

out of sheet-metal instead of casting it, as to the inventor of the steam turbine.

The issue of such patents as are suggested above is one of the least creditable branches of the Patent Office's activity during recent years.

The encouragement of real inventiveness will unquestionably diminish unemployment. Even in the case of 'process' and 'cheapening' patents, any temporary increase of unemployment thus created is more than balanced by increased production, and the consequent absorption of more and more men into employment. Generally speaking, the world is always hungry for goods, if the goods are useful and the price is right.

W. A. BENTON.

Research Department,
W. and T. Avery, Ltd.,
Soho Foundry, Birmingham.

A Breeding Ground of the Nursehound (*Scyliorhinus stellaris*) in the Fal Estuary.

DURING recent years I have had considerable experience on the oyster-beds and adjacent grounds in the Fal Estuary, and as a result of observations made at various times I consider that the greater part of the Laminarian zone in that estuary forms an extensive and regular breeding ground for the nursehound (*Scyliorhinus stellaris* = *Scyllium catulus*). In the autumn of 1924 a few egg-cases containing embryos of this shark-like fish were dredged on Laminaria on the Falmouth North Bank, Carclase, and on other grounds in $\frac{1}{2}$ to $1\frac{3}{4}$ fathoms. (A chart of the grounds of this region is given in my report on a "Survey of the Fal Oyster Beds," 1926.) During the summer of 1926, egg-cases have been frequently taken on Laminaria at Turnaware Bar—which is situated about $1\frac{1}{2}$ miles farther up the estuary than the grounds just mentioned—and young ones recently escaped from the egg-case have been seen at low water on this ground on several different occasions. Young nursehounds have also not infrequently been taken in oyster-dredges in autumn.

During the recent spring tides, the Laminarian zone at Brown Rose Bar—about 1 mile below Turnaware—was being examined for oysters, and, in an area of not more than 20 square yards, 8 egg-cases of the nursehound containing eggs or embryos, as well as a few empty purses, were found; probably others were on the ground and not seen. Two of these egg-cases had been laid within the last few days, and had the thong-like horny extensions of the corners of the case wrapped round the whole of the anastomosing roots of a bunch of old Laminaria stipes. In one instance the new egg-case had been attached to a group of stipes which also carried older egg-cases at a higher level. Four of the egg-cases contained embryos respectively about 12.5 cm. and 10 cm. long, both with internal gills, and two about 6.0 mm. long. It is interesting to note that Ford (*Jour. Mar. Biol. Assoc.*, vol. 12, p. 492, 1921) estimated that embryos would begin to have the gills covered at a length of about 10.0 cm. Thus the collection of egg-cases contained eggs or embryos of four different ages, and therefore of four different spawnings.

While examining one egg-purse in its natural position under water, two *Nassa reticulata*, sometimes called dog-whelks, were observed with their probosces inserted in a natural crack in the case, where the base of one corner thong arises from the body of the case. After observing the *Nassa* for a few minutes, each was pulled off separately and at least half an inch of pink proboscis pulled out of the case. On opening the case, however, to see what damage had been done, there was found no trace of either

yolk or embryo and only a remnant of albumen. As the purse was fixed in an upright position in the water, and the *Nassa* were at the lower end, it was possible—but not probable—that they might have eaten the large amount of yolk generally found in the eggs, but on examining the other egg-cases, one similar in age to that attacked by the whelks was opened and also found to contain nothing but albumen, although the egg-case was intact and full of albumen.

It is clear, therefore, in this latter instance, that the nursehound had made an egg-case and had omitted—perhaps forgotten—to put an egg in it. The contents of both these purses were healthy in so far as they had no noxious smell. It is not improbable that *Nassa* and similar forms may normally attack the embryos of the nursehound and its allies at the vulnerable natural slits in the egg-case (described by R. S. Clark, *Jour. M.B.A.*, vol. 12, p. 584, 1922).

It is well known that the nursehound breeds regularly in the gullies at Wembury Bay West, inside the Mewstone, near Plymouth, but there the egg-cases are usually attached to the strong, stockily growing sea-weed *Cystoseira*. It would seem, therefore, that so long as the nursehound can lay its egg-cases in fairly shallow water—on the south coast of England—the fish may use either Laminaria or *Cystoseira* and probably any other weed so long as it be strong and permanent enough. It is necessary that the weed used for attachment should remain *in situ* for nine months to a year, and perhaps longer, to enable the embryo to develop fully; and presumably the spawning fishes know that both *Cystoseira* and Laminaria are both strong enough and permanent enough even in a situation near low-water mark to serve their purpose; *Cystoseira*, from observation, grows certainly for more than one year, and is so firmly rooted that it is either difficult or impossible for a man to pull the weed off the rock. *Laminaria saccharina*, the species used by the nursehound, may shed its frond at the end of one summer's growth, but the stipes to which the egg-case is attached remains *in situ* and strong for a much longer period. The problem of how the nursehound found out that Laminaria and *Cystoseira* would suit its purpose is only one more of the millions of evolutionary problems awaiting explanation.

J. H. ORTON.

Marine Biological Laboratory,
The Hoe, Plymouth, October 21.

Application of the Drop Weight Method to the Determination of the Surface Tension of Colloidal Solutions.

IN connexion with some work by Henry N. Harkins and myself on the surface tension of certain colloidal solutions, it seemed essential to hold the drop used for the determination at almost full extension any desired length of time before it was allowed to fall. As usual, the drop was allowed to fall from a tip of horizontal circular cross-section into a stoppered weighing bottle (method of J. L. R. Morgan). The weighing bottle was immersed in a thermostat, and was kept dry on the outside by an enclosure of glass and brass, such as was used by Harkins and Brown. This is shown diagrammatically in Fig. 1. The new modification consisted in supporting the supply bottle entirely by the rod A, which was supported in turn by a microscope stand upheld by a heavy tripod which rested on a pier outside the thermostat. The rod was made so small that there was no contact with the inside of the tube C'. There should also be no contact between the stopper of the bottle E and the inverted capillary U tube upon which the tip D is