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The Future of the British Patent Office.

II.

IN investigating in Great Britain the novelty of an invention, the Patent Office confines its search to British specifications published within the previous fifty years, and we have suggested that the search should be extended to cover text-books, periodicals, and foreign specifications, the period of search being restricted to twenty years except in the case of British specifications and text-books. The foreign specifications to be considered would be those published in the Dominions, France, Belgium, Germany, the United States, and Switzerland, for few inventions of serious importance will fail to be protected in one or other of these countries. We have now to estimate the increase of staff and of cost which this innovation would involve, and to show that the expense can be met by practicable means.

The machinery for the present search amongst British specifications was evolved by the scientific section of the Patent Office staff after many trials, and its success suggests that the devising of extended machinery must be left in the same hands. In order, however, to estimate what is involved in the present proposals, it will be necessary to consider in outline the form which that machinery would probably take. The characteristic feature to which the British search owes its thoroughness is the use of abridgments, so that the first step would be the abridging of the specifications published within the prescribed period in the countries we have mentioned, with the exception of New Zealand, Australia, and Belgium, for which countries abridgments are already available. Since the same inventor will often protect his invention in several different countries, many duplicates will be found: in order to sort these out and bring them together, by the aid of the inventor's name, the title, and the general aspect of the drawings, a small clerical staff would be necessary. For the actual work of abridging specifications in French and German the use of translators is to be deprecated, for it is both uneconomical and unsatisfactory in its results. Each class of subject-matter should preferably be indexed and abridged by the examiner, or syndicate of examiners, familiar with that class, so that it will be necessary for each syndicate to contain some one familiar with French and German. This should not be difficult, since most scientific men already know at least one of these languages.

As regards literature, text-books and year-books present little difficulty as they are usually provided with indexes, and examiners would soon become familiar with those which relate to their particular classes. Weekly and monthly periodicals and irregular publications such as bulletins are, with few exceptions, devoted

to a very restricted range of subject-matter: the examiner concerned with any such periodical would make extracts from it for his card index, the shorter extracts by means of manuscript notes and the longer extracts by means of underlined press-cuttings. The more general periodicals would have to be circulated to a number of examiners, but in most cases it would be sufficient to arrange that a single primary examiner should read each issue, passing on to the appropriate colleague any subject-matter for which he could not himself account satisfactorily.

We have now to estimate the increase in staff which would be necessary in order to carry out a search of the extent and thoroughness proposed. Let us consider first the state of things which will prevail when all preparatory work has been completed and only current work is being dealt with. We must compare the work of dealing with the specifications published annually in the countries we have mentioned with the annual work done on British specifications by the present staff, and for this purpose we shall assume that an examiner spends one-fifth of his time in abridging and indexing, one-fifth in actually searching, and the remaining three-fifths in general examination, attending to amendments, interviews, and provisional specifications, preparing for hearings, improving the classification of search material, studying law reports and technical literature, and other miscellaneous duties. We shall assume further that the time spent in reading, indexing, and abridging a specification would be halved in the case of foreign specifications, for since no general examination is to follow in their case, a far less meticulous reading would suffice than in the case of British applications; and we shall assume that the rate of searching could be increased by increasing the number of sub-headings under which inventions are classified. There are no statistics to support these assumptions and they are open to debate, but it can be said in their favour that they appear reasonable, and further, that the actual time spent in these tasks can be controlled, since the standard of thoroughness is necessarily somewhat arbitrary.

These assumptions, then, give us a measure of the additional staff necessary to abridge, index, and search through a given number of additional specifications, and we must turn next to the statistics of specifications published abroad. In doing so, however, we must allow for duplicates, for (to give only two examples) 65 per cent. of Canadian patents are granted to residents in the United States, 7 per cent. to residents in Great Britain, and only 16 per cent. to Canadians: while of British patents 58·5 per cent. are indigenous, 28·5 per cent. are granted to residents in the other countries we have mentioned, and the remaining 13 per cent. are granted to residents in Sweden, Holland, and other countries not mentioned. (These figures relate to the year 1922.) It is safe to assume that every applicant will have applied for a patent in his own country, so that in estimating the number of foreign specifications per annum we may eliminate duplicates by counting only indigenous patents. The resulting figure will be a little too small, but sufficiently accurate for our present purpose. The latest complete statistics are for the years 1921 and 1922, and taking the mean of these two years as a basis, the annual output of unabridged indigenous published specifications is as follows: Canada 1610, South Africa (estimated) 340, India 263, France 10,394, Germany (estimated) 14,500, United States 33,941, Switzerland 1907, total 62,955. This total we must compare with the mean number of specifications abridged annually by the present examining staff during the same period. This figure is not accurately known, as not all specifications which have been abridged are published, but it cannot be far short of 19,000. At this rate the new material to be abridged annually will be about 3·3 times the material at present abridged annually, so that on the basis already explained we must increase the staff by 33 per cent. on this account.

