return, and other recaptures of those tagged at Bonavista do not help us since they were on the Labrador coast to the north as well as on both Newfoundland and Canadian coasts. That return may not be direct is evidenced by double recaptures of salmon tagged on the Norwegian coast,[4] which revealed a to and fro movement of even more than fifty miles. That return was probably not direct is shown by marked Margaree fish tagged on the Margaree coast in 1941 moving only (so far as definitely revealed) away from the river, even past other salmon rivers.

Such maturing salmon have been proved to move in one direction or another as much as 28.9, 35 and 62 miles per day.[5,6,7] Also it seems quite definite that they tend to remain in river water,[8] and their usual tendency to ascend the home stream when a choice is presented where two estuaries fork[9] may be due to their remaining in water from the home river—rather than in that from another river.

Is this case to be taken as representing a regular precise migration of Margaree salmon to the waters east of Newfoundland and back, or did this fish wander from the others and get back a distance of 550 miles in 96 days or less by more or less random movements and by tending to remain in river water, particularly from its home river? The facts for our salmon do not harmonize with the conception of a somewhat precise mass migration to a distant feeding ground, but they give no indication as to the degree of success in return from distant places. Much more work needs to be done.

A. G. HUNTSMAN
FISHERIES RESEARCH BOARD OF CANADA,
UNIVERSITY OF TORONTO

HATCHING OF THE BLUE CRAB, CALLINECTES SAPIDUS RATHBUN[1]

SINCE 1940 efforts have been made to devise a method for hatching eggs of the blue crab, *Callinectes sapidus* Rathbun, in the laboratory and in nature on a large scale. The egg mass or "sponge" contains upward to two million eggs. When once it was found possible to hatch large quantities of eggs to the first true zoea stage, attempts were made to induce further normal development of these zoeae.

In 1940, positive hatching results were obtained by removing masses of eggs, about one cubic inch in size, from a single "sponge" and placing them in large well-aerated tubs, in some of which the water circulated slowly while in others the egg masses were moved through the water so as to simulate natural conditions. Considerable numbers of eggs were hatched under these conditions, but numerical counts were not made to indicate the percentage that hatched into either the prezoeal stage or the first true zoeal stage.

In 1941, it was found that "sponges" may be removed from freshly gathered crabs in the field or from those that have been brought to a commercial crab house, transferred to the laboratory, cut up into small pieces and hatched out in shallow pans. Under favorable conditions, the percentage of eggs that hatched into the first true zoeal stage was 90. When hatching occurred under unfavorable conditions, the larvae usually emerged bearing one or both of the following: inner egg shell membrane and the prezoeal skin.

Under laboratory conditions, it was possible to rear the larvae from the first true zoeal stage to the second stage. This provides a positive basis for identifying these zoea of the blue crab in plankton. Reasonably certain recognition of further zoeal stages of this species should be possible by using the characters recently listed by Aikawa.[2]

MARGARET S. LOCHHEAD
JOHN H. LOCHHEAD
CURTIS L. NEWCOMBE
VIRGINIA FISHERIES LABORATORY
AND
DEPARTMENT OF BIOLOGY,
COLLEGE OF WILLIAM AND MARY

THE PERIOD OF GONADAL ACTIVITY IN THE MARYLAND MUSKRAT

AS part of a program to investigate reproduction in the muskrat, an extensive histological study has been made of the ovaries and testes of the adult Maryland muskrat. The following preliminary statement is based on the results of examination of sample 8 μ sections of one testis and epididymis from each of 222 male reproductive tracts and of complete serial 10 μ sections of one or both ovaries from 340 female reproductive tracts. The animals were trapped at frequent intervals throughout several years on the Blackwater Migratory Bird Refuge near Cambridge, Maryland. The principal purpose of the study was to determine the periods of gonadal activity and inactivity in the Maryland muskrat as indicated by the presence or absence of spermatogenesis and ovulation in the specimens studied. This report constitutes a summary of the findings; the details will be published elsewhere.

[4] Knut Dahl, *Salm. Trout Mag.*, 88: 229–234, 1937.
[5] D. L. Belding and G. Préfontaine, *Contr. Inst. Zool. Univ. Montr.*, 3: 1–58, 1938.
[6] W. J. M. Menzies, *Fisher. Scotl. Salm. Fish.*, 1937, No. 1: 1–17, 1937.
[7] K. Dahl and S. Sømme, *Norsk. Vid.-Ak. Oslo, Mat.-Nat. Kl.* 1935, No. 12: 1–27, 1936.
[8] A. G. Huntsman, *Bull. Biol. Bd. Can.*, 51: 1–20, 1936.
[9] H. C. White, *Jour. Biol. Bd. Can.*, 2: 391–400, 1936.
[1] Contribution Number 8 of the Virginia Fisheries Laboratory and the Department of Biology, College of William and Mary.
[2] H. Aikawa, *Rec. oceanogr. Works Japan*, 9: 87, 1937.

