truth of Huber's declaration that, when ants had been separated for four months and then returned to their nest, they were recognized and caressed by their companions, Sir John found that, though there was no sign of recognition when a separated friend was returned to the nest, he was never attacked, while a stranger being put in was always driven out or even killed. As regards the senses of ants, though Sir John believes they hear, yet they take no notice of any sound he could make; and though they undoubtedly see, they cannot have very keen sight. His experiments do not confirm the suggestion that ants are able to communicate to their companions where food has been discovered; for when single ants had been placed on food, and, going back with some to the nest, were returning with companions to the store, in every case where these pioneer ants were captured their companions wandered about helpless and failed to find their way to the spot.

A NORWEGIAN TIMBER CHURCH.

There exists in Norway, says the *Building News*, a series of wooden churches of great interest to the antiquary. The subject of our engraving is, perhaps, the most curious of them all. Situated in the neighborhood of some of the wildest and most romantic scenery in the country, it is of strange and fantastic design, and the carved pinnacles at its angles give it the appearance of a Chinese pagoda rather than a Christian church. The building is entirely of pine, the roof and walls being covered with tooth-shaped shingles, protected from the weather by layers of pitch. It possesses nave, chancel, and apse, the roof of the latter forming a most curious feature—resembling a large beehive. A covered way, about 3 feet wide, runs all round the church. It is believed to have been erected in the 11th or 12th century, and the resemblance which the mouldings and capitals bear to English architecture of that date fully bears this out.

ANCIENT TIMBER CHURCH IN NORWAY.

The Lesson of a Life.

In December, 1845, in the Department of the Vosges, Xavier Thiriat, a boy of ten, accompanied four young girls of about the same age to the church. They had to cross a brook, over which was placed a single loose plank. The boy crossed safely, the first girl who attempted it fell in. The boy jumped in, pulled her out, and then, walking in the water, guided each of the girls across. Some time was lost by this, and the party reached the church late. Xavier, ashamed of being late, did not go up to the stove, but kept behind. He reached home chilled, a dangerous disease followed, by which he was left a complete cripple for life; his only mode of moving about was on hands and knees, so completely were his legs paralyzed and distorted. Coming of very poor people, there was every prospect that Thiriat would be a heavy charge to his family and a wretched burden to himself. Instead of this, he reached manhood bright, cheerful, and intelligent. Reading all the books which he could lay hold of, he was soon the best educated man in his district, and rapidly acquired extensive influence, which was always used for good. He induced the young people to read and to study. Some contributions to the local newspaper, the *Echo des Vosges*, attracted attention and made him known, the result of which was that further intellectual opportunities were extended to him. He made himself a good botanist, meteorologist, and geologist, instructed others in these branches, and procured the foundation of several local libraries. He could not, however, be satisfied without achieving his complete independence and earning his support. He obtained the position of manager of the telegraph at a neighboring town, was made secretary to the mayor, became a favorite correspondent of several agricultural papers, and received the highest reward of the French Franklin Society—its gold medal.

All this was accomplished by native force of character and strong religious feeling, under circumstances not merely adverse, but at first absolutely hopeless. A horrible deformity, intense suffering, absence of instruction, crushing poverty—all these disabilities were overcome unaided, and this ignorant and crippled lad made himself the light, intellectual and moral, of his whole district.—*Public Ledger.*

Sumac.

Sumac (called by botanists *rhus coriana*), owing to the large quantity of tannic acid which it contains, is extensively employed in dyeing, tanning, in the manufacture of writing inks, etc. Thousands of tons of the dried and powdered leaves and stems of this shrub are annually consumed in the arts. It comes into market in the form of a fine yellowish powder, its chief source being the island of Sicily, where it is extensively cultivated. Its present market value in New York is: Fine Sicilian powder, $120 per ton; Virginia, $65 per ton. The poorer qualities sell for from $50 to $60 per ton. Various attempts have been made to reduce the great expense attending the transportation of the crude sumac for market by extracting the tannin directly upon the ground where the material is harvested, and sending the extract into market in a concentrated form; but it has been found that such extract cannot be kept for any length of time, as it is liable to a species of fermentation which converts the major part of the tannin into gallic acid, and greatly impairs its marketable value.

Diamond Cutting by Girls.

This is another new trade for women, and we wonder that those who are seeking new outlets for feminine work have not thought of it long ago. Diamond cutting is the mechanical labor which above all others requires that extreme delicacy of touch and nice perception of form, color, etc., which is inborn in the majority of women, but which nearly all men are compelled to use much practice to acquire. Diamond cutting involves no severe physical labor, except possibly in the grinding of the stones together to form the facets. That branch, requiring powerful wrist muscles, may be left to the men; but every other process, from the splitting of the rough gems up to the final polishing, is fully within feminine capabilities.

