other media the subjective dichroism, if that is an apt description of the phenomenon, may be equally liable to accentuate the change in hue.

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² Bowen, E. J., *NATURE*, **152**, 476 (1943).

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⁴ Hellmeyer, L., trans. Jordan, A., and Tippell, T. L., "Spectrophotometry in Medicine" (Adam Hilger, Ltd., 1943).

⁵ Commission Internationale de l'Eclairage. *Compte Rendu* (Cambridge, 1931).

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⁸ Hardy, A. C., "Handbook of Colorimetry" (Mass. Inst. Tech., 1936).

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U.S. NATIONAL PATENT PLANNING COMMISSION

By SIR WILLIAM JARRATT

DURING the past few years there has been considerable criticism of the patent system both in Great Britain and in the United States, and the impact of war has tended to intensify it in both countries. In America the criticism has been much more violent than in Great Britain, and many Bills dealing with alleged abuses in the patent system have been introduced in Congress, though none has become law. In view of this acute criticism, President Roosevelt, by Executive Order in December 1941, established a National Patent Planning Commission authorized, in conjunction with the Department of Commerce, to conduct a comprehensive survey and study of the American patent system, and consider whether the system provides the maximum service in stimulating the inventive genius of the American people in evolving inventions and in furthering their prompt utilization for the public good; whether the American patent system should perform a more active function in inventive development; whether there are obstructions in the existing system of patent laws and, if so, how they can be eliminated; to what extent the Government should go in stimulating inventive effort in normal times; and what methods or plans might be developed to promote inventions and discoveries which will increase commerce, provide employment, and fully utilize expanded defence industrial facilities during normal times.

The first report of the Commission, which has now been published (U.S. Superintendent of Documents, Washington, D.C.) is confined generally to the mechanics of patent law, and the use of patents. In an introductory statement, the Commission points out that the strongest industrial nations have the most effective patent systems, and it expresses the opinion that the American patent system is the best in the world. It recommends, however, that the system should be adjusted to meet existing conditions without destroying its basic principles, and it makes numerous specific recommendations for amendment of the patent law of the United States.

Two questions connected with the patent law but of general interest were also considered by the Commission, namely, "Patents and the War Effort" and the "Protection of the Public Interest". On the first question the report states that specific inquiries addressed particularly to representatives of the War and Naval Departments failed to develop any serious instances in which the patent system had interfered with the prosecution of the War. The Commission expresses the opinion that the outcome of

the present War, more than any previous war, will depend upon a continuous superiority in science and invention, and that "never before has there been such a free exchange of scientific and technological knowledge and products of invention between our industrial concerns, our research laboratories, and our Government, and between our Government and our Allies. Such a liberal and complete exchange of scientific information and the secrets of industrial laboratories could not have been possible without the reassurance of the protection afforded by the patent system. The American people should recognize the part the system is thus playing in the free exchange of scientific information which is proving so effective in the prosecution of the war and which is so essential to ultimate victory." It is pointed out in the report that the existing law permits the American Government and its contractors to manufacture and use any patented or unpatented invention on payment of reasonable compensation, and the evidence taken by the Commission indicates that the law is adequate to protect the Government during the present national crisis. The British Government has, of course, similar powers conferred on it, and is given similar protection, by Section 29 of the Patents and Designs Acts, 1907 to 1942, which enacts the right of the Crown to use patented inventions and sets out the procedure for determination of the royalty or other compensation payable.

The Commission considered the question of the protection of the public interest from many points of view, the most important being whether it would be in the public interest to incorporate in the law a general compulsory licensing system, that is, a system under which every patentee can be compelled to allow his invention to be manufactured or used by another person on payment of a royalty or other compensation. It was felt that such a system would affect American needs adversely and would produce detrimental effects in foreign countries; and in consequence the conclusion is reached that it would not be advantageous to incorporate a compulsory licensing system in American patent law. The Commission was, however, impressed with the need of a degree of compulsion in certain fields, such as national defence, public health, and public safety, and it recommends in respect of these cases a system whereby in an action for infringement "the recovery of a patent owner shall be limited to reasonable compensation without prohibiting the use of the patented invention". It is interesting to note that this recommendation of the Commission would bring the American law into closer agreement with Section 38 A of the Patents and Designs Acts, 1907-42, of Great Britain, which enacts that, in the case of any patent for an invention for the preparation or production of food or medicine, the Comptroller of Patents shall, unless he sees good reason to the contrary, grant to any person a licence to use the invention, and in settling the royalty or other compensation payable, the Comptroller shall have regard to the desirability of making the food or medicine available to the public at the lowest possible price consistent with giving to the inventor due reward for the research leading to the invention.

