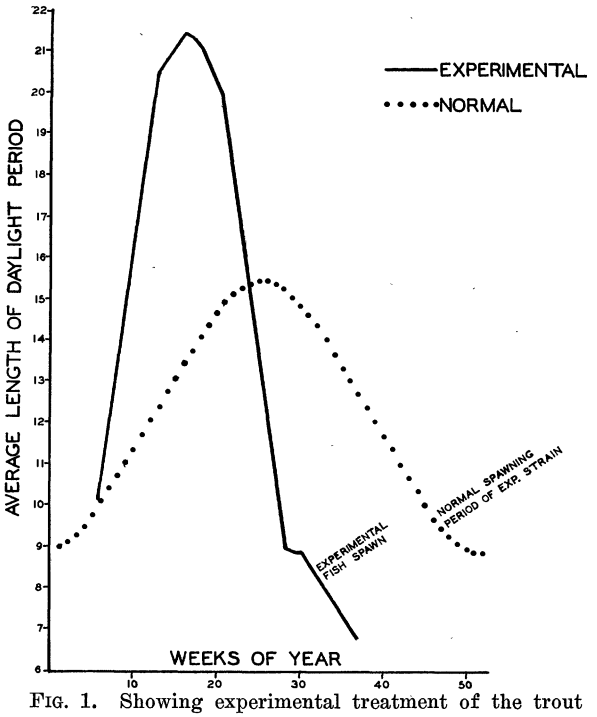

FIG. 1. Showing experimental treatment of the trout by modification of the diurnal light period.

stripped in the usual hatchery manner. The female fish were not quite ripe. Male fish in the wild commonly ripen as long as two or three weeks before the females. The first eggs were taken from the female fish on August 31, 1937, which is approximately three months before the usual spawning time of the particular strain of trout used in the experiment. Control fish which were kept under similar temperature, food and water conditions with the exception of light manipulation showed no evidence of sexual activity.

Similar experiments were carried out on rainbow trout which were induced to spawn in December, 1936, by gradually increasing the average length of day. Rainbows *Salmo irideus* normally spawn in March in New Hampshire, but the degree of hybridization with fall spawning strains was not known, so the data were not published at that time.

It is not known definitely from the completed experiments if it was necessary to add light to the brook trout to induce spawning or if merely diminishing the daylight period would have been sufficient. It is also possible that a combination of the two methods might be most efficient, but it is evident that the sexual cycle of fish, like those of mammals and birds, can be manipulated by controlling the length of day.

The practical value of inducing early spawning in rainbow trout by this method is evident in that most of the strains of these fish in New Hampshire do not spawn until spring and the fry are too small to plant with any degree of success in the streams by fall, which necessitates the expense of carrying the fish through the winter.

The experiments will be fully reported elsewhere.

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VARIATION OF DACTYLOMETRA QUINQUECIRRHA[1]

IN order to attack the problem presented by the Scyphozoan medusa, *Dactylometra quinquecirrha*, L. Agassiz, in the many variations known to exist in its wide geographic range and especially in the Chesapeake Bay, where maturing in the "Chrysaora" stage, it occurs abundantly as two distinct varieties, life history studies of this common sea nettle have been in progress at the Chesapeake Biological Laboratory for three years. In the course of the studies, the organism has been reared, for the first time, through its entire life cycle from the egg, which was fertilized in the laboratory, to the resulting medusoid. The conditions under which this has been accomplished have been as simple and as nearly natural as possible.

The males and females may be easily distinguished when mature by the color of the gonads, which is greyish brown in the female and pink in the male. Fertilization has been determined to occur in late summer under both experimental and natural conditions. This takes place at night between seven and twelve o'clock under laboratory conditions. The process of cell division is rapid, and the following day free-swimming, pear-shaped planula have been developed.

At the end of the third day, the planula attaches itself firmly to the bottom. It is now ninepin-shaped. The tentacles are developed in a ring just below the mouth, and appear as simple outpushings of the body of the animal. After the formation of the first four tentacles, four invaginations are produced, which become the four taenoli or gastric septa of the scyphostoma. The tentacles increase in number until in approximately three weeks there are sixteen of them. Some few individuals may bear twenty tentacles.

The scyphostoma undergoes little change, other than that of size, from late fall until early the following summer. It is practically colorless, showing at times a faint pink, which becomes more intense at the time of strobilization, that is, in the early summer.

