solution and then treated with a larger quantity of this solution, the substance unites to a plastic mass which can be drawn out into sheets and strings, but is not adhesive. From this it is evident why Ritthausen, in washing flours which gave a fluid gluten, obtainable only in small quantity and with great difficulty, found that the addition of calcium sulphate to the wash-water rendered the gluten much more coherent and easily obtainable. The gliadin is thus proved to be the binding material which causes the particles of flour to adhere to one another in forming a dough.

But the gliadin alone is not sufficient to form gluten, for it yields a soft and fluid mass which breaks up entirely on washing with water. The insoluble glutenin is probaby essential by affording a nucleus to which the gliadin adheres and from which it is not mechanically carried away by the wash-water.

It might be supposed that this insoluble glutenin, which so nearly resembles gliadin in composition, results from an alteration of the latter, brought about by the action of the mineral or other constituents of the seed or of the water. This is not probable, for the same amount of gliadin is extracted from flour directly by treating it with alcohol of 0.90 sp. gr., as is obtained from the gluten itself, and also the same amount is obtained after extracting the flour completely with ten per cent. sodium chloride solution, and then with alcohol.

The behavior of the gliadin towards ten per cent. sodium chloride solution shows why no gluten was obtained by Weyl and Bischoff from flour extracted with this solvent. The gliadin had under these conditions no ahhesive qualities, and therefore was unable to bind the flour into a coherent mass. If, however, the salt solution is added in small quantities, and the flour kneaded and pressed, the particles are brought together and then adhere tanaciously.

DEGRAS.[1]

BY CHARLES S. BUSH.

IN this country, the term "degras" is generally applied to the grease or fatty matter recovered from the water in which wool has been scoured; in various portions of Europe, the term

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is employed not only in connection with grease extracted from the waste-water of wool-washing establishments, but also to designate the oil or fatty matter recovered at chamois-skin manufactories.

It is my intention at this time to call your especial attention to degras of the first named type, which, I may say, has but one source; namely, the water in which wool has been scoured.

The process of producing or manufacturing degras (or so-called wool grease) is, comparatively speaking, a simple one and may be described as follows: The soapy liquid remaining in the scouring tubs or machines, after the wool has been scoured, is run off into a large shallow tank or pond and allowed to settle; the greater portion of the grease rises to the surface, but more or less adheres to the dirt and other foreign matter and is carried to the bottom. From time to time, the material which has accumulated at the bottom of the tank or pond is removed, and the grease, or a large portion thereof, is recovered. After the settling process is completed, the liquid is pumped into tanks and allowed to stand for a few days. The next step in the process is to add sulphuric acid. This withdraws the alkali used for washing the wool and breaking up the soapy emulsion, causes the grease and water to separate (this is commonly called "cracking the grease"). The contents of the tanks are then transferred to filter beds where the water is allowed to drain off, the grease and sediment being left behind in the filters. The filter beds may be composed of sawdust or other suitable material. The substance remaining in the filters is then transferred to pieces of bagging and shaped into flat packages. A large number of these packages are placed in power presses and steam applied in order to raise the temperature sufficiently to cause the grease to ooze out and flow into tanks provided for the purpose. Any water which may find its way into the presses will naturally pass into the tanks with the grease, but separation takes place at once and the hot degras, forming a layer on top, is readily drawn off into the barrels. After the degras has been allowed to cool, it is of about the consistency of soft tallow, and in such form is ready for market.

The color of the substance under consideration is yellowish-

brown; it has a disagreeable odor which is not easily described. This odor is due to two causes; first the presence of foreign substances, as dung and urine products, which are still present while the grease is being melted; second, the presence of certain volatile fatty acids which were present as potash salts in the wool, and, being soluble in the grease, remain with it after treatment of the emulsion with strong acid.

The individual character is given to wool grease by an interesting substance called cholesterin, the chemical formula of which is $C_{26}H_{44}O$. This substance is soluble in hot alcohol but precipitated in cold, in the form of tabular crystals somewhat resembling silver nitrate. As the extracted wool grease does not precipitate in the crystalline form, I think it is fair to infer that the cholesterin exists in the wool fat chemically combined with the fatty acid, and not in a state of mixture. Cholesterin is not saponifiable but it makes a most perfect emulsion, taking up 120 per cent. of water and remaining in that emulsive state for years; a sample in my possession is three years old and still shows no signs of separating.

Degras finds its chief use in the finishing of leather, superseding tallow for that purpose to a great extent, on account of the low price of the former and because of its penetrating and emollient nature. Degras is used to some extent in the manufacture of wool-oils, rope-oils, etc. Many persons have been led to believe that this waste material, which has polluted our streams and formed a subject for much discussion, is used extensively in the manufacture of soap. Some months since, an article appeared in one of our local newspapers from which I quote the following words: "In regard to finding a market for this material, I think it possible to sell it to almost any soap manufacturer. A large business is done in New York in this, and at a price of 2 to $2\frac{1}{2}$ cents per pound." To say the least, this newspaper statement is misleading. Degras has been used to a slight extent by a few soap manufacturers but the results have been anything but satisfactory. Cholesterin is unsaponifiable and a positive injury to the soap. It has no detersive properties and is undesirable as a "filler." There is no doubt that new outlets for this interesting product will be discovered eventually.