Twenty-three young women are now successfully working at this trade in Roxbury, Mass. and the credit of teaching them is due to Mr. Henry D. Morse. That gentleman has hitherto employed trained diamond cutters from Amsterdam; and by carefully watching them he became quite an expert himself. The Amsterdam cutters are nearly all Israelites, and they are exceedingly chary of imparting their knowledge to strangers, preferring to teach only their sons or family relatives, or at best Dutch boys of their own selection. It is their invariable rule to decline to take apprentices except under the above restrictions; and accordingly, when Mr. Morse requested his workmen to teach American boys, they peremptorily refused. Anticipating this result, he had secretly established a shop in Roxbury, and there had taught six or eight girls. Consequently, when his men mutinied, he discharged them forthwith, and replaced them by his female employees. The Yankee girls are now cutting and polishing diamonds in superior style.

The Dairy Interests of the United States.

The fourth annual convention of the National Butter and Egg Association was recently held at Chicago, Ill., and was very largely attended. The President, Mr. George E. Gooch, of Chicago, spoke of the benefit which the trade derived from such meetings, and of the magnitude of the interest, adding that $6,000,000 worth of butter was sent eastward from Chicago during the past year. The butter and cheese produced in this country last year reached a value of $124,000,000, and the milk sold in addition was 325,000,000 gallons. He also called attention to the prizes, value $1,500 gold, to be given for the best exhibits of butter and cheese by the Royal Agricultural Society of England, at their meeting to be held in Liverpool next July, the competition being open to all the world. The shipment of butter in vessels provided with refrigerator rooms, such as are already used for conveying beef to Europe, was suggested; and the growing trade in spurious butter under various pretentious names was discussed and condemned. Many of the members present urged that legislation should put a stop to the sale of these compounds as butter. Legislation cannot stop the manufacture of any article not proved to be pernicious to the public; but it might properly compel the seller to designate, on his package, of what the contents consist, so that the purchaser may not be deceived.

The Manufacture of Ammonia Salts from the Ammoniacal Gas Liquor.

The following method of preparing ammonia salts from the gas house waters, by means of soda salts, is particularly interesting, since it produces a pure carbonate of soda at the same time, and is both cheaper and easier than the Solvay soda process; and it involves no waste products. Dr. G. T. Gerlach, of Kalk, near Deutz, is the inventor of the process.

If sal ammoniac is the salt we wish to obtain, chloride of sodium (table salt) is of course the source of the chlorine, and the process resembles in some respects that of Solvay. The crude ammoniacal liquors are first distilled and yield carbonate of ammonia: in this is dissolved a quantity of common salt, equivalent to that of the carbonate of ammonia present. This solution has a gravity of 1·22. Into it is passed a current of carbonic acid gas, as long as any bicarbonate of soda is precipitated. Some sulphuretted hydrogen is thus expelled, which had passed over in the form of sulphide of ammonia. The precipitated bicarbonate of soda is removed and dried; and on heating, enough carbonic acid is expelled to serve for the next operation, monocarbonate of soda remaining. The liquid contains chloride of ammonia with some undecomposed carbonate of ammonia, with chloride of sodium and a little dissolved bicarbonate of soda. The carbonate of ammonia is recovered by distillation, the sal ammoniac and salt by crystallization after concentration. Instead of being decomposed by lime, as in Solvay's process, the sal ammoniac is sent to the market. If, however, it is desired to make *aqua ammoniæ*, some of this mother liquor is treated with lime and distilled.

If sulphate of ammonia is the product desired, the sulphate of soda is employed to decompose the carbonate of ammonia. Either crystallized Glauber salt is dissolved in the concentrated solution of carbonate of ammonia, or the anhydrous sulphate (salt cake), obtained in the manufacture of nitric or hydrochloric acid, is dissolved in a less concentrated solution of the ammonia salt. Equivalent proportions of the salts are employed, and the solution has a specific gravity of 1·3. Carbonic acid is passed into this solution until the bicarbonate of soda ceases to be precipitated. The latter salt is removed and dried as before. In solution are sulphate of ammonia, undecomposed carbonate of ammonia and sulphate of soda, with a trace of dissolved bicarbonate of soda. The carbonate of ammonia is recovered by distillation, the other salts by concentration and crystallization.

When nitrate of ammonia is the product required, the carbonate of ammonia is decomposed by means of Chili saltpetre, or nitrate of soda. The reactions are the same as before, the chief products being nitrate of ammonia and bicarbonate of soda.

It is evident that the use of chloride, sulphate, and nitrate of soda, instead of the corresponding acids, must be both cheaper and more convenient, while the simultaneous production of soda ash still further increases the profits. The separation of the salts which remain in solution is an easy matter, owing to their unequal solubility. In the first case we had common salt and sal ammoniac; on concentrating to a certain point the former will crystallize out of the boiling solution, and after this is removed the solution is allowed to cool, when the latter will crystallize out. Sulphates of ammonia and soda crystallize from solution as a double salt containing two equivalents of water of crystallization. But on evaporating a solution of these salts to a certain point, the anhydrous Glauber salt will separate, and sulphate of ammonia will remain in solution. The anhydrous Glauber salt is not pure, and is employed for decomposing a fresh quantity of carbonate of ammonia. In separating table salt and Glauber salts at a boiling heat, care must be taken not to burn the salts, and on a large scale steam heat should be employed.

A GOOD waterproof cement may be made by mixing glue 5, rosin 4, red ocher 2 parts, with a little water.