help the farmer, they will secure from him and from the public at large the support they need for their highest work.

Unquestionably the stations ought to make practical experiments in the study of the problems before them. But in the long-run, those stations will do best that plan their work most philosophically, and the prosperity of the enterprise as a whole will be proportioned to its success in the discovering of the laws that underlie the right practice of agriculture.

In brief, the ultimate success of the stations will depend upon the discovery of principles. This is accomplished only by patient, profound, costly research, no small part of which has to do with the finding-out of the best methods of investigation of special problems. But while this work is essential, the stations are confronted with the necessity of doing what will directly and immediately help the farmer. The need and value of abstract research are not understood. To show its usefulness and help, prepare the way for the stations to prosecute it, and at the same time do some of the things that are most immediately and pressingly needed in these directions, is one of the important ways in which the department may aid the experiment station enterprise.

THE NEW BUILDINGS OF THE SORBONNE, PARIS.

THE people of France have never doubted the utility and necessity of the Sorbonne. During the long and splendid history of the Sorbonne, to quote from *Nature*, they have had ample experience of the value of a great teaching body in the capital; and the result is that this is one of the institutions in which men of all parties take a common pride.

So long ago as 1855 it was decided that new buildings for the Sorbonne should be erected, but the scheme was not really complete until 1881. It was then estimated that the expense would be 22,000,000 francs — a formidable enough sum, but one which caused no serious difficulty, as the city readily undertook to contribute half of it. The foundation was laid in 1885, and now a considerable part of the work is finished. This was opened on Aug. 5, in the presence of President Carnot, and the ceremonies on the occasion may be regarded as affording fresh evidence of the enthusiasm felt by educated Frenchmen for all that represents and tends to develop the highest intellectual life of the nation. Every university had been asked to send delegates elected by the students to the celebration; and the State, and the city of Paris, agreed to look upon them as their guests during the ten days of festivity in honor of science. This part of the programme was well carried out, arrangements having been made with different hotels to board and lodge the foreign visitors at the expense of the Hôtel de Ville and the Ministry of Public Instruction. Russia and Germany did not accept invitations, but the universities of Great Britain, of the Scandinavian countries, of Belgium, Holland, Greece, Switzerland, Italy, Spain, and the United States were represented. There were about 700 delegates from these countries, besides a large number who went at their own expense.

The exercises began on Sunday evening with a gala performance of "Faust" at the Opera House, which the President attended. On Monday the 5th, 3,000 persons assembled in the new amphitheatre, an immense hall adorned with frescoes. Each delegation had a standard-bearer carrying the flag of his nation, and the members of the various groups were warmly greeted by the public as they advanced to the places appointed for them. At 3 o'clock President Carnot arrived, and took his seat on the platform, surrounded by ambassadors, statesmen, and academicians. M. Ferry, as the minister who made the arrangements for the enlargement, was much cheered.

M. Gréard, rector of the Academy, made the first speech. He sketched the history of the Paris University, extolled the events of 1789, and described study as a common fatherland, which had brought together delegates from nearly all the European and American universities. M. Hermite next reviewed the mathematical teaching of the Sorbonne since 1808. M. Chautemps, President of the Municipality, vindicated democracy from the imputation of indifference to culture, and claimed credit for the body represented by him for having founded a chair of French revolution history and a chair of evolution. M. Fallieres, Minister of Education, dwelt on the efforts and sacrifices of the republic for the diffusion of culture. He referred to the moribund condition of the universities on the eve of the Revolution, and the want of cohesion between the colleges afterwards established, and eulogized the individuality now developed by the provincial universities.

THE MARINE CONFERENCE AT WASHINGTON.

THE following is the programme of subjects to be considered at the International Marine Conference which will meet at Washington on Oct. 16 of this year.

In General Division 1 will be considered marine signals or other means of plainly indicating the direction in which vessels are moving in fog, mist, falling snow, and thick weather, and at night; also rules for the prevention of collisions and rules of the road: —

1. Visibility, number, and position of lights to be carried by vessels, — (*a*) steamers under way; (*b*) steamers towing; (*c*) vessels under way, but not under command, including steamers laying cable; (*d*) sailing vessels under way; (*e*) sailing vessels towing; (*f*) vessels at anchor; (*g*) pilot vessels; (*h*) fishing vessels.

2. Sound signals, their character, number, range, and position of instruments, — (*a*) for use in fog, mist, falling snow, and thick weather as position signals; for steamers under way; for steamers towing; for sailing vessels under way; for sailing vessels towing (these signals to show the approximate course steered, if possible); for vessels at anchor; for vessels under way, but not under command, including steamers laying cable; (*b*) for use in all weathers as helm signals only; for steamers meeting or crossing; for steamers overtaking; for steamers backing; (*c*) whether helm signals shall be made compulsory or remain optional.

