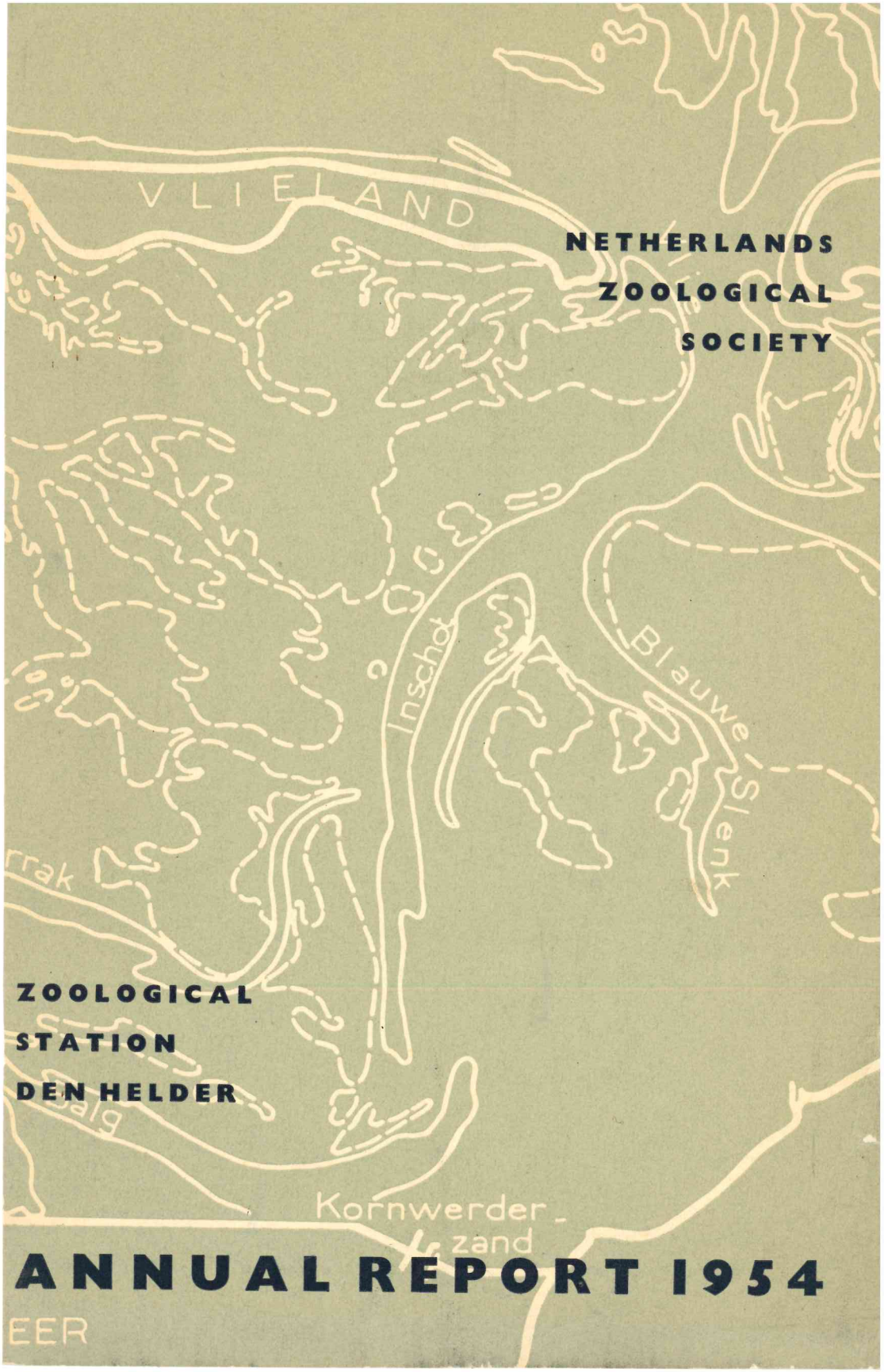

NETHERLANDS
ZOOLOGICAL
SOCIETY

ZOOLOGICAL
STATION
DEN HELDER

ANNUAL REPORT 1954


HOE ZIT DAT

Marine research in the Netherlands is carried out by the following Institutions:

Zoological Station of the Netherlands Zoological Society at Den Helder. Marine biological and hydrographical research. University extension work. Expenses paid by the State: Ministry of Education, Arts and Sciences.

