

being increased from the main flock being in full view, and thus stimulating the natural ovine tendency to rejoin companions. In several cases, on the dog nearing the three sheep, the mumble and independent wethers scattered and galloped in different directions out of sight, when the collie, after an honest attempt to bring them together, seemed to conclude that it was hopeless to complete the task in twenty minutes, so he philosophically dropped it altogether and trotted back to his master. Some of the triads of wethers behaved in a manner more in accordance with the gregarious traditions of their race, and, when in addition to hanging together, they happened to start in the right direction down hill, the first portion of the dog's work was easily and speedily done. The marvellous sagacity of the breed was seen when the sheep were near the pen and the dog had to overcome their natural disinclination to enter. Not only did the animal in this position obey every sign and word of his master, but he would exercise what might almost be called his own reason and discretion in the mode of carrying out his master's wishes in a fashion that was astonishing. Success, however, depended altogether on the behaviour of the three particular sheep. One famous dog named Handy, which won the champion prize two years running, in Wales, was very unfortunate in this respect. He succeeded in getting them to the pen in splendid style, but nothing could induce the brutes to enter. They broke away a score of times, and, after a display of ability worthy of his high reputation, poor Handy failed to accomplish the task within the twenty minutes. The most successful performance was that by a slut named Maddie, belonging to Mr. John Thomas, of Bala. Favored by tractable wethers, she succeeded in a little over four minutes. A famous dog named Boy did the work in seven and a half minutes. Another, called Laddie, took nine minutes, and two others, Pentre and Twed, twelve minutes each. There were nineteen entries for the All-Aged Stakes, and these were tested. Mr. Lownd's Laddie perhaps showed the highest training, by the way in which he followed every motion of his shepherd's hand; now circling round, now creeping nearer and nearer to the flock, and then sitting on his haunches until the signal to move again was given. The man who worked the dog had not seen him for twelve months. But the triumph in point of quickness was reserved for Mr. Jones' young dog, Boy, who brought his charge to their pen in seven minutes and a half. Mr. Thomas' Maddie also penned her sheep very well. It is curious that all these were Welsh dogs belonging to Welsh graziers, but then the great home of collies—Scotland—was not represented. The English dogs nearly all managed to let their sheep wander in freedom 'over the hills and far away,' but Mr. J. Gwendolym's Tool got his lot together very well, and penned them cleverly.

#### Sand for Building Purposes.

There is a certain test which a child may employ without failure by way of ascertaining whether sand is really good or whether it is second, third or fourth rate. Yet not one person in a thousand has ever heard of the test. Take a handful of sand in one hand, squeeze it into a ball, and if it falls apart as soon as the pressure is removed, it may be counted as good sand. On the contrary, if the mass continues to remain in a roll, it may be of second, third or fourth quality. But one thing will always be found reliable, that good sand, even when wet, will not remain packed in a ball or lump. In order to be well adapted to the making of mortar, concrete, or those kinds of artificial sandstone into which lime enters as a component, sand should be sharp, clean and free from salt. Sharp sand is that which has ragged, angular edges, and has not been water-worn and rounded. Sand of which the particles are rounded never forms a strong mortar, the reason being perfectly obvious. The strength of the mortar depends in a large measure upon the adhesion of the lime to the particles of sand. Now, this adhesion is greater or less, just in proportion as the extent of surface of the particles of sand is increased or diminished; and, since the surface of a round or globular mass is less, in proportion to its contents, than that of any other figure, it follows that just so far as the particles are rounded, just so far will their surface be decreased, the adhesion between them and the lime lessened, and the strength of the mortar diminished. Clean sand is free from particles of dust, clay and similar matters. The reason why sand should be clean is this:—Mortar is in reality a mass of stony fragments, cemented together by lime or other material. The strength of mortar depends not only upon the strength of the cementing material, but on the strength of the materials that are cemented. Clay and ordinary dust and dirt have but little strength, either as a cementing material or a material to be cemented. We speak now of clay in its ordinary condition, mixed with the lime but not combined with it. In some forms, it is true, the materials of which clay is composed will make strong blocks. The hardest gems, next to the diamond, are pure alumina. Emery or corundum, which, from its great hardness, is used for grinding and polishing, is made of the same material. It is also known that when certain kinds of clay are mixed with lime or chalk, carefully burnt and then ground, they form strong and valuable mortars or cements. But the learner must not allow himself to be misled by these facts. Alumina may be strong in some forms and weak in others, just as carbon when in the form of the diamond is the

