

the research was carried out with the object of finding how best to anneal blocks of optical glass, the apparatus is available for testing any glass, chemical or otherwise, and Messrs. Hilger, having the apparatus set up in their laboratory, are prepared to test specimens of glass for the trade, and thus provide the valuable information which they are able so easily to obtain.

C. V. Boys.

#### UNIVERSITY AND HIGHER TECHNICAL INSTRUCTION IN FRANCE.

ONE of the principal articles in the *Revue générale des Sciences* for June 30 is that by Prof. Paul Janet, of the Sorbonne, director of the Higher School of Electricity, concerning the rôle of the universities in higher technical instruction, especially in relation to the Bill before the French Senate, at the instance of M. le Goy, to sanction the establishment of faculties of applied science in the universities. The proposed measure is exciting considerable interest, not only amongst the learned bodies in France, but also amongst those engaged in scientific industries. The question has assumed a deeper interest in view of the problems raised by the war and of the position and means of development at its close of the national industries, especially those closely dependent upon chemical and electrical science.

Incidentally the question raised by M. le Goy in his project embraces other deep considerations relating to economic problems, including the right direction and utilisation of capital, the question of tariffs and raw materials, a closer union of capital and labour, and especially the creation of a better educated industrial *personnel* in the scientific control and administration of industry, together with measures for the amelioration of industrial conditions. It is urged with considerable force that there is need of a much closer understanding between men devoted to pure science and those engaged in the higher technical industries. The former are often ignorant of the difficulties which beset the engineer and manufacturer, despite the systematic methods he employs in the actual production of commodities; whilst the latter, resenting the accusation that they lack all scientific spirit, do not hesitate to apply derisively the epithet "Sorbonnique" to the science which is incontinently thrust upon them.

Only when this antagonism is entirely removed by a closer sympathy, understanding, and appreciation, on the one hand, of the potentialities of pure science, and on the other of the difficulties which beset its translation into terms of production, can there come that union of effort upon which the successful development of industry depends. In the case of the electrical industry it is freely admitted by all concerned that it finds its solid base in electrical science; nor is it now possible to pretend that any man can hope to become a competent engineer whose technical skill is not founded upon a sound training in science.

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The article goes on to consider the existing resources for the training of the expert engineer, and passes in rapid review the faculties of science existing in the universities of France and their competence to train the future technologist; the technical institutes, such as the Chemical Institute at Nancy, founded in 1890, and the Electro-Technical Institute at Grenoble, founded in 1892; the Ecole Polytechnique and the Central School of Arts and Manufactures at Paris, and other special schools in France. An unfavourable view is taken, however, as to the competence of the faculties of science, which have never shown any appreciation of the needs of industry, adequately to train the men, who in fact do not really seek them, destined for industrial pursuits. A firm distinction is drawn between the ideals and aims of the university and the functions of the schools of practical science. The former need for their realisation absolute freedom and long leisure, since their purpose is the exploration and discovery of natural laws, the attainment of exact knowledge as the grand end of their existence, and the moral rather than the material progress of humanity. Research is with them the end, and teaching only the means. The latter, to achieve their purpose, require direct contact with industrial problems, and the due and serious employment of the time of their students, with strict discipline and method and supervised work.

In order to bring the universities into closer touch with industry, it is suggested that they should, with the collaboration of practical men, establish scientific institutes preparatory to industry. It is further proposed to found a very few higher technical schools for more advanced industrial training and research, established and controlled directly by men eminent in industry, yet aided by the State and directly linked with the Ministry of Public Instruction.

#### PUBLIC SCHOOLS AND OTHERS.

"PUNCH" of September 27, under the title of "Public Schools," prints a poem of which the last two verses are as follows:—

*Spite of the anti-classicists' arraignment,  
Spite of the ink so petulantly spilt,  
Not by exact laboratory training,  
Not by the test-tube character is built.*

*Only in fields of emulous endeavour,  
Fired by the teaching of the famous dead,  
Public-school boys, who play the game for ever,  
Grow into leaders and inspire the led.*

#### PUBLIC SCHOOLS: AN ANSWER.

Dear *Punch*, your poet praises public schools,  
Not well, nor wisely, nor by half enough.  
Their modern Army Classes, "mostly fools,"  
Have shed his "grand old fortifying" stuff.  
Their "labs," which he accentuates so oddly,  
Seem just as formative, and just as godly.