Government Institution for fisheries research at IJmuiden. Sea, coastal and inland fisheries. Fish preservation. Oyster research at Bergen-op-Zoom and, temporarily, at Wemeldinge for studies in connection with the closure of the estuaries in the province of Zeeland. Ministry of Agriculture and Fisheries.

Oceanographical Department of the Royal Netherlands Meteorological Institute at De Bilt (Utrecht). Physical Oceanography and maritime meteorology. Ministry of Defense.

Hydrographical Department of the Navy. Office at the Hague. Bathymetrical surveys. Study of tides. Chart construction. Ministry of Defense, Dept. of the Navy.

Research Department of the Rijkswaterstaat. Headoffice at the Hague, research departments scattered. Current, tides, sedimentation, erosion, reclaiming of land. Ministry of Traffics and Waterways. The service of the Zuiderzee works, with office at the Hague, under whose direction reclamation of land in the Zuiderzee is organized, is under the junction of the same Ministry.

Extrait des Archives Néerlandaises de Zoologie,
Tome XI, 3e livraison, 1956, p. 361–372

ANNUAL REPORT OF THE ZOOLOGICAL STATION OF THE NETHERLANDS ZOOLOGICAL SOCIETY FOR THE YEAR 1954

In the previous report it was stated that of late years a gradual change has been noticeable in our research. In the zoological work emphasis has shifted to problems of details and at the same time attention has become focused more and more on behaviour and physiology. This state of things implies that outdoor work, which would yield general results, was promoted to a less degree, whereas greater facilities were made available for experimental work on various subjects. However, as students often favour outdoor research, this kind of work is continued, which is gratifying because it frequently contributes to opening up new lines of enquiry.

The investigation on the spatfall of the mussel (*Mytilus edulis*), which has been in progress for several years, was now taken up by Mr. REDDINGIUS (Leiden). His observations were a continuation of those made by Mr. BAS in 1953, which aimed at estimating the role of transport along the tidal flats among small mussels that have passed primary settlement. The minute size of the youngest spat requires microscopic examination for counting and measuring. This takes so much time that a single person is seriously hampered in extending his observations to any considerable scale. It would therefore be more efficient to have three men engaged upon this work at the same time rather than in succession. Nevertheless, our insight into the matter has gradually increased and we are looking forward to the publication of Mr. REDDINGIUS' results, together with those obtained by Mr. BAS in 1952 and 1953, and perhaps with those of others. Mr. DRINKWAARD (Utrecht) studied the settling of the mussel in the field as well as in the laboratory. Flower-pots were mounted on iron bars to serve as a substratum at different levels in the water. The results were disappointing because of the small numbers of individuals that actually attached themselves to the pots.

In the laboratory Mr. DRINKWAARD examined the influence of light

on the settling of young mussels. In spite of their preference for illumination the animals seem to prefer and settle on dark substrata rather than light ones. The results are still in a preliminary stage and the work should be continued.

Some progress was also made in another part of lamellibranch research, which deals with the difference in behaviour between younger and older planktonic larvae of bottomdwelling species. In 1950 Mr. LUCAS studied the subject and after him Mr. ANTHEUNISSE in 1952. Generally, pelagic larvae of benthic animals are kept in the upper water layers by their need of light, but when reaching the stage of metamorphosis, they are forced to go down to deeper levels so that their reaction to light must become different by this time. THORSON, however, put forward the supposition that benthic animals of shallow waters maintain the same reaction to light throughout their larval life. An attempt was made to test this supposition for the larvae of *Littorina littorea*. The work was carried out by Dr. AL KHOLY from the Marine Biological Laboratory at Ghardaqa (Red Sea, Egypt) during his six months' stay at Den Helder in 1954. Relative frequencies of younger and older larvae were evaluated at different depths during slack high water at midnight and at noon. Behaviour towards light was found to change during larval life in such a way that the need of light becomes stronger in the older stages. The results will be published in "Archives Néerlandaises de Zoologie".