On the general question of patents, the American people and their Government are urged by the Commission to recognize the fundamental rightness and fairness of protecting the creations of its inventors by the patent grant, and the Report states that the American patent system has: (1) encouraged and

rewarded inventiveness and creativeness, producing new products and processes which have placed the United States far ahead of other countries in the field of scientific and technological endeavour; (2) stimulated American inventors to originate a major portion of the important industrial and basic inventions of the past hundred and fifty years; (3) facilitated the rapid development and general application of new discoveries in the United States to an extent exceeding that of any other country; (4) contributed to the achievement of the highest standard of living that any nation has ever enjoyed; (5) stimulated creation and development of products and processes necessary to arm the nation and to wage successful war; (6) contributed to the improvement of the public health and the public safety; and (7) operated to protect the individual and small business concerns during the formative period of a new enterprise.

In view of a report so favourable to the present American patent system, it is of interest to note that the numerous important technical changes recommended by the Commission are almost uniformly of such a nature as to bring the American patent system more closely into accord with that of Great Britain.

TRICOTYLEDONY

By H. E. HOLTORP

TRICOTYLEDONY is well known as a sporadic occurrence in dicotyledonous plants, but it has apparently been treated in the past as a rare and somewhat trivial abnormality. I have been unable to trace any evidence of its being regarded as heritable.

During the last few years I have collected tricotyledonous seedlings from a number of plants, the more important including various brassicas, wallflowers, *Didymus sinensis*, carnations and carrots. These are mainly biennials, but I have also observed tricotyledony in certain annual dicotyledonous weeds and have more recently secured tricotyledonous tomatoes.

The observations, which I shall describe, have been made chiefly on brassicas (cabbage, savoy, cauliflower), for here the cotyledons are distinct in shape, substance and structure from the true leaves, even to casual inspection. This advantage is shared by tomatoes and carrots, but my investigations with these plants have not yet progressed so far.

I grew the first few tricotyledonous brassicas (generation *P*) to seed, isolated from other brassicas though not from one another. This seed yielded a considerable number of tricotyls in the *S*₁ generation. They were not counted, but there is no doubt that the proportion was higher than in the *P* generation. From this *S*₁ I selected seventeen of the most symmetrical tricotyls and again seeded them under similar conditions. The next generation (*S*₂) contained not only some hundreds of tricotyls, but also eighty tetracotyls—a form of which I had not seen a single example in thousands of brassica seedlings before this generation. Again I have selected and planted, in separate groups, the best tricotyls and tetracotyls for an *S*₃ generation in 1944.

It is thus clear that tricotyledony is a heritable character and one which can easily be changed by selection. Dicotyledony must then be adaptive and maintained by natural selection.

Pleiotcotyls are not alike in form, and are not all to be traced to the same kind of variation in the seedling

structure. Seedlings must be grown to a considerable size before adequate description and classification are possible.

In brassicas I have recorded three main types of tricotyledony, each subject to its own characteristic variation, under the headings: (a) *simple fission*, (b) *twinning*, complete and incomplete, and (c) *supplementation*.

Fission. This appears as simple splitting of a cotyledon, from the notch in the terminal edge along the central vein towards the petiole. The split varies in length, the most extreme case seen being one of two elliptical pieces of tissue with separate stalks joined to form one petiole. Seedlings in this class are viable and grow into healthy plants, but the split cotyledon is always distorted and lags behind its normal fellow in growth.

Twinning. The diagram represents various forms of twin cotyledons and their petioles as found, together with all intermediate forms, in the brassicas. The simplest form (1) is a two-notched broad cotyledon in which the central peak is quite commonly not prominent (1a). The mid-vein is noticeably forked. This form is very common and is the only one which (except for true tetracotyls) occurs often in both cotyledons of a seedling. The remaining types are not infrequent though the symmetrical tricotyl (A) is somewhat rare, just as is a perfectly symmetrical dicotyl.

Supplementation. This variant has been quite common in the progeny of tricotyls after selection. Three main classes have been distinguished.

(1) The seedling is apparently normal and dicotyledonous, but the first subsequent true leaf, instead of being of the characteristic rough type, develops as a third cotyledon identifiable by substance, structure, venation and petiole, and even, in many cases, by its shape. It is, however, never a normal cotyledon, for its shape never changes by growth once it has developed. It grows but little after development, unlike the normal true leaf. This third cotyledon replacing the first true leaf may be (a) nearly but not quite a normal cotyledon, (b) clearly cotyledonous but incomplete, varying from the major portion of a cotyledon down to little more than the central vein, (c) clearly cotyledonous but with one lower quadrant, or perhaps a little more, showing a serrated edge like a true leaf, or (d) rarely, with about one half cotyledonous and the other more like a true leaf.

(2) The third cotyledon appears in rare cases in place of the second true leaf, after a first normal true leaf has been produced. It may even appear in place of the fourth leaf after three true leaves. Though