strongest substance known, while when in the condition of charcoal or lampblack, it is one of the weakest. A mass of charcoal fragments, cemented together would be just as strong as the weak charcoal. A mass of flinty fragments would be just as strong as the cement—the weakest link determining the strength of the chain in both cases. There is no use, therefore, in trying to get a strong cement and then employing it to bind together particles which have no strength in themselves.

#### Fish Culture in Canada.

There are now seven public establishments in Canada for the artificial reproduction of fish. The first of these was erected at Newcastle, Ontario, and subsequently three others were established at Gaspe, Restigouche, and Miramichi. Last year three additional fish-breeding houses were built at Sandwich, in the Detroit River; at Tadoussac, on the Saguenay river; and at Bedford, on the Sackville river, near the Bedford Basin, a few miles from Halifax. The whole number of young fish distributed last spring from these establishments was 1,700,000. The Newcastle, Ont., establishment did the best work, and sent supplies of young salmon and white-fish to a large number of streams in that section of the country. Mr. Whitcher says that great numbers of salmon, which have been bred at the Newcastle establishment, are now to be found in Lake Ontario, into which they have escaped from the breeding houses. Large schools of them are frequently seen by the fishermen, and considerable numbers are taken in the nets used outside for lake trout. There can be little doubt that in the course of a few years all the Canadian streams emptying into Lake Ontario will be fully stocked with salmon. Operations this year at the Newcastle establishment are to be carried forward on an extensive scale. Last fall one million salmon eggs were laid down, besides three hundred thousand salmon trout and two hundred thousand white-fish, from which at least 80 per cent. of young fish are expected. About 80,000 California salmon eggs are also in process of being hatched at Newcastle. At the Miramichi establishment 1,500,000 salmon eggs were laid down in the fall of 1874, but most of them were lost, leaving only 150,000 healthy fish, which were distributed among the tributaries of the Miramichi. Only 60,000 ova were laid down last fall, so that the operations of the Miramichi establishment this year are likely to yield a very small result. At the Restigouche establishment upwards of 600,000 healthy young salmon were distributed in the various branches of that river last spring, and the overseer, Mr. Mowatt, expects to have 300,000 healthy young salmon this spring. At Gaspe last year 110,000 salmon fry were hatched and placed in the Dartmouth, St. John (Quebec) and Malbaie Rivers. Only 20,000 eggs were laid down at this establishment last fall. It is a matter of regret that the fish-breeding houses on the seaboard are not doing better work.

At Tadoussac, on the Saguenay, 80,000 salmon fry were turned out last spring, and 200,000 salmon eggs were laid down last fall, which bid fair to hatch out with a trifling percentage of loss. At the new establishment at Dartmouth, Nova Scotia, 600,000 salmon eggs were laid down last fall, and are now in a thriving condition. These salmon eggs were obtained from River Philip. The new establishment at Sandwich, on the Detroit river, for the propagation of white-fish, is the most extensive of the kind in the world. When fully completed and furnished, it will admit of the laying down of fifty millions of white-fish eggs, which, supposing the average of fish hatched to be as low as fifty per cent, will yield annually twenty-five millions of white-fish for the restocking of the Great Lakes. This year it is expected that the Sandwich establishment will turn out some twelve millions of white fish, which may be regarded as a splendid beginning.