The previous annual report included a discussion of the work of Miss BLOKZIJL (Groningen), who demonstrated that lamellibranchs will produce more pseudofaeces and fewer faeces in waters carrying a greater amount of particulate matter. This means that more food is rejected in waters with a greater silt content. Mr. KRISTENSEN, assisted by Mr. DRAL, attempted to study the influence of suspended matter on the uptake of food in a different way by determining growth in waters with different silt content. These experiments formed part of a more comprehensive series which was planned to find out to what extent growth and mortality in *Cardium*, *Mya*, and *Mytilus* depend on such environmental factors as absence of light, quantity of suspended matter, and salinity. These experiments have not, however, yielded conclusive results as yet.

In 1954 Miss HEIKENS (Groningen) finished her item of research initiated at Den Helder in 1950. With the assistance of Mr. DRAL she determined the quantities of water pumped by mussels at various temperatures. Her method depended on the fact, ascertained by TAMMES and DRAL, that mussels retain all particles of a size of about 40 μ. The rate of pumping was calculated from the decrease in concentration of a suspension of spores of *Lycopodium*. The data revealed that

mussels continue pumping till the temperature is lowered to about zero, but the quantity pumped becomes extremely small then. This was a confirmation of earlier indications from other data.

In connection with this investigation Mr. DRAL studied the influence of temperature on the mussel's pumping activity by a method described by WALLENGREN (1905). A light pendulum, carrying a minute mirror, is suspended in front of the exhalation siphon so that the strength of the watercurrent can be measured from the deviation of a beam of light reflected by the mirror. These observations revealed a more or less linear relation between the temperature and the quantity of water pumped within the temperature range of – 0.5 to 9.-° C. Even at – 0.5° C. pumping is not altogether stopped. In the common oyster pumping is known to stop at about 5° C.

As was reported last year, Mr. GLAS (Groningen) studied the response of the common shrimp (*Crangon crangon*) to a diminishing head of water. This work was now continued and extended by Mr. HEYLIGERS (Utrecht), who arrived at the conclusion that during the day the shrimps perceive the fall of the surface with their eyes, without the help of antennae; whereas at night they probably observe changes in height when swimming. The water depth preferred when hiding is different in individuals of different size: the larger animals tend to prefer a greater head of water than the smaller ones.

Mr. HAECK (Utrecht) also took up an item which had been studied before at Den Helder, without its having yielded conclusive results so far. In 1950 Mr. WILLEMSEN had tried to demonstrate the shrimp's perception of minute variations in salinity. He endeavoured to condition the shrimps, as BULL had successfully done with fishes. The experiments had miscarried because of the shrimp's readiness to become conditioned to adventitious factors rather than to salinity. At first Mr. HAECK had to cope with the same difficulty, but after some time he gained evidence that shrimps do probably perceive variations down to 0.20 $^{0}/_{00}$ Cl'. Since the threshold had not yet been reached Mr. HAECK will carry on his experiment in 1955. Up to now, little was known as to the threshold of perception of salinity changes in evertebrates; SPIEGEL believed that *Crangon* could perceive NaCl changes of about 2 $^{0}/_{00}$.

Another piece of research, started by Mr. ROESSINGH (Leiden) at Den Helder and Plymouth in post war years, was taken up by Mr. LEEUWENBERG (Utrecht). It dealt with the influence of external factors on the tendency of *Psammechinus miliaris* to cover itself with foreign substances. The habit was found to be most apparent in full daylight, and less so in faint light. When the animals are given small pebbles, shells etc., they will completely cover themselves within half an hour, using their tube-feet for getting hold of the rubbish. LINDAHL and

J. RUNNSTRÖM found that animals from deeper water, which are less pigmented, are sooner inclined to cover themselves than animals from shallow water. They supposed that Lichtschutz might be the ultimate aim. Predators, such as the lobster (*Homarus*) and the edible crab (*Cancer*) will, no doubt, find *Psammechinus* by scent or taste, and not by vision, so that the disguise will be useless against these enemies at least.

