1840

On the anatomy of the breast - Plate I: Of the cow

Sir Astley Paston Cooper , Bart.

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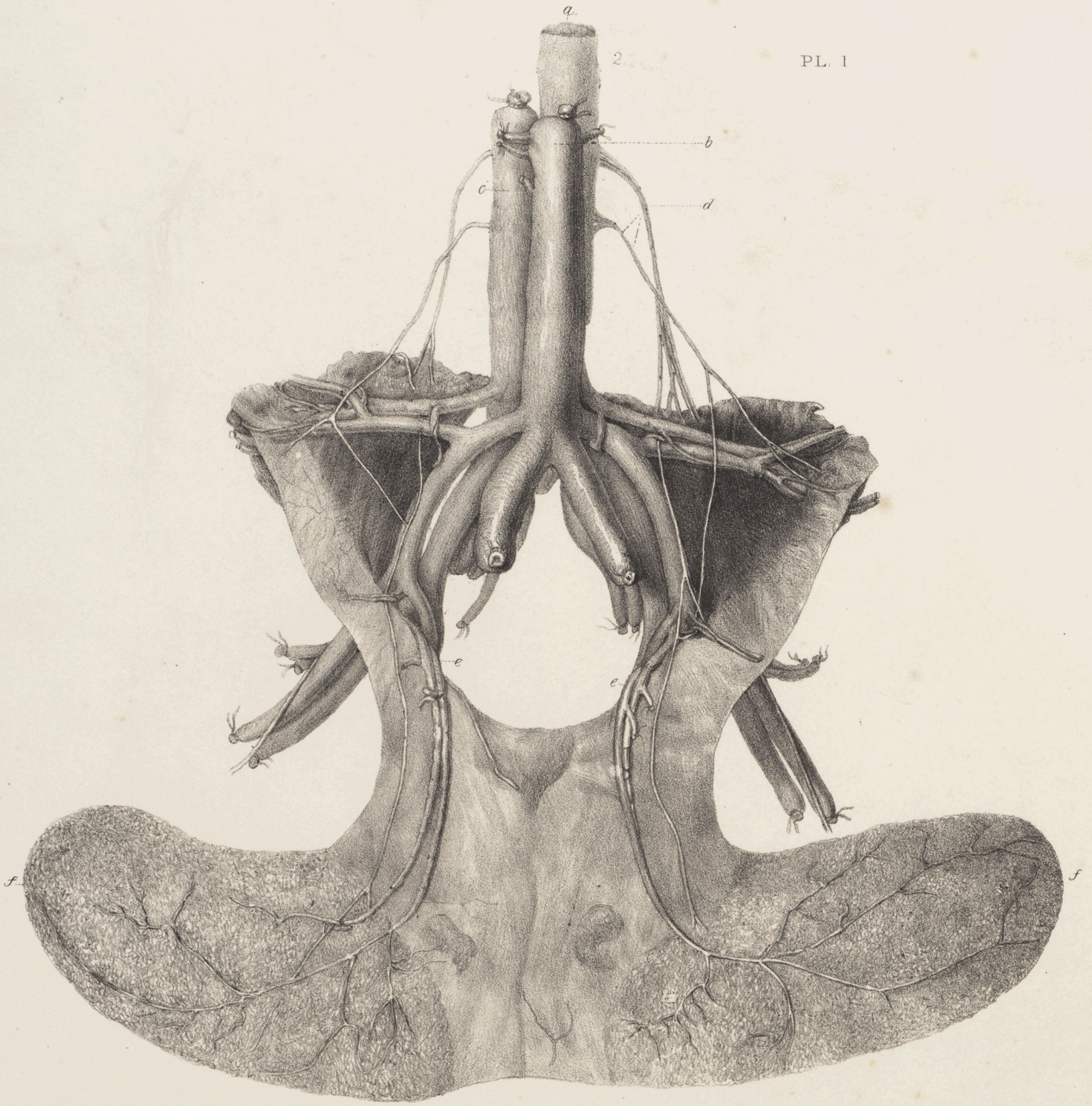

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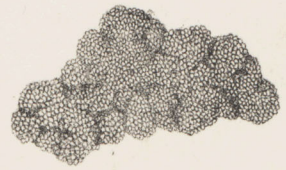

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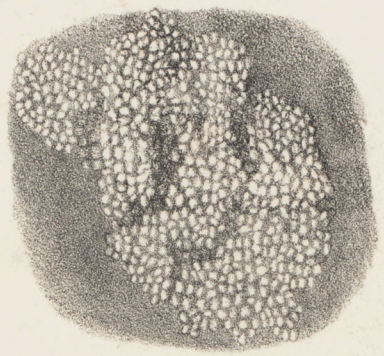

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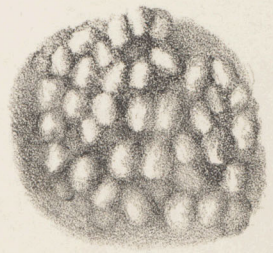

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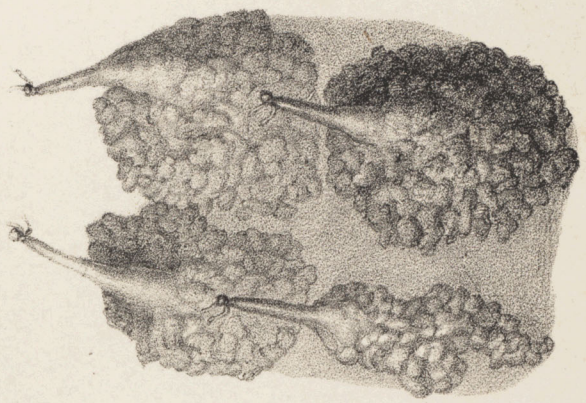

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J. Graf, Printer to the Queen.

