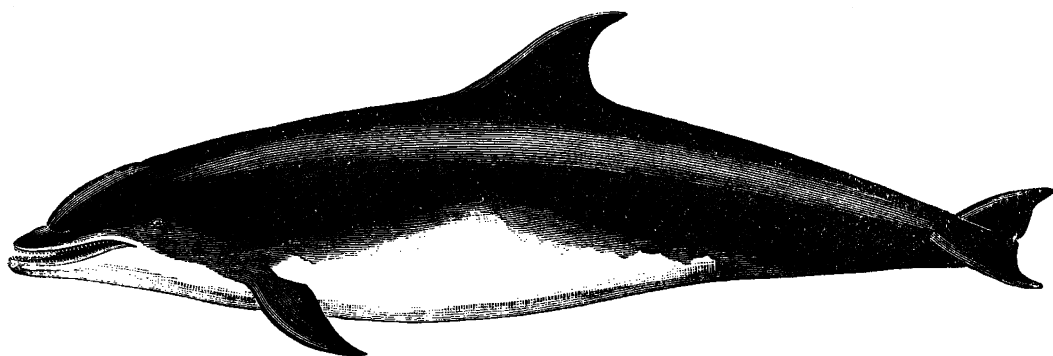


the common gurnard (*Prionotus carolinus*). The specimens having been drowned, the lungs were filled with water. The fishermen state that this species cannot remain under water more than four or five minutes.

The color of the back in the specimens secured was a light plumbeous tint. It shaded rather suddenly at the middle of the sides into the pure white of the under parts. I was informed that the depth of the color of the back varied considerably in different speci-

Much butter is now made without any salt at all, and the use of such butter is rapidly increasing. Salt is cheaper than butter, and there is therefore a tendency to use it to the maximum endurable by the eater. But butter without salt will hold more water; and, as soon as this fact is generally known, sweet, moist butter will be more common than the dry, salt article. It would be a good thing if all the caseine could be washed out of the butter, but this is impracticable. Albuminous bodies



THE BOTTLE-NOSE DOLPHIN, *TURSIOPS TURSIUS* (AFTER FLOWER).

mens, and it deepens very rapidly as soon as life is extinct, especially if the specimens lie in the sun.

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BUTTER.

THE work of the U. S. bureau of agricultural chemistry shows that the percentage of water in a good butter should not exceed twelve. In thirty-four analyses the highest percentage of water found was 14.51, and the lowest 7.34. It is naturally in the interest of the seller to incorporate as much water as possible in the butter. But, if all butter should be legally condemned which should contain more than ten per cent water, the tendency to 'under-work' the butter would be speedily corrected. In one instance a report of an analysis of foreign butter gave a percentage of water of 35.12. The quantity of salt in a butter should depend solely on the taste of the consumer. I doubt very much whether the addition of a few per cent of salt helps preserve the butter. It is therefore a condiment only. In eighty-four analyses the highest percentage of salt found was 6.15, and the lowest 1.08. Two per cent is a fair mean of the salt usually present.

decay more easily than all others, and butter with a great deal of curd in it is very hard to keep sweet. Of all the constituents of butter, this is the most difficult to estimate. Oleomargarine butters contain no curd, unless they have been churned with milk, and even then not a great deal. If butters do not have more than one per cent of curd, they may be accepted as having been properly prepared. Owing to the difficulty of estimating it, however, the quantity present should not be taken as a test of purity.

The fat of genuine butter is heavier than that of tallow, lard, or any of the common fats used as butter adulterants. Its specific gravity is about 912, water at the same temperature being taken at 1,000. The relative weight of tallow or lard often falls below 900. In analyses of commercial oleomargarine I have found the highest density to be 905. Of butter-fats in thirty analyses the maximum was 912.5, and the minimum 908.6. There should be grave doubt of the purity of a butter, if the specific gravity of the fat should fall below 909. For this reason the specific gravity of a butter-fat, if it be properly taken, is almost a certain test of its genuineness. The process is, however, a tedious one, and requires the greatest care and delicacy in manipulation.

