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| Tomato Leaf-mould | E. E. Chamberlain, Vol. 45, No. 3. |
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## LEATHER RESEARCH.

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The manufacture of leather has long been regarded as an art rather than a science. As more information has been obtained about the components of leather—*i.e.*, about the materials which constitute hides and about those which serve for tanning purposes—the art has rapidly acquired a scientific basis. Rule-of-thumb methods, which originally controlled the different processes, are gradually being replaced by definite scientific methods of control.

The lack of information of the chemical structure of collagen or true hide, and of the different tanning-materials of either vegetable or mineral origin makes fundamental research on the problems of leather-manufacture long and difficult. A much simpler method of attack, and one which may give results of great value to the industrialist comparatively quickly is that of associating definite results with definite causes. This method is not quite so simple as it first appears to be.

Leather is the resultant product of a whole chain of processes in which any one defective link affects the whole chain. There, however, the analogy ends, for the alteration of any one link in the chain demands that modifications must be made in most of the others before the new one fits in to its best advantage. As the number of processes in the manufacture of leather is large it will be realized how difficult it is to introduce rapidly any improvement before its far-reaching and uncertain effects in the whole series are fully understood.

Under modern conditions of manufacture, progress in the leather industry is intimately connected with scientific methods of control. In the past definite control was possibly not so necessary because time, the healer of many wounds, was allowed to mask or obliterate the faults which arose from a lack of knowledge of factory technique. Those firms which are not only consolidating their position, but extending their activities, are those firms which not only realize the possibilities of science, but take advantage of them.

### Chrome Leather.

In the year with which this report deals, some of the processes which are used in the manufacture of chrome leather have been examined from the point of view mentioned above—*i.e.*, cause and effect. Chemical analysis has in the past helped the chrome-tanner materially, but the time has come when other methods must be employed. One of these is the microscopic examination of the fibre-structure of the skin at the various stages in the process of manufacture. Fibre-structure is probably more closely allied to the qualities of the finished leather than is the chemical composition, as revealed by the present system of analysis.

To enable these investigations to be carried out a freezing microtome and a photomicrographic camera have been installed. These have been a valuable aid towards making all reports more clearly understood, through a visual presentation of the points to which attention is specially directed.

The processes of chrome-leather manufacture which were investigated in their relation to the finished leather were soaking, liming, pickling, tanning, and mordanting. It was realized that in the short space of time available a really comprehensive investigation of each of these processes was not possible. The two most desirable features of chrome upper leather are probably rubbery "feel," and fineness of the break after graining. By choosing these two desirable features as the qualities which might be affected by alterations of the different processes the investigation was made much shorter. Several very interesting conclusions were obtained, and these have been tested in different tanneries. The results of these trials have once more illustrated the point mentioned previously that each process is only part of a co-ordinated whole, and that it is not safe to alter any one part without a corresponding alteration in some other part. For example, an alteration in processing was made in one tannery successfully, and the same alteration in other gave an entirely different result.

It may be stated that as a result of the year's work on chrome tanning the quality of this type of leather made in the co-operating tanneries of the Research Association has materially improved.

An investigation was carried out to determine whether it would be possible to institute a microscopical method of checking the processes of the manufacture of sole leather. The difficulty encountered was that small weekly variations were established, but it was possible to determine whether these were due to differences in the hide or in the processes employed. Whilst the result of the investigation was not successful from the point of view of control, more detailed information as to the actual conditions prevailing in the tannery was obtained.

Contact has been maintained as far as possible with the various users of New Zealand leather. This is an important part of the work carried out as it not only establishes the points in which the leather fails to meet the requirements of the user, but also indicates the conditions under which it fails. This is often a very necessary consideration, and it may be more profitable to suggest alterations in the conditions of manufacture of the articles made from leather than in the manufacture of the leather itself.