Some interesting observations on the cockle (*Cardium*) were made by Mr. ROOSENSCHOON (Utrecht). They concerned the way in which *Cardium* digs itself into the sand and contributed to the study of animal behaviour. He endeavoured to analyse the digging activity, and it seems likely that the chain of actions can be set off even when the cockles hang freely in the water without any contact with the bottom. The observations might stimulate further ethological work.

The study of nudibranch slugs, which had been in progress during former years, was suspended, except for the work of Mr. STOCK (Amsterdam), who wanted to get acquainted with the methods for his intended investigation at Roscoff, and of Mr. DE WOLF (Amsterdam), who tried to continue last year's work. Both attempts (of 19 and 12 days respectively) were hampered by the difficulty of obtaining sufficient numbers of slugs.

The investigations of Mr. DE BLOK on the influence of lunar and tidal periodicities on the reproduction of marine animals was continued. The work is financed by the Netherlands Organization for Pure Research. Its progress is slow but sure. A theoretical treatise was composed, from which it appears likely that various factors are instrumental in inducing reproductive rhythms in the sea. In cooperation with Mr. DUK, instrumentmaker at the Zoological Laboratory at Leiden, an apparatus was designed for separately testing the action of each of the factors that will accompany tidal and lunar phases. The costs are estimated at *f* 21 300.—, an amount that has also been granted by the Organization. The investigation is supervised by Mr. KORRINGA (Bergen-op-Zoom) and Mr. VERWEY.

The data obtained this year by Mr. KRISTENSEN, by buying up specimens from fishermen, are again tabulated. Contrary to the findings of 1953, the southern species were scarce, whereas the occurrence of northern species was normal. Southern species, viz. the cuckoo gurnard (*Trigla cuculus*), the black bream (*Spondyliosoma cantharus*), the hake (*Merluccius merluccius*), the dory (*Zeus faber*), the pilchard (*Clupea pilchardus*) and the cephalopods *Loligo vulgaris* and *Octopus vulgaris* were less numerous than in former years. Only the rays *Raia brachyura* and *R. montagui* were rather common. Mr. KRISTENSEN holds the opinion, that this year's scarcity of the southern species was brought about by the low spring temperatures, which must have checked their northward

migration. The northern species did not respond to the low temperatures and appeared in normal numbers. In this respect there was a marked difference with 1953, when the northern species did migrate farther south. As in 1953, the haddock (*Gadus aeglefinus*) predominated among the northern species and considerable numbers were again found off Den Helder in Texel Hole.

In the spring of 1954 the high salinity of the Wadden sea was conspicuous, which, no doubt, made great numbers of *Sepia* and *Loligo* spawn in the Wadden area. It is not clear whether this high salinity also caused the abundance of young cod (*Gadus callarias*) and sole (*Solea solea*) (born in 1954) and the scarcity of young (1954 born) whiting (*G. merlangus*) and plaice (*Pleuronectes platessa*). Rather, it seems likely that the abundance or scarcity of these animals in the Wadden sea depends directly on the greater or smaller success of their spawning in the southern North Sea. The great numbers of young cod would then be due to the low temperature in February; low temperatures may be considered favourable for this species.

During the frost period of February Mr. KRISTENSEN made some observations on the tidal flats. Between the ice and the frozen bottom he found water rich in H_2S and poor in oxygen. Salinity had reached twice the normal value as a result of freezing. In this medium mussels, cockles, clams (*Mya arenaria*) and polychaetous worms died in great numbers, whereas gastropods, viz. *Littorina* and *Hydrobia*, survived.

