sidering the maximum value of hydration as 40 per cent for protein, the hydration volume per target is $0.44 \times 10^6 \text{ \AA}^3$. The excess water $2.1 \times 10^6 \text{ \AA}^3$ per target must be outside the target and not inside. Assuming the distribution of this water in a uniform layer around the target, the thickness of water surrounding each of the hydrated targets comes out to be $6.5 \text{ \AA}$. So besides the hydrated target the radicals can come only from 2 or 3 molecules thickness of water.

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Gross Beta-Activity in the Thames River (Conn.)

GROSS β -radioactivity has been determined in a number of marine organisms in the Thames River, Connecticut, United States. Collection areas were selected on the basis of established beds. Samples have been obtained and assayed every two weeks since April 1960. Organisms were returned to the Laboratory immediately after collection, washed free from surface contamination, weighed wet, dried under infra-red and ashed. Aliquots of the ash were prepared for radioassay and counted in an automatic β -counting system.

Radioassays were conducted on the following organisms: *Crassostrea virginica* (oyster), *Mer-*

cenaria mercenaria (clam), *Mytilus edulus* (mussel), *Modiolus demissus* (mussel), *Laminaria agardhii*, *Fucus vesiculosus*. *Ulva lactuca* and *Chondrus crispus* (algae). The β -activities obtained from these organisms exhibited seasonal variations, with *Laminaria* showing highest values and the oyster the lowest values.

Average monthly radioactive values for three of the above organisms are recorded in Fig. 1. Locations from which these organisms were obtained are: *Laminaria* from a point north of the Electric Boat Co., *Mercenaria* from a bed opposite the United States submarine base and *Crassostrea* from a bed north of the submarine base.

Maximum levels of radioactivity occurred in January 1961, in *Laminaria* with a total of $356 \mu\text{c./gm.}$ of ash. Minimum values recorded during the year were in oysters in December 1960, with $23 \mu\text{c./gm.}$ of ash.

On the basis of analyses for total potassium in these organisms and calculations as to the amount of radioactivity contributed by natural potassium-40 it can be determined that most of the β -activity observed is due to potassium-40. It can be concluded, therefore, that the quantity of radioactivity present in marine organisms studied is extremely small, and does not represent a health hazard.

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BIOLOGY

Biological Incorporation of Implant Material in the Rat

WHEN plastic material is used as a biological implant, to improve contour or function, one of four things commonly occurs: it may cause an acute inflammatory episode and be rejected; rejection may be delayed for several months or years; it may be removed piecemeal by the body's own phagocytes; it may become encysted by fibrous tissue and remain *in situ*. In the last situation the implant has become virtually extracorporeal.

During a recent investigation of various plastic materials in rats, a completely new biological reaction, that of incorporation, was noted. The method of investigation was as follows: through a midline incision the abdomen was opened and a square $2 \times 2 \text{ cm.}$ of peritoneum and muscle was excised from the lateral abdominal wall. The defect created was covered by the material under test and sutured in place. The abdomen was then closed (Fig. 1). Naked-eye and microscopic examination of the implants were made at various times up to three months later.

In six animals a sheet of polytetrafluoroethylene, 0.3 mm. thick, was used. This material appeared to cause very little tissue reaction, and in four rats it became completely encapsulated by fibrous tissue. But in two animals normal peritoneum grew over the material. The histological picture in these two rats was quite unique; the polytetrafluoroethylene sheet

Fig. 1. Radioactivity in organisms obtained from the Thames River (Connecticut). —, *Laminaria agardhii*; ···, *Crassostrea virginica*; ---, *Mercenaria mercenaria*