The process of strobilization in *Dactylometra quinquecirrha* differs from that of *Aurellia* and other similar forms for which knowledge is available, in that the number of discs produced appears to be fairly constant and does not exceed six. The ephyra produced as a result of this process have eight bifurcate arms, on every one of which there is a tentaculocyst.

[1] Preliminary note.

Upon growth, the Ephyra comes to resemble the adult medusa.

In the course of this study several interesting facts have been observed, two of which will be set forth. During the formation of the discs of the strobila, the unsegmented basal region of the scyphostoma forms a new set of sixteen tentacles. After strobilization has occurred, the small cruciform mouth of the basal region enlarges and the polyp regains its normal appearance and awaits the coming of the following summer when strobilization again occurs, followed by the reorganization of the Scyphostoma. Under controlled conditions, all the Scyphostoma do not undergo strobilization at the same time, thus prolonging the time of year during which this process occurs from early June until late July. Field observations disclose that medusae from post-ephyral to adult development may be found in a given locality from June until August, indicating that similar development occurs under natural conditions.

In July of this year (1937) ephyra were obtained in large numbers near the bottom of deep creeks in the vicinity of Solomon's Island. On cloudy days and after heavy storms, the ephyra were found at the surface and well distributed from surface to bottom. At the same time they are not found in the near-by bay waters. The explanation of these results must await further investigation.

There is a strong indication that the results of this study may serve in the solution of the problem presented by the existence of two distinct varieties of the one species in the same locality. Since the study of the life history appears to be the logical approach to a fuller understanding of a little known form, it becomes obvious that such studies, supplemented by collected and preserved material, offer a solution for many of the taxonomic difficulties presented by the hydroid relationships and variability of medusae in general.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

CONCERNING THE HEMOLYTIC ZONE OF H. PERTUSSIS COLONIES ON COUGH PLATES

NEITHER Bordet and Gengou nor other European bacteriologists mention the zone which, under ideal conditions, surrounds single colonies of *H. pertussis* on cough plates. It is fleeting, not always visible—seldom present for more than a day or two. If, however, the positive culture showing the zone is kept in the refrigerator, it may be preserved for a week. In strong, reflected light, the zone appears distinctly darker than the rest of the surface, when the plate is held at an angle, and a good hand lens is used. If, as usually happens, the surrounding culture medium has already darkened (*i.e.*, the cherry-red color has disappeared), the zone is seldom visible.

The absence of this zone in freshly isolated cultures is probably due to extrinsic factors. For example, if the agar is too warm or the blood more than twenty-four hours old when it is added, if the surface of the cough plate is dry when it is exposed, if mouth saprophytes or air contaminants (especially mycoides) grow luxuriantly before *H. pertussis* colonies are plainly visible, the zone will not be present. In short, any external factor that makes the rest of the culture medium surface darker before the end of the third or fourth day of incubation will make this rather characteristic zone quite indistinguishable. Whenever the rest of the surface in the vicinity of the colony has lost its cherry-red color, the zone can not be seen.

If fresh, rather thinly poured petri dishes of freshly prepared Bordet-Gengou medium (with 20 per cent. fresh, defibrinated human blood) are exposed as cough plates, and if other conditions are ideal, not only should the darkened zone be visible in reflected light on the third or fourth day, but when the positive plate is held against strong, transmitted light and viewed from behind (*i.e.*, the growth surface toward the light) no transition between the border of the colony and the zone is distinguished—the colony and the zone appear equally lighter than the rest of the medium—"hemolysis." The line of demarcation is where the outer border of the "hemolyzed" and unaltered medium meet. Other simple aids in the identification of *H. pertussis* on cough plates are:

(1) A pointed platinum wire, touched to the minute, glistening, smooth, markedly elevated, round, gray colony, on the third or fourth day of incubation removes most of the soft, slightly sticky growth.

(2) When touched with a minute platinum loop the colony never slides from its original position on the medium;

(3) A colony on the loop diffuses quite evenly in a droplet of water on a clean slide without much mixing;

(4) A clear (unstained) capsule is often seen in thin, gram-stained smears (counterstained with double-strength carbol-fuchsin;

(5) Cultures should give a positive Dold test before (and after) intensive vaccine cultivation.

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