In the water the most extreme salinity value was twice higher than normal, namely 32.20 $^0/_{00}$ Cl′ at a temperature of -2.9^0 C. In the bottom even lower temperatures were measured, viz. -5.9^0 C. This means, that in preceding days the watertemperature must at least have been equally low. In this connection Mr. POSTMA draws attention to RINGER's work of 1906. RINGER pointed out that the water can only reach such a low temperature when freezing has increased the salinity to 50 $^0/_{00}$ Cl′, which is about three times the normal value. The observation is also important because RINGER has demonstrated that at these low temperatures calcium carbonate is precipitated. So under these extreme conditions lime could be formed on the tidal flats by an inorganic process.

During the frost period considerable mortality of the molluscs *Gari fervensis*, *Dosinia exoleta* and *Cardium norvegicum* occurred in the southern North Sea. Mr. KRISTENSEN believes these species extend their area of distribution into the North Sea during periods of higher temperature, but perish again during extreme cold.

Our hydrographic research derived considerable advantage in 1954 from a visit of Prof. KREY of the Institut für Meereskunde at Kiel, who worked six weeks at the Zoological Station at Den Helder in return for a stay made by Mr. POSTMA at Kiel in May and June. This exchange

Species	Sex; Size (cm)	Locality (ST Means buoy on the Silverpit-Texel route)
Southern migrants, supposed to have entered the North Sea through Dover Strait		
Scylliorhinus stellaris	♀ 54; ♀ 56; ?; ♀ 41	Texel Hole; ST 4; ST 3; Texel Hole
Raia brachyura	38–107	1 spec. off Petten 12 m (28 Aug.); Texel Hole-Tea Kettle Hole-Oyster Grounds
Raia montagui	29–67	ibidem (42 spec. in one catch in Tea Kettle Hole)
Raia undulatus	♂ 57	Tea Kettle Hole
Raia naevus	♂ 62; ♀ 70	N. of Terschelling 31 m.; ST 3
Clupea pilchardus	adults	May: Texel Hole; Aug.–Sept.: 1 spec. Zuiderhaaks 5 m, others from Wadden Sea
Merluccius merluccius	♂ 54	NW. of Texel, 38 m
Spondyliosoma cantharus	25; 32; ♂ 26; 13; 28	from off Egmond 27 m to N. of Terschelling 36 m and ST 4
Atherina presby ter	9; 9; 16; 8; 9; 9	May: off Callantsoog 4 m. Aug.: many adults and newly born from brackish waters on Texel
Trigla cuculus		mostly from Texel Hole area
Trigla lineata	♂ 29	between ST 4 – ST 5
Northern fishes, likely to have entered the southern North Sea from the North		
Gadus virens	21	Petten 5,5 m
Molva molva	40; ♂ 55; 49	ST 3; NW of Terschelling 36 m; NW of Texel 29 m
Onos cimbrius	25; 22; 19; 19; 11; 9	Texel Hole; off IJmuiden 29 m; Texel Hole (2 spec.); Petten 4 m; Texel 4 m
Anarhichas lupus	± 40; ± 35	Tea Kettle Hole; Texel Hole
Hippoglossus hippoglossus	♀ 54	ST 4
Fishes, whose direction of migration is uncertain		
Raniceps raninus	11; 6; 10; 6; 7; ± 10	coastal water between Petten and Texel 4–11 m
Labrus berggylta	25–35	from off IJmuiden to ST 4
Ctenolabrus rupestris	7	Malzwin (Wadden Sea)
Spinachia spinachia	15	off Petten 5,5 m
Scorpaena dactyloptera	21; 14	ST 4; off IJmuiden 29 m
Evertebrates, "rare" in the area off Den Helder		
Portunus puber		Texel Hole
Nephrops norvegicus		Texel Hole – ST 4
Illex illecebrosus	♀ 26.5	Texel Hole
Todaropsis eblanae	10	Texel Hole
Loligo vulgaris		mostly from coastal waters (no data collected June–Oct.)
Loligo forbesi		mostly from Texel Hole Area (no data collected June–Oct.)
Sepia officinalis		mostly from coastal waters and Wadden Sea
Eledone cirrhosa	7.5–11.5	off Petten 5 m – Botney Gut 50 m
Scaphander lignarius		ST 1 – ST 2