The quantity of alkali required to saponify the fat is another valuable means of judging of the purity of a butter. This equivalent is an abstract number obtained by dividing the molecular weight of the alkali employed by the number of milligrams of it used in saponifying a given weight of the fat. Butter-fat contains acids (butyric chiefly) which have a lower molecular weight than oleic, margarine, and palmitic acids. The saturation equivalent of a butter-fat is therefore expressed by a smaller number than if it were composed solely of glycerides of the acids with a higher molecular weight. The determination of the equivalent being an easy one, it is generally made as the first test in determining the genuineness of a butter sample. For genuine butters, this number is about 245. When it goes above 250, the samples should be regarded with suspicion. In one case of a Jersey butter very rich in butyric acid, this number fell to 239.8. On the other hand, in four samples of tallow, lard, and oleomargarine (two), the numbers were 280, 284, 282, and 281 respectively.

Pure butter contains a certain proportion of glycerides of fat acids soluble in water (butyric, capronic, caprylic, etc.). The percentage of these acids to the total weight of butter-fat is about five. In thirty analyses the lowest percentage found was 4.49, and the highest (except in one case) 5.66. In the case of the Jersey cow's butter, already mentioned, this number was 6.79. Tallow and lard have at most only a trace of these acids. In commercial oleomargarines the highest percentage found was .56, and the lowest .20. The determination of the soluble acid requires much time; but it is not a difficult operation, and it is the most certain method of determining the purity of a butter. A sample which would give no more than four per cent soluble acid would be open to condemnation. It would either be a very poor sample of genuine butter or else an adulterated article.

Pure butter which has not been melted gives, with polarized light and a selenite plate, a pure uniform tint of red or blue to the field of vision. Adulterated butter in similar circumstances always gives a mottled appearance to the field. This is a very simple and speedy qualitative test for the purity of butter, but is not sufficient in itself to definitely determine the matter.

The difficulties which make the analyses of milks of little practical value are equally as great with butter. A more extensive study of their composition, however, is certain to lead to profitable results. H. W. WILEY.

THE SASKATCHEWAN COUNTRY.

THE district at present attracting attention as the scene of an insurrection of half-breeds and Indians against the Canadian government is situated on the North Saskatchewan River, near the northern margin of the great plains. The vast region of plain and prairie, which occupies the whole central portion of the continent, crosses the 49th parallel of latitude—which constitutes the international boundary-line—with a width of 750 miles, but extends north of the boundary about 300 miles only, being there limited by the edge of the great northern forest which stretches, with little interruption, to beyond the arctic circle. Prairies of considerable size occur, it is true, in the valley of the Peace, but these are isolated from the great plains by wide forests. There is reason to believe that the greater part of the prairie country in Canadian territory might become permanently wooded but for the almost annually recurring prairie-fires, which are still tending to increase its area. The southern edge of the forest is, however, in the main, coincident with that of a region of abundant rainfall.

The northern border of the prairie country may be generally defined by a line drawn from the vicinity of the city of Winnipeg westward to the junction of the Assiniboine and Qu'Appelle rivers; thence north-westward to the junction of the North and South Saskatchewan rivers; thence westward, nearly following the latter river, to Edmonton; from that point south-westward to Calgary, on the Bow; and thence southward along the eastern base of the Rocky Mountains. The total area thus outlined, which is either altogether treeless or characterized by wide stretches of prairie interspersed with scattered groves of aspen and other trees, is approximately 300,000 square miles. The southern and south-western parts of this region may be described as entirely without wood, though even there the rivers are almost invariably fringed by groves of cottonwood.

The general elevation of the plains of the Canadian north-west is very considerably less than that of the corresponding portion of the continent farther south, the mean height of the whole region above outlined being probably less than two thousand feet above the sea-level. The most pronounced inclination, however, giving direction to the rivers of this portion of the great plains, is that from the base of the Rocky Mountains to the east or north-east. The Red-River valley, which constitutes the