Development of the Dyestuff Industry in India

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THE manufacture of most organic chemicals is contingent on the development of a well-organized dyestuff industry. Certain salient features as regards the existing Indian dyestuff industry and the way it should develop so that it might occupy the pride of place that it deserves in chemical industries in India are discussed. Development of the dyestuff industry in India is actively engaging the minds of both the Government and the public and several publications are now available which give a detailed picture of the problem. In particular, reference may be made to the Pai-Venkataraman report (1945), the Tariff Commission Report (1954) and more recently the August, 1955 issue of " Colourage ".

In the last five years, considerable progress has been made, thanks to the helpful Government tariff policies and import restrictions. As against the manufacture of Rapid Fast colours, stabilized diazonium salts and a couple of solubilized vat dyes which were then produced in a few rather small units. India will be producing by the middle of this year, a substantial portion of its requirements of some of the largely used cheaper soluble azo dyes of the direct and acid type, certain naphthols and azoic dyes of the direct and acid type, azoic printing compositions, the more important anthraquinonoid vat dyes and their solubilized derivatives, Sulphur Black and certain spirit soluble basic dyes. This rapid development appears at first sight highly satisfactory, but when one looks at the picture a little closer, one at once can discern several very disquieting features as regards the present and planned dyestuff industry. Unfortunately many of the dyestuff factories have started only due to restrictions of import of dyes rather than with the real desire to establish manufacture on rational lines on a long-term basis. The present indigenous production is largely confined to soluble azo, azoic and solubilized vat dyes and Fast Salts from imported penultimate intermediates. The Government of India is naturally concerned about these developments and is closely watching the situation and is contemplating taking effective steps aimed at the speedy and rational growth of this key industry.

In considering the question of a rational development of the dyestuff industry, one has to consider among other things the following:—(1) How to alter the present set up of the industry, built as it is on the insecure foundation of imported penultimate intermediates? In other words, how best to sponsor intermediate manufacture in India? (2) In the latter connection one could consider the ways and means by which the Government could persuade, if necessary, under pressure of suitable tariff policies, the Indian dyestuff manufacturers to undertake production of intermediates. (3) Should there be single large manufacturing unit such as the cartels in Western countries and in Japan or should there be several units many of which may be engaged in duplicating each other? (4) Should there be foreign collaboration in dyestuff production, and to what extent? (5) Rôle of research and pilot plant work in the dyestuff industries and elsewhere.

The most serious feature of the indigenous dyestuff industry is that manufacture is mostly confined to converting penultimate intermediates into dyes by

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one or two steps. Often these intermediates amount to as much as 75-94% of the factory cost of the dye. So that the foreign exchange saved by restriction of import of indigenously produced dyes is merely diverted in a large measure back again because of import of intermediates. The manufacture of dyes starting from coal-tar primaries such as benzene, toluene and naphthalene is of such vital importance to the national economy that the object of the tariff policy should be to assist the establishment of the industry in the national interest. The interests of the existing dyestuff industries should be safeguarded but only without prejudice to the integrated development of a sound and rational dyestuff industry based on coal-tar primaries. One of the conditions for granting protection for a dye must be its being based within a reasonable period from the indigenous manufacture of the necessary intermediates. There may be some justification for the manufacture of dyes from penultimate intermediates for the first few years, but the Indian dyestuff factories should also formulate and implement a plan for the manufacture of nearly all the intermediates. German and other dyestuff organizations which are in a position to manufacture intermediates cheaply are also large exporters of dyes to India and, as such, are unlikely to offer intermediates to India at low prices. In addition, the cost of the transport, packing, corrosive, explosive and hygroscopic character of certain intermediates are other factors which add to the cost of the imported intermediates. If one actually goes into the possibility of manufacture of the various intermediates which are used in indigenous production of dyes, one will find that many of these intermediates could, in fact, be produced economically in India. Besides by undertaking production of such secondary intermediates, a nucleus around which other organic chemical industries could grow would also be created. It is necessary to emphasise that a dyestuff industry based for all time on imported intermediates fulfils no national purpose. In the case of primary bulk intermediates, such as chlorobenzene, aniline, phthalic anhydride, etc., if private sector is not coming forward to undertake production due to uncertainty as regards their off-take by the dyestuff and other allied industries, the Government may consider the manufacture of these products on its own. Other specific intermediates should be made by the different dyestuff industries themselves for domestic consumption and also for sale to other users. The import duty on intermediates should be so levied that in addition to giving immediate relief to Indian dye manufacturers as at present, it should also encourage indigenous manufacture of intermediates. Thus special intermediate and certain bulk chemicals such as aniline, phenol, nitrobenzene, phthalic anhydride, pyridine, etc., whose manufacture may not be economical for various reasons, may be charged low import duty, whereas intermediates such as salicylic acid, naphthionic acid, benzanthrone, etc., whose competitive manufacture is feasible, should be charged the normal import duty. Import of intermediates produced in India in sufficient quantities should be banned and others which are produced in insufficient quantities may be imported but only to meet the short-fall. These restrictions should, however, be accompanied by price control.

