their behests to men through ghosts or dead children by whistling sounds or whispered words. Tattooing is permitted only when a deity has given his assent by whistling; house spirits and the genii of trees give their revelations by whispers only. A. S. G.

APPLIED THERMODYNAMICS.

In a recent publication of '*Documents sur la Laboratoire de Mécanique de l' Université de Liége*,' describing its methods of instruction, by the Professor of Applied Mechanics and of Industrial Physics, M. Dwelshauvers-Dery, we find a *resumé* of researches in applied thermodynamics, mainly in the experimental study of the steam-engine, which is interesting as exhibiting the character and extent of the work recently performed, and valuable as supplying important data previously unknown.

This laboratory of applied mechanics was completed in 1893, after, as the author of these documents says, five years of constant solicitation of the government to supply this '*auxiliaire précieux*,' of which M. Dwelshauvers-Dery was the first to conceive the idea, a generation ago, though so late in its realization. His idea was that of a laboratory of research and instruction in engineering, to be employed in the work of the regular courses leading to technical degrees and devoted to the purposes of the student, rather than, as previously usual in nearly all departments of applied science, primarily for those of the distinguished professor in charge and only secondarily and incidentally for the student.

The researches which have been conducted since the date of completion of this laboratory by the Director, assisted by his staff and by advanced and able students, have been mainly in applied thermodynamics. M. Dwelshauvers-Dery is a disciple of Hirn and aided in the investigations made in Alsace at the beginning of the work of his eminent leader. Since that time, the famous discussion between Zeuner and Hirn and their followers has made this work and these workers familiar to all investigators and students in that field. It has been in the supplementing of Hirn's earlier work that the experimental steam-'plant' at Liége has been mainly occupied recently.

Among other investigations, those relating to the influence of the water collecting in the steam-chest of the engine upon its efficiency, on the effect of superheating, on the use of the steam-jacket, on the effect in the real engine of compression, and those on the condition of the vapor, as to 'quality,' in the clearance spaces, have been the most extensive and important.

It was found to be the unquestionable fact that, with the engine employed, it was advantageous to continually drain the water of condensation from the valve-chest of the engine when using moist steam and whether the jacket is in use or not. With superheated steam, naturally, no effect was observed.

The steam-jacket was found to give an economy of from 24 to 28 per cent., either with or without superheating; the latter being a disputed question until thus, for this case, at least, settled. Superheating produced an economy of about 20 per cent., as a maximum.

The investigations of the quality of the vapor in the compression period occupied several years and attracted much attention and some opposition to the conclusions reached was manifested by a number of distinguished experts in that department. Those experiments which were made with 'constant absolute work' showed a decided loss by compression and a loss proportional to the amount of the compression; which fact was attributed to the heat-exchanges between vapor and cylinder-wall. This conclusion was challenged and it was denied that the fundamental assumption that, as asserted by Hirn, the steam at the end of emission is dry, could be accepted as true. Dwelshauvers-Dery and his former assistant and pupil, Duchesne, furnished proof of the correctness of his proposition. (Revue de Mécanique, Jan., 1899; July, 1899.)

Mr. Isherwood, the famous pioneer in this class of work and the Engineer-in-chief of the navy during our civil war, suggested that the experiments be repeated, making the 'indicated work' a constant quantity. He thought it possible that it might be found that the use of compression was neither economical nor wasteful in the actual case and, therefore, its use simply a question of smoothness of operation of the machine and entirely outside

the realm of applied thermodynamics. The work of the past year has been in this line of investigation and the results have sustained the view of Commodore Isherwood.

The schedule of proposed work for the year 1900 includes the study of the effect of 'throttling' steam, as proposed by Isherwood.

The publication of these documents for the use of the Congress of Applied Mechanics at the coming International Exposition at Paris gives all interested in this department of research and in this kind of instruction an opportunity to learn just what are the methods employed, the apparatus used and the character of the researches best adapted for laboratory work of this sort in the instruction of the young engineer and physicist, as arranged by a pioneer in this field.* The work reported has been extensive, important and admirable in method and in its execution. It has been conducted under circumstances of very great difficulty, patiently, carefully, persistently, and while few who have not kept in touch with it while in progress can realize what labor and sacrifice have been involved, every specialist in this department will recognize its value and elegance.

R. H. THURSTON.

*Documents sur le Laboratoire de Mécanique de l'Université de Liége, et sur l'Enseignement qui y est donné par V. Dwelshauvers-Dery, Professeur de mécanique appliquée et de physique industrielle. Liége, Charles Desoer, Editeur, 1900.

A NEGLECTED DEPARTMENT.

THE American Society of Mechanical Engineers is issuing to its members a circular, prepared by its Council, calling attention to the neglect of the Patent Office of the United States by Congress, to its importance to the country and to its hoppled condition as produced by the refusal of Congress to provide for either suitable accommodations or a sufficient clerical force and staff of examiners. Members of the Society are urged to force upon the attention of their members of Congress the necessity of "providing sufficient room, force and facilities for the prompt and proper execution of its work," that arrangements be made at once for "providing incombustible receptacles for the records," which records "largely constitute the legal evidence of title of so many of the larger industries of the country," that the library be kept up and properly cared for, that the Patent Office be given the entire control and use of its own building—now occupied largely by 'squatters' from other bureaux—and that its earnings be dedicated to its own purposes and improvement. The Patent Office is 'out of practical politics,' and is only prevented from doing its full duty to the country by its lack of space and of force. Yet, up to January 1, 1899, 693,979 patents had been granted, and 41,422 trade-marks registered. Last year alone 25,527 patents and 2260 trade-marks were added to the record. The accumulations of records and of exhibits has come to be so great as to put it quite beyond the power of the restricted force in its restricted space to properly store, arrange, classify and care for them. The library, which it is imperatively necessary to keep up to the highest state of efficiency, and which should be a complete collection of the technical publications of the world, and of all time, was last year only allowed $1500 for purchases of books. No funds at all were obtainable for the law library. The whole business of this department of government, upon which the success of our great industries is so absolutely dependent is trammelled, and every industry of the country is embarrassed, by its forced inefficiency. This inefficiency is entirely due to the indifference of Congress. The Patent Office has accumulated out of its own earnings a large amount of available capital—several millions of dollars—and it has not been even allowed to draw upon its own funds to meet imperative needs.

So indifferent, in fact, have been some Congresses that it is within the experience of the writer that important matters of business, involving large interests, have been delayed for weeks through the impracticability of securing a full meeting of a committee, repeatedly called.

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MUSEUM OF THE STATE OF NEW YORK.

DURING the winter season, the energy of the museum staff has been concentrated on an im-