3. Steering and sailing rules, — (*a*) sailing vessels meeting, crossing, overtaking, or being overtaken by each other; (*b*) steamers meeting, crossing, overtaking, or being overtaken by each other; (*c*) sailing vessels meeting, crossing, overtaking, or being overtaken by steamers; (*d*) steamers meeting, crossing, overtaking, or being overtaken by sailing vessels; (*e*) special rules for channels and tideways where no local rules exist; (*f*) conflict of international rules; (*g*) uniform systems of commands to the helm; (*h*) speed of vessels in thick weather.

In General Division 2 consideration will be given to regulations to determine the seaworthiness of vessels, — (*a*) construction of vessels, (*b*) equipment of vessels, (*c*) discipline of crew, (*d*) sufficiency of crew, (*e*) inspection of vessels, (*f*) uniform certificates of inspection; in General Division 3 attention will be paid to the draught to which vessels should be restricted when loaded, and uniform maximum load mark; and in General Division 4 will be discussed uniform regulations regarding the designating and marking of vessels, — (*a*) position of name on vessels, (*b*) position of name of port of registry on vessels, (*c*) size of lettering, and (*d*) uniform system of draught marks.

In General Division 5 saving life and property from shipwreck will be considered: —

1. Saving of life and property from shipwreck at sea, — (*a*) duties of vessels after collision; (*b*) apparatus for life-saving to be carried on board ship (life-boats, life-preservers, life-rafts, pumps, and fire-extinguishing apparatus); (*c*) the use of oil and the necessary apparatus for its use; (*d*) uniform inspection as to (*b*) and (*c*).

2. Saving of life and property from shipwreck by operations from shore, — (*a*) organization of and methods employed by life-saving institutions; (*b*) the employment of drilled and disciplined crews of life-saving institutions; (*c*) the maintenance of a patrol upon dangerous coasts by night and during thick weather by day, for warning off vessels standing in danger, and for the early discovery of wrecks; (*d*) uniform means of transmitting information between stranded vessels and the shore; (*e*) life-boats, life-saving apparatus, and appliances.

3. Official inquiries into causes and circumstances of shipwrecks aud other casualties.

In General Division 6 will come, necessary qualifications for officers and seamen, including tests for sight and color blindness, — (*a*) a uniform system of examination for the different grades; (*b*) uniform tests for visual power and color blindness; (*c*) general knowledge of methods employed at life-saving stations; (*d*) uni-

form certificates of qualification; in General Division 7, lanes for steamers on frequented routes, — (*a*) with regard to the avoidance of steamer collision; (*b*) with regard to the safety of fishermen; in General Division 8, night signals for communicating information at sea, — (*a*) a code to be used in connection with the International Code Signal Book; (*b*) or a supplementary code of limited scope to convey information of special importance to passing vessels; (*c*) distress signals; and in General Division 9, warnings of approaching storms, — (*a*) the transmission of warnings; (*b*) the uniformity of signals employed.

General Division 10 will cover reporting, marking, and removing dangerous wrecks or obstructions to navigation, — (*a*) a uniform method of reporting and marking dangerous wrecks and derelicts; (*b*) the division of the labor, cost, and responsibility among the several maritime nations, either by geographical apportionment or otherwise; of the removal of dangerous derelicts, and of searching for doubtful dangers with a view of removing them from the charts. General Division 11 will take in notices of dangers to navigation, and notices of changes in lights, buoys and other day and night marks, — (*a*) a uniform method of taking bearings, of designating them (whether true or magnetic), and of reporting them; (*b*) a uniform method of reporting, indicating, and exchanging information by the several maritime nations, to include the form of notices to mariners; (*c*) a uniform method of distributing this information. General Division 12 will be devoted to a uniform system of buoys and beacons, — (*a*) uniformity in color of buoys; (*b*) uniformity in numbering of buoys; and General Division 13 to the establishment of a permanent international maritime commission, — (*a*) the composition of the commission; (*b*) its powers and authority.

The programme, as above drawn up, is submitted over the signatures of Rear Admiral S. R. Franklin, U.S.N.; Commander W. P. Sampson, U.S.N.; S. T. Kimball, General Superintendent of the Life Saving Service; J. W. Franklin, master marine; J. W. Shackford, master, merchant marine; and W. W. Goodrich, counsellor-at-law.

The Hydrographic Office desires to obtain the opinions and suggestions of interested parties on the various subjects to be considered, with a view to assisting members of the conference in formulating satisfactory rules. It is hoped, therefore, that those whose opinions are likely to have weight on any of the subjects mentioned, may give the benefit of their knowledge or experience.

BOOK-REVIEWS.

Thermodynamics of the Steam Engine and other Heat Engines. By CECIL H. PEABODY. New York, Wiley. 8°. $5.