From the above it will be seen that fish culture is assuming large dimensions in Canada, and is likely in the future to assume still greater proportions. We presume the Fisheries Department will presently see the necessity of erecting a fish-breeding establishment on some of the tributaries of the St. John. The day will, no doubt, come, when hundreds of Canadian streams, now utterly unproductive, will become valuable for their fisheries, and the more fish breeding houses are multiplied, the more rapidly that desirable consummation will be reached. A few salmon breeding houses on the scale of the Sandwich establishment would work a mighty revolution in a few years.—*St. John's Telegraph.*

#### The Value of Grapes as Food.

There are some persons who think grape-raising overdone in Canada because an occasional tremendous yield runs the price down. If a true knowledge of the value of grapes as food could be diffused, the market could not be overstocked. Grapes are entitled to the first rank among fruits. They contain a considerable amount of hydro-carbonaceous matter, together with potassium salts—a combination which does not tend to irritate, but, on the con-

trary, to soothe the stomach, and which is consequently used with advantage even in dyspepsia. According to Dr. Hartsen, of Cannes, in France, who has recently contributed an article on the subject to a foreign medical journal, the organic acids in the grape, especially tartaric acid, deserve more consideration than they have generally received. Their nutritive value has, he thinks, been much underrated. It is known that they are changed to carbonic acid in the blood, and possibly careful research may show that they are convertible into fats. Dr. Hartsen thinks that they should be ranked with the carbo-hydrates as food. They have been found a valuable fever diet, and the success of the "grape cure" in the Tyrol and other parts of Europe appears to show they are positively beneficial in other diseases.

No doubt the good results of a residence at these establishments are in a measure to be ascribed to the climate and the general hygienic discipline adopted. The advantage does not wholly consist in the fact that so many pounds of grapes are eaten daily, but partly in the fact that other less healthful things are not eaten; and pure air and exercise are also important elements in the curative treatment. But after giving all due weight to these allied influences, we must allow no small fraction of the beneficial result to the grapes.

#### Cutting Flowers.

This may seem a very simple matter, and yet the method adopted for the cutting may seriously affect the growth and blooming of the plant. The usual manner is to cut all flowers with a long stem. Unnatural and almost barbarous as it may seem, the true way (for the greatest part of our flowers) is to remove them without a stem.

Roses of all kinds should be cut with a long stem—the longer the better, provided other buds are not destroyed. The Carnation, and all plants that bear their flowers in clusters, should be removed without stems. The Heliotrope should be allowed a very short stem; and the Verbena should only be cut as far down as the first leaf. A bit of wire or a match stick will serve for a stem, if it is desired to make of these stemless flowers a bouquet. If they are to be placed in shallow dishes—the best way to display them—stems are of no consequence.

The best time for cutting flowers is immediately after sundown, unless to preserve them from a storm, which would otherwise destroy or prevent their being cut in the evening. On cloudy days the time of cutting is a matter of much less difference. The explanation of these rules as to the proper time for cutting is found in the state of the sap at different times of the day and night. From the earliest dawn until sundown the leaves are actively drawing upon the roots, and the sap is flowing freely. After that time the leaves are nearly dormant till morning. The plant is then resting—is asleep. A flower cut in the sunshine will wilt at once, and if not put into water will quickly perish, whereas if cut at sunset it will remain fresh all night. In a cool place it will not appear to change for a long time, even if not put in water; yet in a close, hot room it will fade in an hour.

In this connection, it must be remembered that no rose should be allowed to expand fully before cutting. Cut them all while in bud. This rule may be applied to every flower. It costs the plant more to bring one plant to maturity than to produce a dozen buds. Therefore, cut as soon as in condition, and cut them all. To suffer flowers to fade on a plant and go to seed, is to lose nine-tenths of the whole crop. Freedom and generosity in cutting flowers is the best and truest economy.

Do not collect flowers in large bundles or tie them together, as these processes also hasten decay. Never pull them, but cut them cleanly off with a sharp knife—not with scissors. If the stems are bruised or lacerated, the pores are closed and the sap will not ascend freely.

#### The Way to Drive Horses.

With few exceptions teamsters guide and drive their horses and mules quite too much with the reins. Most teams are so accustomed to be pulled and hauled incessantly by the lines that they do not know how to act when the driver is not tugging away, applying the whip and bawling. Horses should be taught to go where the driver would have them when the reins are slack. If a horse is headstrong and the driver is required to hold him back with a firm hand, it is sometimes a sensible practice to put on a check rein and require the animal to carry his head a little higher than he is accustomed to carry it without a check rein. When a driver is mowing grass with a machine he should hold a steady rein, and avoid the practice of keeping the heads of the animals moving incessantly to the right and left with a constantly vibrating motion. Let the driver keep his eye on the heads and forefeet of the team rather than on the machine. Let the