

PATENTS AND SCIENTIFIC RESEARCH.<sup>1</sup>

TO encourage scientific investigation and to utilise the results of that investigation for the benefit of the community are problems of the deepest concern. As such they are to-day receiving the attention of the keenest of intellects, and herein lies the hope that from the turmoil of the Great War, with the suffering it has brought in its train, there may emerge a measure of good. Should the present hostilities bring home to the mass of the population a knowledge that with the future of the country is intimately associated the ability to prosecute scientific investigation with diligence, the mighty struggle in which we are engaged will not have been fought in vain.

To bring the abstract reasoner and the research student into closer touch with the needs of the moment, and to direct their energies into channels which shall be productive of the greatest benefit, is no novel endeavour, for in the past they have been the occasion of much deliberation and the practice of many expedients. Of the numerous schemes having these objects in view, some have proved capable of general application, while others have reflected the special purposes which have called them forth, or the work of the institutions immediately interested. No scheme, however, which has been suggested by a reputable body can be said to have been wholly devoid of merit, or to have been incapable of occasional employment. But whether one scheme or the other is preferable in the circumstances of a special case still remains a matter of opinion, and one upon which divergent opinions may rightly be held.

In scientific investigation, the following up of an idea to its logical conclusion, or until definite results are reached, demands unremitting and often exclusive attention, an attention not to be interrupted by considerations foreign to the business in hand. The aloofness thus necessarily engendered is reflected in the proverbial inability of the devotee to protect himself commercially or to secure adequate pecuniary return for prolonged industry. For the encouragement of research and the freeing of the investigator from the petty tyranny occasioned by the needs of daily living, Prof. T. Brailsford Robertson, professor of biochemistry and pharmacology in the University of California, propounds a scheme which, while leaving the investigator untrammelled, also relieves him of much anxiety as regards his physical welfare. In setting out the scheme Prof. Robertson refers to various projects which have been put in hand for stimulating research and for bringing the student into closer touch with the utilitarian or business side of his operations. Thus there are reviewed the action of the Solvay Institute in Brussels, which has set aside certain proceeds from inventions for the support of scientific enterprise, and

the procedure of Behring and Pavlov, who have handed over profits obtained by the sale of articles manufactured in the laboratory. The precedent established by Ehrlich in his disposal of the proceeds of salvarsan forms, in addition, an illustrious example whereby the furtherance of research in a special direction may be assisted. In this instance, however, although it was so highly successful, Prof. Robertson alludes to defects difficult to remove. Notably, the intimate association of an individual investigator with a business enterprise, and the absence of supervisory control of the exploitation of a discovery, were felt to be susceptible of improvement. As regards industrial fellowships, which to so many seem to have justified themselves, they have perhaps served to bridge the gap existing between pure science and industrial progress rather than to initiate new developments.

A plan of wider scope and capable of indefinite multiplication occurred to Prof. Robertson. The scheme is essentially based upon payment by results, the results, however, being in part due to co-ordinate action by the governing body of a university. Prof. Robertson suggests the establishment of a trust for the working of such patents as have been obtained by the investigator. After recouping itself for the expenses of this working, the governing body is to hand over a certain sum of money, and, out of profits, to grant an annuity continuable after death in favour of the investigator's dependents. Unexpended profits are to be pooled in favour of the prosecution of research work in definite directions. A board of directors under the governing body is to be deputed to supervise, if desired, the work of research. The scheme is capable of wide application, similar arrangements for specific purposes being susceptible of multiplication. Moreover, Prof. Robertson and his governing body have shown their faith in the project by entering into an agreement on the subject of the growth-influencing substance "Tethelin," which Prof. Robertson had isolated from the anterior lobe of the pituitary body.

Whether it is desirable for an educational authority to depart from its normal functions and to enter into the bustle and competition inseparable from commercial undertakings is questionable. That it would be satisfactory to the patentee, engrossed in his scientific investigation, admits of little doubt; but hesitancy may well be evinced in assenting to the employment of an academic board in the exploitation of patents. Moreover, although the terms of the incorporation of the University of California would seemingly permit of the University entering into business undertakings, many institutions elsewhere have no such privilege conferred by their charters.

Among the many other proposals for stimulating investigators to further effort is the conferring of rewards in the form of money. This method is of considerable standing and has met with success. But in the opinion of not a few a system is still to be found which is less open to criticism and more uniform in application.

<sup>1</sup> "The Utilisation of Patents for the Promotion of Research." By Prof. T. Brailsford Robertson, University of California. Pp. 14. (Privately circulated.)

"A Scheme for the Promotion of Scientific Research." By Walter B. Priest. Third edition. Pp. 88. (London: Stevens and Sons, Ltd., 1910.)