Numbers per month											
J	F	M	A	M	J	J	A	S	O	N	D
—	—	—	2	—	—	—	—	—	—	1	1
—	—	—	3	—	2	—	1	—	1	1	5
7	—	49	23	5	—	1	1	—	2	7	53
—	—	—	—	—	—	—	—	—	—	1	—
—	—	—	—	—	1	—	—	—	—	—	1
—	—	—	—	4	—	—	16	2	—	—	—
—	—	—	—	—	1	—	—	—	—	—	—
—	—	—	—	—	—	—	4	—	—	—	1
—	—	—	—	6	—	—	8	—	—	—	—
—	—	—	—	5	17	7	—	1	—	—	1
—	—	—	—	1	—	—	—	—	—	—	—
—	—	—	1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	1	—	—	—	—	—
1	—	1	4	—	—	—	—	—	—	—	—
—	—	1	1	—	—	—	—	—	—	—	—
—	—	—	—	1	—	—	—	—	—	—	—
—	—	2	3	—	—	—	—	1	—	—	—
—	—	3	1	—	—	—	—	—	—	—	—
—	—	—	—	1	—	—	—	—	—	—	—
—	—	—	1	—	—	—	—	—	—	—	—
1	—	1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	1
1	1	2	—	1	2	1	—	—	1	—	1
—	—	—	—	1	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	1	—
—	—	—	7	248	?	?	?	?	?	—	1
29	—	—	—	—	?	?	?	?	?	32	118
6	—	—	—	50	48	12	37	8	10	1	4
—	—	3	3	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	1	—	—	—	—

was promoted by financial aid on the German side and from the Organization for Pure Research. In close cooperation with Mr. POSTMA Prof. KREY examined the composition of suspended organic matter in the Wadden Sea. The chlorophyll content of live phytoplankton was compared with that in detritus. An exact knowledge of this relation is essential in evaluating the fertility of water masses. A closer analysis of the relation between dead and living matter was made possible by a specific test for live protein, which had been developed by Prof. KREY. These determinations were carried out together with those for nitrogen, phosphor, etc.

Prof. KREY and Mr. POSTMA continued their cooperation in May during a visit of the latter to Kiel. On this occasion several watersamples from the Baltic Sea were analysed and attention was again focused on the relation between living and dead matter. They had an opportunity to compare two methods for determining organic phosphorus. The results justified every confidence in the method employed.

Subsequent to his visit to Kiel, Mr. POSTMA became acquainted with the Hydrobiological Institute at Plön and then spent a fortnight at the German Hydrographic Institute at Hamburg. Here, in cooperation with Prof. KALLE, he carried out an investigation into the origin of a turbidity maximum in the lower Elbe. A similar maximum is found in almost every river estuary in Europe and in many cases, notably in the Elbe, it has been ascribed to flocculation of the colloids of the river water by the minerals of the sea. It was shown by this investigation, in which samples of river water were treated with sea water, that no such flocculation takes place in the Elbe, at least not on a scale sufficient to explain the existence of the turbidity maximum. Mr. POSTMA assumes that hydrographic factors are the main causes of this turbidity. Recently, Ir. SANTEMA of the Rijkswaterstaat arrived at the same conclusion in regard to the lower Rhine.

Mr. AL KHOLY also cooperated with Mr. POSTMA, and further Mr. RD. ENGKOES SOERIAATMADJA, analyst of the marine biological laboratory at Djakarta (Java), joined the hydrographic team. Mr. AL KHOLY also tested the stability of chlorophyll in a dead culture, which is of interest in connection with the occurrence of chlorophyll in non-living organic matter in the sea. Perhaps a short contribution on the subject will appear in print.