New Zealand publishes about 360 indigenous patents per annum, Australia 2600, and Belgium 6000, but as these are already abridged the work of indexing them, at the rate of about 1 per fortnight per examiner, need not be taken into account. As regards the time spent in searching amongst foreign patents, the search material would be increased by the specifications published in the countries mentioned during the previous twenty years, the total being about 1,750,000, but to allow for duplicates this must be reduced, in the general ratio of indigenous to total patents, to 1,250,000. The latter figure must be compared with the number of British patents at present in the search files and covering a period of fifty years: that number is about 550,000, so that the search material will be increased by about 228 per cent., and on the basis we have adopted this means a further increase of 23 per cent. in staff to allow for the extra time spent in searching.

As regards literature, we pass over text-books and year-books because, as has already been pointed out, the staff can take these in its stride. Of the 1759 weekly, monthly, and irregular periodicals taken by the Patent Office Library, a considerable proportion is devoted to non-patentable subject-matter. Of those which contain search material it has been estimated that there are very roughly 18,000 issues per annum, a number of the same order as the number of British specifications filed per annum. To determine the average content of an issue would require a very elaborate research, for some periodicals, such as papers on wireless, contain a good deal of subject-matter, while others, such as agricultural

papers, rarely contain any reference to invention, and mere quotations from specifications could, of course, be ignored. On the whole, we shall be fairly safe if we say that one average issue contains as much subject-matter as one average specification, and at this rate we must allow a further increase in staff of 10 per cent. on account of indexing periodicals and 7 per cent. on account of searching them for the past twenty years. This gives a total increase of 73 per cent. in the staff, if we make no allowance for time to be spent in visiting factories.

We turn next to the preparatory period which must elapse before a universal search could be undertaken. The preparatory work would include (1) the improvement of the classification by increasing the number of headings; (2) the training of the new staff and reorganisation of the staff as a whole; (3) the abridging and indexing of the periodicals and foreign specifications published during past years. The last item is the most serious, and is the only one which we shall take into consideration here. If merely the additional 73 per cent. of staff were to be engaged some time before the institution of the search for the purpose of carrying out the work of preparation, there would be a delay of 12 years before the search could begin; so that in addition to increasing the establishment by 73 per cent. it would be necessary, in order to shorten this delay, to engage a temporary excess of, say, 23 per cent. of the then establishment. This would enable a search to be begun five years after the engagement of the new staff and covering a period of thirteen years: three and a half years later the full period of twenty years could be searched, and there would then be a redundant staff of 23 per cent., which would be absorbed by normal wastage in six or seven years. If a larger excess staff were engaged in the first instance the search could be undertaken at still shorter notice, but the capital cost would, of course, be increased. Against this capital cost must be set off, in any case, the saving due to the fact that the new staff would enter the office on the lowest rung of their salary scale.

Great Britain is spending some 466,000,000*l.* in the relief of unemployment, largely by methods admittedly uneconomic. Little is being spent in the relief of unemployment by the stimulation of new manufactures: on the contrary, the inventor has to pay for the whole cost of the patent system and to pay upwards of 75,000*l.* a year in addition, in relief of general taxation, whereas in 1924, the United States thought it worth while to spend on her patent office 408,602 dollars out of her exchequer. These facts must be borne in mind in considering the question of the annual cost of the proposed extended search. The chief item will be the annual salaries of the additional staff, and we must estimate these not at the initial rate of salary at which new entrants will take up their duties, but at the average taken over their whole official career, which will be considerably higher. We may assume that this average will be equal to that for the present examining staff, so that if we take the aggregate salary of the latter, excluding Hearing Officers, and multiply it by 0·73, we shall arrive at the normal increase in annual expenditure on this account. The result, as estimated from the Comptroller's Report for 1924, amounts roughly to 106,400*l.* per annum, and to this we may add 3000*l.* for clerical and other supplementary staff, 5000*l.* for purchase of documents, and 7000*l.* for buildings, furniture, and maintenance, giving a total of 121,400*l.* per annum.

How is this additional expenditure to be met? We may put aside for the moment the suggestion that the whole cost of the patent system might be transferred to a tax on the sale of patented articles, and turn to more conventional sources of revenue. In the first place, the Patent Office makes a profit of 75,000*l.* a year. There is no justification whatever for this profit: it is a direct tax for the discouragement of invention, and only persists because it has been no one's business to attack it effectively. We may assume, then, that this profit can be abandoned, as the community's contribution to the cost of a scheme which is to benefit it considerably. Next, the maximum normal life of a patent might be extended to twenty years instead of the present sixteen. For the older patents the yield from renewal fees in respect of the nth year is given in pounds sterling by the formula $1{\cdot}7 \times 10^{5-0{\cdot}072n}$ with such accuracy that we may venture to extrapolate for the four years following. We thus find an additional yield of 32,000*l.* per annum from this source, leaving 14,400*l.* still to be found. As some 17,000 patents are sealed per annum, the addition of 1*l.* to the sealing fee is consequently the only increase in fees which would be necessary in order to balance the Patent Office budget.

