula is concerned, as they are based upon certain mechanical assumptions, that are independent of the nature of the material.

That phase of the subject which will perhaps never submit to pure mathematical analysis — the properties of materials, the behavior of various kinds of materials under stress, the laws of fatigue, proper working-stresses, etc. — is very properly passed over with an occasional allusion, and such tables of values as may be necessary to solve the problems dispersed through the book.

In this connection it may be said that a table in which the average ultimate tensile strength of soft steel is given at 80,000 pounds, and of wrought iron at 60,000 pounds, without further explanation, is calculated to give the student an erroneous impression of the latest practice, in which even 55,000-pound steel has been recommended for bridge-work, and 80,000-pound steel is considered a high grade to use.

Again: an allusion to Wöhler's law of fatigue of materials as a recent discovery seems a misleading expression to apply to investigations made twenty years or more ago. But it is far easier to criticise minor points than it is to improve on the main features of Professor Church's work, an investigation of which discloses the following plan: —

The first chapter discusses the theory of stress and strain; and by mathematical investigation, of the action upon an assumed form of elements of the mass, the nature and relation of direct tension or compression, and shear, to each other, are clearly defined. The modulus of elasticity is explained; and, in short, all the fundamental principles of stress and strain in the abstract are shown in their true relations.

Chapters II.–V. inclusive, occupying about one-third of the book, relate to torsion and to flexure of beams.

The generally employed theories of Xavier have been used instead of a more intricate mathematical analysis, and a specially clear statement is made of the assumption upon which the formulæ for beams are based. Column formulæ are treated in the twenty-three pages comprising Chapter VI. The usual presentation of Euler's, Hodgkinson's, and Gordon's theoretical formulæ occurs, and some allusion is made to modifications in practice.

Consistency, perhaps, prevented Professor Church from giving what students much need, — a clear statement of what our engineers are actually doing in practice with the designing of columns, and the fact that certain simple formulæ derived from experiment seem to agree with actual tests fully as well as, if not better than, those mentioned.

Chapters VII.–XI. inclusive, taking about one-third of the space, treat of arches mainly by the use of the moment polygon. The in-