Mr. SOERIAATMADJA studied the methods of hydrographic work, but at the same time furnished a contribution to our own line of research. He analysed the composition of the water in the North Holland Canal and traced the influence of this water in the Wadden Sea near Den Helder. Since salt water is a nuisance in the low lands of the region, fresh water is let in near Amsterdam from the Yssel Lake and drained

off at Den Helder. This management tends to get rid of the salt water penetrating the sluices. The water of the canal contains considerable quantities of phosphate and nitrate, which fertilize the tidal waters nearby. The observations were made in November and December and will be continued after the departure of Mr. SOERIAATMADJA.

A hydrographic survey of the Eems and the Dollart was carried out in cooperation with the Royal Netherlands Meteorological Institute (K.N.M.I.), the Oceanographic Section of which has taken water samples from a point near Embden down to the sea. A comparison with the western part of the Wadden Sea revealed an interesting difference. The samples from the Dollart contained much more suspended matter (living and non-living) than those from the western part of the Wadden Sea, and the Dollart-water was therefore more nutritive. Both Dollart and western area act as a store for suspended material, but the river Eems, contrary to the river Yssel, considerably adds to the fertility of these waters.

The Government Institute of Fisheries Research applied to the Station for assistance in finding out whether the densely inhabited mussel grounds off Den Oever (Wieringen) cause a local decrease in the quantity of suspended matter, organic as well as inorganic. The investigation was undertaken jointly by Mr. HAVINGA, Mr. KORRINGA, and Mr. POSTMA. In particular the chlorophyll content was taken as a measure for the amount of organic matter. The chemical analyses were carried out at Den Helder by Mr. KORRINGA and the personnel of the Zoological Station. In connection with this work cruises were made in the western part of the Wadden Sea. The work did not yield conclusive results and will probably be continued later on. The data obtained so far contribute, however, to our knowledge of the occurrence of chlorophyll, the distribution of which has had Mr. POSTMA's attention for several years.

Assistance was also offered to Mr. KORRINGA in his effort to estimate the productivity of the Easter Scheldt. A considerable number of phosphorus determinations were made on water samples collected at regular intervals on Ierseke Bank and more accidentally in other locations.

In April and August further aid was given to an investigation initiated by Rijkswaterstaat, section Hoorn, on the transport of silt in Den Helder harbour. In former reports the changes that have here taken place were mentioned. The silting up of the new harbour exceeds expected standards and Waterstaat has therefore tried to gain an insight into the settling of the sediments. The Zoological Station determined the silt content of a thousand water samples. In an attempt to limit sedimentation in the new harbour, the old outer harbour (the so-called Nieuwe Diep) will now also be dammed off in its outer part.

In the Nieuwe Diep salinity and temperature determinations were carried out daily. This routine work was supplemented by a number of oxygen determinations. In front of the Zoological Station the water is high in salinity near the bottom, most of the time even higher than at high tide formerly when the currents could pass freely. The deeper water is therefore quite suitable for the aquaria, but in summer its oxygen content is poor. During the last few years the water has therefore been pumped up from the Nieuwe Diep during winter only, whereas a waterboat maintained the supply from the Marsdiep in summer. The management has been satisfactory so far, but future arrangements are uncertain as long as the construction of the new harbour has not been completed.

Besides the persons already mentioned, Mr. J. A. W. LUCAS (Leiden), Mr. R. PEELEN (Amsterdam) and Mr. J. JANSONIUS, a geologist from Utrecht, spent short terms at Den Helder, mainly for orientation. Further Mr. POSTMES (Utrecht) and Mr. VAN DER HEIDE (Amsterdam) spent one day at the Station for fixation of specimens, while Dr. J. S. ZANEVELD (Leiden) had a five days' stay to get acquainted with methods of aquarium management and research methods in connection with the erection of a marine biological laboratory on Curaçao (Caribbean).

The number of students attending the Station's summer courses amounted to 29 this year; 20 of them were from Leiden, 8 from Utrecht and 1 from Amsterdam. The courses were jointly given by the five members of the staff, including Mr. DE BLOK, from June 21st to July 3rd and from July 5th to July 17th.