In order to justify the preceding calculations it is necessary to examine rather carefully the effect of an increase in fees on the annual output of inventions. It may be supposed that such an increase will tend to diminish the output of inventions, while the enhanced value of the patent when granted will tend to augment it, so that some doubt arises as to the net effect. All experience goes to show, however, that a small change in fees has a negligible effect. When the present very limited British search was introduced in 1905 and at the same time the sealing fee of 1*l.* was added to the cost of the British patent, no change at all took place in the annual number of applications, while, on comparing the triennium 1902–4 with the triennium 1906–8, we find that the annual number of complete specifications increased by 17·5 per cent., and the annual number of

patents sealed increased by 6 per cent. In the United States the application fee was increased in 1922 from 15 dollars to 20 dollars, the final fee of 20 dollars remaining unchanged and no *quid pro quo* being offered by way of increased value in the patent: yet if we compare the preceding years 1919–21 with the following years 1923–4, we find that before the change the United States had 2·54 times as many applications as Great Britain, and after the change 2·50 times as many, a drop of only 1·6 per cent.

Then again, the scales of fees are very different in Great Britain, Germany, and the United States; yet the output of inventions per head of the population is roughly the same in each of these countries. Thus in Great Britain there is an application fee of 1*l.*, a "complete" fee of 3*l.*, and a sealing fee of 1*l.*, or a total initial fee of 5*l.*, followed by an increasing scale of renewal fees for the fifth and later years. In Germany there was until recently an application fee of 6 gold marks and an examination fee of 8 gold marks, or a total initial fee of 14 gold marks (about 14*s.*), followed by an increasing scale of renewal fees from the second year onwards. In the United States there is an application fee of 20 dollars and a final fee of 20 dollars, or a total of 40 dollars (8*l.*), but there are no renewal fees at all. It might be expected, therefore, that the output of specifications would be very different in the three countries, yet if we take the official figures on this subject for the year 1923 and compare them with the populations as given in the latest Whitaker's Almanack, we find the following result: Applications per thousand of the population in Great Britain, 0·69; in Germany, 0·75; in the United States, 0·76. Complete specifications filed per thousand of the population in Great Britain, 0·40; in Germany, 0·38; in the United States, 0·39. All these figures go to show that within reasonable limits fees have very little effect on the output of inventions.

Mr. Churchill has said that an overwhelming case can always be made out for doing nothing. To institute an extended search such as we have described would be a large undertaking, and one which is sure to encounter the opposition of a good deal of natural inertia. Yet at the present time the British patent system is like an unfinished house, and if the figures we have given are of the right order, there is no serious reason why it should not be provided with its roof. We have shown that if a substantially universal search be undertaken within five years, the Patent Office can still balance its annual budget without increase of fees, except for the addition of 1*l.* to the sealing fee. It is for those who would benefit by the institution of such an extended search to press upon the Government the importance of this method of stimulating invention and industry.

Technical Problems of the Painter's Art.

Papers of the Society of Mural Decorators and Painters in Tempera. Second volume, 1907–1924. Edited by John D. Batten. Pp. v + 134 + 6 plates. (Brighton: Printed for the Society by the Dolphin Press, 1925.) 10*s.* 6*d.*

THE Society of Mural Decorators and Painters in Tempera is to be congratulated on having produced a volume of fascinating interest to those who are intrigued by the practical problems of the painter. The trouble is that it suggests so many queries, criticisms, and comments and opens up so many lines of inquiry that it requires a volume rather than a brief article for adequate treatment.

The painter of pictures and of wall decorations of to-day is in the unfortunate position of having lost invaluable studio traditions and having to rely on obscure and doubtful records of old methods of painting. The Tempera Society is, therefore, on the right lines in trying to bring together the experience of the painter, the information to be obtained from ancient records and the critical examination of old pictures, and in addition, the knowledge of the man of science. When all this has been done, the difficulty remains that there are many problems that can be solved only by the study of the slow but inevitable action of oxygen, of moisture, of light, and possible internal changes in the materials themselves through long periods of time.

All the publications in this volume are not new to those who are closely in touch with the subject, but they are none the worse for being reprinted, the papers by Mr. Neol Heaton on the frescoes at Knossos and by the late Sir George Beilby on lime putty being of special interest. Mr. Tudor Hart is also to be congratulated on his excellent recipes for preparing egg and size emulsions. He has had much experience in the use of these mediums. The systematic and scientific study of emulsions which is at present in progress in many laboratories must ultimately prove of the utmost value to the painter in the egg or tempera medium, and the modifications of it produced by the addition of drying oils and varnishes.

There are two urgent problems before the painter to-day. One is the problem of wall decoration under modern conditions of air laden with coal smoke and oxidation products of sulphur dioxide. It is admitted that painting with selected pigments mixed with water on wet lime has proved the most permanent method of wall decoration under suitable conditions, and it has an æsthetic value which is not obtainable by an oily medium no matter how much the oiliness of oil is suppressed by the addition of wax; but it