

ponding *n*-butyl derivative (pale liquid; Hg: found, 44.9 per cent; calc. (C₁₃H₁₈O₂SHg), 45.7 per cent) were obtained in practically quantitative yields from ethylmercuribromide, sodium hydroxide and the thiosalicylic esters. Both compounds are insoluble in water but readily soluble in lipid solvents, an obvious advantage when applying the materials to paints and lacquers; moreover, the methyl ester can be obtained in a pure condition much more conveniently than the sodium salt.

The action mechanism of the sodium salt as a fungistatic and fungicidal agent is uncertain. It has been proved to act at a distance, but it is improbable that a sodium salt of this configuration would possess a significant vapour pressure. Kharasch has pointed out that aqueous solutions of the sodium salt tend to break down to ethylmercurihydroxide (III) and sodium thiosalicylate, the latter, in the presence of oxygen, passing irreversibly to the dithiosalicylate (IV). Thus the access of water vapour, providing conditions for fungal growth, might also favour a similar breakdown of the lacquer-incorporated mercurial, or even further to more volatile substances.

¹ Scientific Liaison Bureau, Australia. "Report on the condition of Service Material under tropical conditions in New Guinea."—Restricted—October 21, 1943.

² Scientific Instrument and Optical Panel, Ministry of Munitions, Australia. "The Tropic Proofing of Optical Instruments, Part I", July 1944.

³ O.S.R.D. Reports, U.S.A., No. 1833, July 1943, No. 4188, September 1944.

⁴ Reports of Optical Instruments Panel of Conference on Tropic Proofing, Controller of Chemical Research and Development, Ministry of Supply, Great Britain, papers issued under MG/OPT.

⁵ Hutchinson, W. G., in O.S.R.D. Report, No. 1833, July 1943.

⁶ Campbell, Major I. G., "Fungi in Optical Instruments under Tropical Conditions, and Possible Control", D.M.E. War Office, Great Britain, December 1944.

Simmons, R. T., and Woods, E. F., *Austr. J. Sci.*, **8**, 108 (1946).

⁸ Kharasch, M. S., U.S.P., **1**, 672, 615 (1928).

⁹ Waldo, *J. Amer. Chem. Soc.*, **53**, 993 (1931).

Comments by Dr. J. W. J. Fay, Ministry of Supply

I AM glad to have seen these two interesting papers, and take the opportunity of offering the following comments on British experience.

Two factors have militated against the use in Britain of M.T.S. on other than an experimental scale.

First, in the design of new instruments, or the modification of old types, the tendency has throughout been towards the improvement of sealing and of packaging. This, coupled with the use, if necessary, of a desiccating agent, is considered the ideal at which to aim, since the need of a fungicide is eliminated.

Secondly, in connexion with the protection of old instruments, including ex-civilian surrendered types of unknown history, the incorporation of volatile fungicides was not without its dangers. Thus, various substances tried gave rise to such troubles as softening of cements, corrosion and filming. Nevertheless, the need for a suitable fungicide was recognized and many were tested.

Among these, M.T.S., of which the vapour pressure is extremely low, was found to depend for its action upon a decomposition in the presence of moisture, giving rise to a volatile mercury compound which is presumably the active agent. The decomposition was found to be accompanied by a corrosion danger, and in the lacquers we have used this danger has not yet been overcome. We are, however, now awaiting samples of Australian lacquer for test.

In general, therefore, even in the case of old-type instruments, our attitude has been to improve sealing and methods of servicing, packing and storing, and the tendency is in any case to regard the incorporation of a desiccant as preferable to the use of fungicides.

With reference to the New Guinea experiments, we have had the opportunity of examining a few of the instruments tested, and our view is that while the results afford evidence of the superiority of the new complete Australian 'tropical treated' method over the old one, it is not entirely clear, in the absence of true controls, how much of the improvement is to be ascribed to the use of M.T.S. For this reason, we shall look forward with great interest to the results of the long-term New Britain experiments in which rigid controls are apparently included.

FIBROUS PROTEINS

BOTH the man of science and the technologist are greatly indebted to the Society of Dyers and Colourists for its enterprise in organising a symposium on fibrous proteins so soon after the end of the War. The meetings were held at the University of Leeds during May 23–25, and among the three hundred in attendance were visitors from Australia, Belgium, France, Holland, Norway, Sweden and the United States. Full details of the proceedings will appear in a volume which is to be issued shortly by the Society. Some thirty papers were read and discussed: they covered subjects ranging from the structure of protein molecules to the production of synthetic protein fibres; from the thermodynamics of water adsorption by proteins to the production of an unshrinkable finish on wool. No distinction could be drawn between science and technology, for new methods of examining the structure of wool and silk were shown to give results with a profound bearing on recent hypotheses concerning the structure of protein molecules in general, and technological advances were found to be the direct outcome of a clearer understanding of the nature of the proteins.

Our present conception of the structure of protein molecules is based to a large extent on the results of X-ray analysis in the hands of Prof. W. T. Astbury and his collaborators. In their view, proteins of the keratin-myosin-epidermis-fibrinogen group are characterized by long-range elasticity and the reversible α - β intramolecular transformation. When wool fibres are steamed for two minutes at 50 per cent extension, they contract to a length 30 per cent less than the original length on release in steam. Supercontraction of this type has been referred by Astbury to more severe folding of the polypeptide chains than in the case of α -keratin. Dr. K. M. Rudall pointed out at the time when this hypothesis was advanced that folding of this type should be revealed by a cross- β pattern on examination by X-ray methods. A cross- β pattern had been obtained by Astbury in work on the denaturation of egg-white in boiling water, and has since been observed in a number of other cases.

In his paper on the structure of epidermal protein, Rudall showed that a cross- β pattern could be obtained with strips of cow's lip epidermis which had been supercontracted in water at 100° C. Similar behaviour was observed with films of the protein extracted from the epidermis with 50 per