THE author of this book is associate professor of steam engineering in the Massachusetts Institute of Technology, and the book is intended mainly for the use of students in that and similar technical institutions. He presents in a clear manner, and with a minimum of mathematical expression, the general theory of thermodynamics; and his treatment of the properties of gases and vapors, and of the injector, presents several novel and interesting features, especially in the comparisons with experiments. More novel still, and more valuable to the student who intends to adopt steam-engineering as a profession, is the author's treatment of the steam engine. He has considered it advisable to leave untouched all approximate theories based upon the assumption of adiabatic changes of steam in the cylinder of the engine, making instead a systematic study of actual tests of engines in use, for which purpose a large number of test records have been collected, arranged, and compared. This will enable the student to learn what is actually known on the subject, and will point out to him the direction in which future investigations will give the best results, as well as show him how and where improvements may be made.

It will be gathered from the foregoing that this book differs, in some parts, either in substance or in manner of presentation, from other text-books on the subject; but in general, commonly accepted methods have been followed. The formal presentation of thermodynamics is the same as that employed by most authorities, and presents clearly the many difficulties of the subject, besides making plain the processes employed.

The author gives special attention to the investigations of the action of steam in the cylinder of an engine, considerable space being given to the researches made by Hirn, as well as to the experiments which provided the basis for them. Directions and instructions are given for the designing and construction of simple and compound engines, and also for making accurate tests of their efficiency. Chapters are given on air-compressors and refrigerating machines, which important subjects may profitably be studied in connection with the theory of thermodynamics.

Though this volume, like all similar text-books, is largely an adaptation for a special educational purpose of the work of other authors and experimenters, more than a general acknowledgment of indebtedness to them would not under the circumstances be deemed necessary; still Professor Peabody has given references in foot-notes wherever direct quotations have been made, which will aid students materially in making more extended investigations

AMONG THE PUBLISHERS.

D. APPLETON & CO. call attention to the fact that "Christianity and Agnosticism" has gone into a second edition.

— Messrs. Houghton, Mifflin, & Co. announce for early publication, "Literary Landmarks: A Guide to Good Reading for Young People, and Teachers' Assistant." By Mary E. Burt, Teacher of Literature, Cook County Normal School, Englewood, Ill. 152 pages. Cloth, 75 cents.

— The *Modern Science Essayist* for July contains an essay on the "Evolution of Society," by James A. Skelton. In the August number, J. Sidney Sampson discusses the "Evolution of Theology."

"Useful Hints on Steam" is the title of a very attractive little volume of nearly a hundred pages, written and published by E. E. Roberts of 107 Liberty Street, New York. It is written in a popular vein, and is intended for beginners.

— Charles H. Kilborn, Boston, have just ready "Round the World with the Poets," selected and arranged by Mary Cate Smith and Sarah C. Winn, intended to afford a series of review exercises in the study of geography. The quotations are arranged beginning with physical features and then giving longer poems relating to particular countries, mountains, rivers, cities, etc. These are followed by an illustrative tour, giving in selections from well-known authors an interesting journey around the world.

— The September number of *Harper's Magazine* will contain two articles by Theodore Child, one describing the American fine art exhibition at the Paris Exposition, which Mr. Child does not hesitate to say is one of the strongest and most interesting of all the foreign departments, and the other giving features of Moscow life that escape the eye of ordinary travellers. In the same number Edmond de Pressensé gives an outline of the religious movement of the present day in France; "London Mock Parliaments," by John Lillie, illustrated by Harry Furness; the distinguished caricaturist, Caran d'Ache, will have a series of sketches of dogs in the "Editor's Drawer;" and Lynde Palmer contributes a story about electricity called "The Pendragon Trial."

— The next volume in the Badminton Library to be published in the autumn, is "Fencing, Boxing, and Wrestling," written by Messrs. Walter H. Pollock, F. C. Grove, Walter Armstrong, E. B. Mitchell, and M. Prévost. This will be followed later by "Golf," to which Mr. Horace Hutchinson, Mr. A. J. Balfour, and Sir William Simpson (among others) will contribute.

— In the September *Scribner's* Lieut. W. W. Kimball, U.S.N., United States Inspector of Ordnance, will describe the various types of magazine rifles which have been adopted by the leading European armies, including the Mannlicher, Hotchkiss, Lee, Mauser, and Vetterli. A number of illustrations will show the contrivances by which the cartridges are fed to the rifle. Andrew Lang will write of Alexandre Dumas. Harold Frederic will begin a new serial romance of the Mohawk Valley in the days of the French and Indian wars and the Revolution. H. G. Prout's article on "Safety in Railway Travel," is the twelfth and last in the very successful railroad series. It is announced that these articles, with