Spermatogenesis was found to begin rather abruptly in the middle of December. In the great majority of animals, large quantities of sperm were found in both testes and epididymides from the beginning of January until the beginning of October, when spermatogenetic activity began to decrease. No indication of spermatogenesis and very little sperm storage were observed in the reproductive tracts of the 24 males trapped between October 22 and November 26. Similar inactivity was noted in all but three of the 21 males trapped between November 27 and December 11; spermatogenetic activity was limited in the three exceptional males.

Study of the serially sectioned ovaries involved a search for ripe follicles and particularly for corpora lutea as indicators of imminent or actual ovulation, respectively. Although present in one or both ovaries of four of the 54 females trapped between January 21 and February 15, corpora lutea did not make their appearance in a significant number of cases until the latter part of February. Corpora were present thereafter in significant numbers of specimens until the last part of October. There was no evidence of ovulation in the 69 female tracts from animals taken between October 29 and January 14, with the exception of one pregnant animal trapped on December 11.

Cognizance must be taken of the probability that there are minor variations in the extent of the periods of ovarian and testicular activity from year to year. However, the evidence indicates that in the Maryland muskrat spermatogenesis begins in the middle of December and ovulation in the middle of February and that seasonal gonadal activity terminates in both sexes during the latter part of October.

THOMAS R. FORBES

FISH AND WILDLIFE SERVICE,
U. S. DEPARTMENT OF THE INTERIOR,
SWARTHMORE, PENNA.

"AUDIENCE ENEMIES"

IN SCIENCE for March 13, Dr. DuBois, of Cornell University Medical School, made a vigorous plea for improving the quality of presentation of papers at scientific meetings. He described the common "audience enemies" with such clarity that no possible defense could be offered for the speakers (their number is legion) who fail to recognize that "while effective presentation can never take the place of able investigation, it is the indispensable means of assuring full success to any investigation."[1] However, perhaps the one most common fault indulged in by inexperienced speakers because of stage fright and continued by a large number through sheer inertia is the custom implied by the title, but omitted from the body, of Dr. DuBois's discussion, "the *reading* of scientific papers."

It is bad enough for a teacher to read verbatim to students. They at least have some reason for listening. But for a scientist to address an audience of his peers, no doubt including many of his betters, by literal reading from typed pages, is gross discourtesy. The societies themselves may partly be to blame for the prevalence of this wide-spread "audience enemy." Programs of meetings all too commonly list "papers to be read" or "the following will read papers." Perhaps this time-"honored" custom should not be taken literally and that in such cases "read" really is intended to mean "present." Unfortunately, attendance at scientific meetings would indicate that many of our prominent workers take the literal interpretation and *read* their papers, word for word.

As a consequence, they address their papers and not the audience; they speak in language meant for publication, not oral presentation; they must look up and waste time when a slide appears and then rush back to the typed page after pointing to the screen, in so doing perhaps losing the place. It is virtually impossible for an investigator to make a vigorous oral presentation without looking at and deliberately focussing his attention upon his audience. Reading it is therefore ineffective and, worse, distinctly discourteous. Such a presentation automatically implies that any one could have read the manuscript, but that the investigator did so just to let the audience have a look at him. It also suggests that the speaker is willing to relate his results to his colleagues, but that they are not worth the effort required to prepare an effective oral presentation, utilizing very brief notes, if any.

Aside from papers "read by title only," we might well completely drop the word "read" from our scientific programs and practices.

JOHN B. LUCKE

DEPARTMENT OF GEOLOGY,
UNIVERSITY OF CONNECTICUT

THE "audience enemies" Professor DuBois discusses in the March 13 issue of SCIENCE could be effectively controlled if our societies insisted on a rehearsal of their important programs. The officers would have an opportunity of verifying the speaker's ability to be heard and to keep within his scheduled time and might suggest elisions and improvements in arrangement. The radio broadcasters manage to do as much.

GILBERT DALLDORF

A SEVENTH "audience enemy" who should be added to the six described by Dr. E. F. DuBois in SCIENCE for March 13 is the person who reads aloud from his charts or lantern slides every word or number even

[1] Douglas Johnson, *Jour. Geomorphology*, I: 1, 64, 1938.