Government Control :

Government should exercise an overall supervision of the dyestuff industry to ensure its stability in peace and war. Internal competition resulting in duplication of effort and wastage of capital already invested by way of idle plant should be prevented and co-operation among different dyestuff and intermediate manufacturing units in India should be encouraged. In certain cases, however, when dyes produced by the larger units

are sold at prices much higher than the imported dyes and where they are, in addition, not always up to the mark by way of standardization and uniformity of shade, it is permissible to have more than one unit manufacturing the same items provided these are produced in good quality and at lower prices. Some of the smaller units are likely to hold their own in competition with larger units in certain items such as soluble azo, azoic and solubilized vat dyes on account of their limited capital outlay and overheads, intimate knowledge of consumer requirements and their zeal in carving out an independent existence. They may also provide avenues for more employment. Even in countries such as Italy and England, where large combines exist, there are still small dyestuff manufacturers who also thrive.

In special circumstances discussed above, competition may be a good thing. In general, however, it is irrational to licence several factories in India making the same dye or group of dyes with the possibility of plant remaining idle, while large numbers of other dyes continue to be imported, since the dyestuff industry is vast comprising hundreds of intermediates and dyes.

Imported "know-how" and rôle of research:

Special care must be exercised in granting licences to firms depending on foreign co-operation for technical knowledge. Experience during the last few years has clearly shown the serious limitations of such co-operation. Undue reliance on foreign producers of dyes, who have large remunerative business in India for guidance in indigenous production is undesirable. Such foreign firms will offer to an Indian manufacturer no more co-operation than they are compelled to give by force of circumstances, and the Indian manufacturers will continue to be at the mercy of its foreign partners for an indefinite period. It cannot be emphasized too strongly that it is a dangerous illusion from which the Indian capitalists are suffering if they imagine that the Indian dyestuff industry can be built as a result of agreements with foreign dye manufacturers for the supply of technical knowledge. An important consideration in connection with a dyestuff industry is that it is dynamic and progressive, and difficulties in the manufacture of many dyes and intermediates are to be anticipated from day to day, unlike the production of chemicals such as caustic soda or sulphuric acid, the manufacture of a dye or an intermediate cannot be based permanently on so-called technical know-how obtained from abroad. Even where foreign collaboration has been sought, attempts must be made for self-reliance for future development and also in order to cope with the difficulties which usually arise even in routine production of dyes. The dyestuff industry, therefore needs to be manned by carefully selected chemists with adequate training in the chemistry and technology of dyes for its efficient working and healthy growth. The industry must have its roots in the soil and in the long run it can survive in competition with dyestuff industries abroad only if the country has a reservoir of chemists and chemical engineers with adequate knowledge and experience in research. The Indian dyestuff industries must maintain well-equipped and well-staffed laboratories and should, in addition, sponsor such activity undertaken elsewhere in Universities, Government and other laboratories. The expenditure on research and development by Imperial Chemical Industries in 1953 amounted to nearly 3% or more of the turnover (Annual Report of the ICI Ltd., for the year 1953).

A development council for dyestuffs and allied organic chemicals needs to be set up, which will consider subjects such as classification of dyes and intermediates

for the purpose of duty, restriction of import of intermediates and dyes, and suggest ways and means by which the industry could be developed speedily and rationally.

The growth of the dyestuff industry abroad is intimately bound with contributions of a fundamental character that organic chemists, such as Perkin, Hoffmann, Baeyer, Bohn, Schmidt, Ullmann, Linstead, Reppe, Maki and others have made. Their research work and the school of chemists that they created, coupled with the ready financial support from the Industry, are the main factors which have contributed to the eminent position that the British and German dyestuff industries occupy today. In context with our own dyestuff industry also, research on the following lines should be encouraged. The first factor is applied research, such as that which is necessary to work out processes from published reports on the German industry and patents. The second category of research, which should be undertaken, is of a similar nature and relates to the work on latest developments such as the Phthalogen Blues and other new dyes on which there is little published information. Work of this nature will probably be best carried out in the industry itself or elsewhere, where facilities for such work are available. Lastly, comes unfettered fundamental research work. In this category, topics such as the synthesis of newer dyes, the relation between colour, constitution and dyeing properties, development of new synthetic routes to known and unknown compounds, etc., may be included. Such research will best flourish in Universities and other academic institutions. These are nurseries of dyestuff chemists of tomorrow and in order that these infants get off to a good start, it is also essential to considerably strengthen the undergraduate teaching in chemistry.

If dyestuffs industry is to flourish in India, it is necessary that the indigenous industry and the Indian Government must give generous support to research work outlined above.