scientists, industry and administration, should be set up in all the Provinces and major States.

A suitable method for the exploitation of patents in respect of inventions made at either the national laboratories or universities and other research organisations should be evolved. A National Trust of Patents should be set up for the purpose of holding and exploiting all patents resulting from research financed by Government and those dedicated by individual scientists and by institutions, supported either by public funds or private endowments.

The institution of a Board of Standards for drawing up Indian standard specifications and the establishment of a technological institute on the lines of M.I.T. are recommended.

The Committee emphasises that research can yield its best results only when it is backed by a comprehensive industrial plan. This will not only inspire enthusiasm among research workers but will serve the practical purpose of indicating an order of priority in the various lines of investigation. The Committee accordingly recommends that the National Research Council must work in close co-operation with the department of Industrial Planning so that industry and research will each stimulate the other.

The Committee further emphasises the organic relationship between the different categories of research, *viz.*, agricultural, medical and industrial, and welcomes the constitution of the Scientific Consultative Committee in the Department of Planning and Development as a body expected to secure the necessary co-ordination at a high level. The Committee, however, considers it necessary to examine the possibility of bringing all the research activities of the various Government departments under the administrative control of the Member for Planning and Development.

RESINATED FABRIC LAMINATES

THE development of jute fabric-shellac laminates by the Indian Jute Mills' Association, an account of which appeared in this *Journal* last month (August 1945, pp. 202-03), provides an appropriate opportunity for reviewing briefly the basic work carried out in India on the subject of resin-impregnated fabrics which find numerous industrial applications. The work dates back to 1926, when successful investigations on a laboratory scale were carried out in the *University Chemical Laboratories, Lahore*. The commercial possibilities of the products attracted wide attention, and at least two Indian industrialists, one from Calcutta, and another from Cawnpore, came forward to finance the development work on fabric-shellac laminates, particularly for constructional purposes and for the production of containers. When the *Board of Scientific and Industrial Research* was inaugurated in 1940, the problem of resinated fabrics was taken up once again for detailed investigation. Metal containers were in short supply and there was an urgency for finding substitute materials. Resinated laminates of textile materials and paper suggested themselves as suitable substitutes, providing wide scope for the development of a large range of containers. A considerable amount of basic work, both on the methods of spreading resin on fabrics and on processing them, was carried out. Successful processes were developed for the manufacture of resinated laminates both of fabrics and of paper, in the laboratories of the *Board* (*cf.* Indian Patent Nos. 28277 and 28281) and handed over to industry and army for exploitation and development.

The application of shellac or other resins to fabrics, which is the primary process in the production of this class of materials, can be carried out in one or the other of the following ways: (1) dusting shellac or applying molten lac without the use of any solvent, but using only wetting agents, and passing the treated material between hot rollers to ensure uniform spreading of the resin, (2) impregnating with aqueous dispensions of powdered shellac, and (3) impregnating solutions of shellac, in solvents selected for their easy availability or cheapness or processing advantage. The resin coated materials are further processed to obtain laminates. They can be passed between hot rollers or compressed in hydraulic presses to obtain products of any desired compactness and finish. A variety of samples were prepared in the laboratories of the *Board of Scientific and Industrial Research* by employing various methods of spreading shellac and of processing the treated fabrics. For the production of unburstable containers (Indian Patent No. 28247) solutions of shellac in alcohol or ammonia were employed, and for jettison tanks, required by the U.S.A. Air Force, either dispersions of shellac in water, or molten lac with extenders or wetting agents, were preferred. It is obvious that for the production of laminates on a commercial scale, one or the other of the methods investigated in the laboratories of the *Board of Scientific and Industrial Research* or modifications thereof, will have to be employed. Wartime successes have been determined largely by the availability of processing materials and manufacturing equipment, and recourse had to be taken often to alternate processes as expedients, such as the *one* developed by the Indian Jute Mills' Association, for securing immediate results. As the emergency conditions, do not obtain any longer, future developments will be determined largely by the quality of the products and the efficiency of the processing techniques. The laminated boards have already found use in the production of a large number of useful products (*cf.* Indian Patent No. 30680). We are glad to learn that the processes developed by the scientists in their research laboratories are being increasingly utilized by industry. This is to be welcomed. History teaches us that every development of an enduring character originated in a research laboratory. It is appropriate that the *Council of Scientific and Industrial Research* has been pursuing an enlightened and liberal policy with regard to the processes developed in its research laboratories, which aims at providing all possible assistance to industry. Further applications of resinated laminates envisaged by the work of the *Council* will be watched with keen interest.