"Observations: an Appendix to the 'Scheme.'" By Walter B. Priest. Pp. 9. (Privately circulated, 1916.)

Mr. Walter B. Priest would regularise procedure and render its operation more certain by assimilating application for State aid to that which obtains when a patent is solicited of the Crown. Mr. Priest has accordingly drafted a Bill, a notice of which appeared in *NATURE* for January 21, 1909 (vol. lxxix., p. 345). He has since followed up the matter by addressing a series of "Observations" to the Committee of the Privy Council for Scientific and Industrial Research, together with a copy of the Bill and the remarks which accompanied the publication in 1910 of the third edition of the Bill.

The provisions of Mr. Priest's Bill follow closely the Patents Act, 1907, an Act which, while prescribing the method of applying for a patent, modified the substantive law in certain particulars.

According to the plan set out in the Bill and in the "Observations," pecuniary grants may be restricted to scientific discoveries and improvements in means and appliances not of a patentable nature which, after investigation in accordance with the provisions of the scheme, are found to have effected or contributed to the attainment of purposes of general utility and advantage subsequently to the applications for such grants.

If, however, it should appear that the subject in respect of which an application for a grant was made was of a patentable nature, the applicant was not thereby to be prejudiced, except in so far as he might be called upon to refund what had already been granted, on the assumption that the discovery was not of a patentable nature.

The proposed Bill speaks freely of "discoveries" in respect of which benefits are to be received, as though the full significance of the word was readily perceptible. But what a discovery may be, or a discovery as opposed to an invention, and where the one ends and the other begins, are scarcely even adumbrated.

In patent law a difficulty similar in kind to this is presented when the attempt, usually futile, is made to distinguish between inventions which are said to be based on a "principle" and those which do not embody a "principle." Usually those who talk most of "principles" in this connection confuse the idea of a principle with an object to be achieved, a problem to be solved, or an end to be attained; and a century and more of litigation has failed to elicit a simple and, at the same time, indisputable account of what is understood when this distinction is brought forward. Indeed, the complete meaning of the word "principle," not only in patent law, but also in many another situation, requires much exposition. So with the word "discovery," which looms so largely in the proposed Bill, for difficulties not unlike these would undoubtedly be encountered in the endeavour to distinguish a discovery, in respect of which a grant is to be given, from an invention, for which the reward is a patent.

Seemingly, however, the question as between a discovery and an invention is to be relegated to a body of examiners or advisers, to whom also the settlement of other points is to be entrusted. In

some instances the Judicial Committee of the Privy Council is to be called in aid, or, since the establishment of the Advisory Committee of the Privy Council for Scientific and Industrial Research, this committee may be substituted for the Judicial Committee.

A further notable omission in the scheme presented by the Bill is the absence of relief to the individual, who, having found out some profound "law of Nature," at once ingenuously announces it to the society of which he may be a distinguished member. By so doing he often prepares the way for another, who, not having been mentally congested with the work which led up to the discovery, seizes upon its practical application and for his own advantage embodies it in an invention and forthwith applies for a patent. The originator of the idea, in these circumstances, is at the mercy of the subsequent exploiter. Even if this questionable action has not taken place, the originator may by his announcement have precluded himself from embodying his discovery in an invention for which a valid patent could be obtained, since for a valid patent no previous publication is, in general, permissible.

But no useful purpose would be served by discussing the various clauses of the Bill, for although it might be highly desirable to regularise procedure for obtaining grants in aid of scientific research, yet to model a scheme upon that adopted for obtaining a patent seems to be inadvisable. As the Patents Act stands at the present day, it is incomprehensible without interpretation, while its meaning is usually not what it expresses, as judged by meanings ordinarily attaching to words. In what to the uninitiated is clear and permitting of no dispute, a wealth of judicial exposition is unfolded, whereby curious and recondite meanings are found to be hidden in passages apparently clear and simple. Indeed, the Patents Act is the result of historical accident and must be interpreted by reference to history. To apply its provisions to procedure for obtaining a money grant would be at the outset to tie the hands effectually and to obscure the vision of those to whom the examination of applications and the allocation of moneys were entrusted. Far simpler methods—methods more in touch also with modern requirements—could readily be devised. Even at the present moment a system is in operation whereby inchoate inventions, whether based upon new or old discoveries, receive the help of Government and are brought to fruition, to the mutual advantage of inventor and State. But whatever opinions may be held upon schemes hitherto propounded for the stimulation of scientific discovery and for the rewarding of investigation, it is clear that a collation of all known and workable schemes should be undertaken and a serious consideration of them as a whole put in hand. Whether assistance be given by way of pecuniary grant for definite research or through the medium of industrial scholarships, or whether reward be proportioned to results already achieved—results consisting in discoveries or the application of scientific truths