Plate I.

Of the Cow. Fig. 1.

This Plate gives a view of the udder of the cow injected, showing the teats and some of the blood-vessels, and the gland entirely filled with injection, excepting a large reservoir.

There are generally six teats, but the two posterior lead to imperfectly formed glands.

The two anterior teats are much larger than the two posterior, and are directed forwards, and so are the two posterior, and their direction renders them more easy of access to the offspring.

Each teat contains only one tube, lined by a mucous membrane, having a vascular layer upon its outer surface, both arteries and veins being of considerable size. Next an elastic coat appears composed of a net-work of cellular fibres, which by crossing each other in all directions, render it elastic, so as to allow of a great increase of its diameter by the pressure of the milk, and when distended it contracts and assists in the expulsion of the fluid.

The common integuments next invest the elastic coat, and some condensed fibrous matter is added at the orifice so as to check its dilatation or expansion, and to force it to remain small under great extensio of the tube.

The teat at its junction with the udder opens into a large reservoir, as is seen in the Plate, a bougie being passed through the tube into it. (*See Plate* I.) This reservoir will contain a quart of milk, and in very large cows considerably more. It is lined with a similar mucous membrane to the teat, and is, indeed, a continuation of it.

This reservoir opens into large cells, and these into canals rather than lactiferous tubes, which lead to the glandules and form the inequalities or waves upon the surface of the gland. In these glandules, which terminate in a foliated edge, are placed the milk cells.

Fig. 2. View of the glands in the fœtal calf.

a, The spinal marrow.

b, The aorta.

c, The vena cava.

d, The nerves derived from the lumbar plexus, and these are connected with the ganglia of the great sympathetic nerve, which crosses them, and is the medium of connection with the uterus and ovaria, and udder.

e, *e*, The epigastric artery and vein.

f, *f*, The glands.

Fig. 3. Udder of a small fœtal calf injected, to show the four teats and glands, filled with wax. The two imperfect teats were filled, but the wax passed only to a short distance.

Fig. 4. The milk-cells of the cow magnified three times.

Fig. 5. The milk-cells magnified twenty times.

Fig. 6. The milk-cells magnified fifty times.

The arteries and veins of the gland are seen in the depressions between the four portions of the udder in fig. 1.

Observations. A moderately good cow will give, when in full milk, from twelve to twenty quarts per diem, varying with its pasture.

A very large and good cow, milked three times per diem, has been known to yield thirty quarts.

At the close of each milking the milk is richer than in the beginning.

More milk is given by the cow in the morning than in the evening.

More cream is given out in winter than in summer.

The milk left by the calf is good.

The milk suffered to stand separates its cream or oily part, which being specifically lighter than the milk, rises to the surface: it is composed of numerous globules of unequal sizes, which may be entirely separated from the milk by frequent filtration.

The proportion of cream necessarily varies with the richness of the milk, the goodness of the pasture, and the period from calving.

1	month . . .	Cream / Milk $\frac{1}{8}$
2	„ . . .	Cream / Milk $\frac{1}{7}$
3	„ . . .	Cream / Milk $\frac{1}{6}$
4	„ . . .	Cream / Milk $\frac{1}{4}$
5	„ . . .	Cream / Milk $\frac{1}{8}$
6	„ . . .	Cream / Milk $\frac{1}{8}$
8	„ . . .	Cream / Milk $\frac{1}{8}$
9	„ . . .	Cream / Milk $\frac{1}{7}$
10	„ . . .	Cream / Milk $\frac{1}{6}$

If milk be skimmed again after twenty-four hours, the proportion of cream is larger.

This table shows that the variety is from one-fourth to one-eighth, but one-eighth is a frequent proportion, and eight quarts of milk produce a quart of cream.

The most cream is given out in a broad vessel from two to three inches deep.

The cream is thicker in cold than in warm weather.

Cream consists of butter and butter-milk. The butter is produced by agitation of the cream in an upright or turning churn, or by agitating the cream in a bottle.

A quart of cream produces a pound of butter.

If butter be melted, and some curd be removed from it, the butter will keep a great length of time.

The butter-milk, which remains when the butter is made, still contains some butter, curd, and sugar.

Oil separates from cream, if it be either heated, or kept long.

After the separation of the cream, another spontaneous change occurs, which is the formation of an acid (lactic), which separates the curd; or it may be separated by rennet.

The curd dried and pressed forms cheese.

It may be separated by acids and alcohol, to form cheese; and a kind of cheese may be formed from the serum of the blood by precipitating its albumen by acids.

When the curd is separated, the residue is whey.

The whey when evaporated deposits the sugar of milk.

Of the Colostrum.—The milk given for two or three days after calving is often bloody. In this state, the cream and milk are not properly separated, and there is a thick yellow substance, which looks like cream, occupying a considerable part of the fluid which has been drawn.

On the first day, this yellow substance occupied twenty measures out of twenty-four.

On the second day, the yellow matter was three in twenty-four measures.

On the fifth day, the yellow matter was cream 4, milk 20.

On viewing the colostrum with a magnifying glass, it showed, under the fourth of an inch lens, a net-work composed of numerous flakes; each flake containing milk globules in the progress of their formation, but not yet completely separated.

The particles of milk under the microscope appear oily. They are rounded, but not uniform in size. If the glass upon which they are placed is inclined, they roll down in a beautiful avalanche.

For the chemical history of cow's milk, see the *General Observations on the Composition of Milk.*