to manufactures—or whether the individual be left to the operation of patent law, it is difficult to conceive of an inquiry of more urgency or importance than one which would enter fully into the merits of the various systems which have not only been found successful in practice, but have also failed to pass the preliminary stage of suggestion. A report from a competent authority would be of the greatest benefit and would repay many times the expense and trouble involved in its preparation. The Committee of the Privy Council for Scientific and Industrial Research has the means within its power, and it is earnestly to be hoped that it may see fit to advise men of science, academic bodies, and commercial syndicates as to the best procedure for the encouragement of scientific investigation and the application of results to daily needs.

#### PRECIOUS STONES AND PLATINUM IN 1916.

TO the twenty-fifth volume of "The Mineral Industry," which deals with the conditions obtaining in the year 1916, Dr. G. F. Kunz, the well-known gem expert, contributes not only, as for many years past, the chapter on precious stones, but also another on that most precious of metals, platinum.<sup>1</sup> In passing we may remark that the scope of this annual publication is not so wide as its title would indicate, the subject being considered entirely from the point of view of the United States.

There is no better or surer indicator of the state of the trade of a country than the business done in jewels. It is not, therefore, surprising to learn that the imports of precious stones into the United States during the year under review reached the remarkable total of ten million pounds sterling, this amount being nearly double that of the preceding year, and exceeding by more than one-tenth the figures for what was at the time considered the exceptionally prosperous year 1913. About two-thirds of the chapter on precious stones is taken up with the precious stone *par excellence*—the diamond. During the year the diamond trade with the United States was very much interfered with by the operations of German submarines, more, however, on account of the considerable rise in the rates of insurance than because of the actual losses suffered. At the beginning of the year the Diamond Syndicate raised the price of rough stones by another 5 per cent. This powerful organisation has secured complete control of the diamond market by acting as agents for the sale of the produce of the Premier mine, and by arranging with the Government of the Union of South Africa to purchase the stones found on the sands of the shore of what was once known as German South-west Africa. We are reminded that diamonds, besides their ornamental use, play an important part in in-

dustry, and especially the manufacture of munitions of war, by the fact that in November, 1916—none too soon—the British Government placed diamonds suitable for industrial purposes with emery, corundum, carborundum, and all other abrasive materials, whether natural or artificial, on the list of absolute contraband.

Inasmuch as practically all the diamonds placed on the market pass through London, it may appear strange, except to those acquainted with the formerly rigid restrictions of the powerful diamond-cutters' union, that diamond-cutting should have so long languished in this country. The upheaval caused by the war has brought about a change in this respect. Most of the Belgian cutters fled from Belgium on the fall of Antwerp, and many of them came to England. With their aid a number of factories have been started in London, and particularly in Birmingham. Amsterdam, too, benefited by the ruin of the diamond industry of Antwerp, but owing to the shortage of coal a large number of the small factories there were closed by a committee of the trade, and the business was concentrated in the large establishments.

The improved demand for diamonds brought about a revival of business in the South African fields, and the alluvial deposits were very active; the De Beers Company raised very little blue ground, the stones recovered coming almost entirely from ground already on the floors. A 37-carat stone was found in the recently opened Kameeltontein digging, the stones from which have the peculiar opalescence characteristic of those occurring in the Premier mine. Dr. Kunz points out how little India, once the sole source of diamonds, now contributes to the world's supply. It is thought possible that the deep-seated deposits have never been touched; the problem is attracting some attention, but whether prospecting on a suitable scale would prove commercially profitable is under present conditions more than doubtful.

A few interesting points may be gleaned from the remaining pages of this chapter. A large, though imperfectly formed, trapezohedron of garnet, weighing 4.763 kg. (10½ lb.), was discovered in the course of grading a property in New York in 1915. Rubies, to judge from the experience of the Burma ruby mines, are slowly recovering from the depression under which they have for some years laboured, a depression largely caused by the success that has attended the artificial manufacture of this stone. The demand for sapphires continues steady. The Queensland output was formerly wholly in German hands, and for some two years after the outbreak of war operations were brought to a standstill; but an opening has now been obtained on the London market. It is interesting to note that recent experiments have shown that the transparency of the Queensland stones is much improved if they are subjected to a high temperature.

The extraordinary rise in the value of platinum is a striking instance of what happens when an

<sup>1</sup> (1) "The Production of Precious Stones for the Year 1916." (2) "Platinum for the Year 1916." (New York: McGraw-Hill Book Company, Inc.: London: Hill Publishing Co., Ltd., 1917.)