Apart from this, Mr. VAN NIEUWENHOVEN and Mr. KOOY, assistants at the Physiological Laboratory of the University of Amsterdam, gave a physiological course, which had been planned together with Dr. J. DE WILDE. From June 9th to June 16th 12 students attended this course.

The total number of man-days for individual workers and summer course participants in 1954 amounted to about 1550. In the previous report it was explained that this number varies a good deal in the course of time; over the period 1947–1954 it averages about 1080.

Considerable expenditure was again laid out for the maintenance of the building and the students' lodge, which were both painted this year. The caretaker's sitting-room was given a better appearance. The electric circuits near the aquaria were replaced by waterproof cables and finally a dark room for photographic work was added to the building.

The Mekog Ltd. transferred to us the new aquarium, including plastic pipings and pumping installation, for *f* 18500.—. This amount was furnished from a fund accumulated from payments by

Mekog Ltd. for the contracted research on industrial waste waters, carried out by Dr. TAMMES in previous years. The Bleeker electric spectrophotometer that had been in use for the same purpose was taken over by us for *f* 2 500.—. The aquarium and the photometer are most valuable acquisitions for the Station.

The Station's equipment was further supplemented by additional instruments, for which the Government furnished an extra grant of *f* 5 000.—. The purchases included a Christ centrifuge of 1 litre capacity. In general, the Station's equipment has been much improved of late years. This was especially noticeable in 1954, thanks to the above mentioned extra grant and the raising of the regular allocation for instruments to *f* 3 600.—.

The Station's vessel "Max Weber" did not require heavy expenses. The ship was in fairly regular use, also during the winter. It passed a general inspection by Scheepvaartinspectie which did not lead to large expenditure. The Station obtained the use of a second rowing-boat, which is the property of the Organization for Pure Research and had been used by the Foundation for Marine Geology at Groningen. A second rowing-boat will often be an advantage for work on the tidal flats.

There were no changes in the personnel, except for the departure of the student-analyst G. VAN DER WAL, who left the Station on October 1st. A memorable event was the conferment of the doctor's degree on Mr. POSTMA. His stay at Kiel and Hamburg has already been mentioned. In October and November Mr. POSTMA worked at the Zoological Station at Naples. His program had been set up in cooperation with Mr. KORRINGA, who had visited Naples in spring. Their aim was to study the fertility of some small lagoons which communicate with the Mediterranean. Attention was also given to the fertility of the Gulf of Naples. The latter observations will perhaps contribute to a better understanding of fertility relations in the Mediterranean in general. During his stay in Italy Mr. POSTMA also attended the Congress of the "Union Géodésique et Géophysique Internationale", which was held at Rome from September 14th to October 1st.

The condition of the library was quite satisfactory, thanks to the good care of Mr. WESTENBERG and Miss STOLL. The main feature was an extension of our exchange program. Special efforts were made to acquire large sets of periodicals at once in exchange for backnumbers. The number of exchange relations now amounts to about 225. The library is becoming more and more cramped for space and an expansion is urgently necessary. Only a few books were obtained by purchase and quite a lot of reprints by donation, for which we express our sincere gratitude. VON BUDDENBROCK's "Vergleichende Physiologie" was received as a present from Prof. KREY, Kiel.

The supply of study material to laboratories, schools, zoological gardens, private workers and amateurs brought in *f* 4 392.08. The purchase of animal specimens required a sum of *f* 3 375.33 and expenditure for wicker-bottles, preserving solutions, packing, freight etc. was *f* 641.94, from which *f* 110.33 was returned; this resulted in a nett profit of *f* 485.14. This side of the Station's activity takes much time and is therefore costly, but at the same time important. The business could be made selfsupporting by charging for the salary costs, but this would raise the prices considerably.

The Government grant for 1954 amounted to *f* 87 700.—, of which *f* 66 000.— was allocated for salaries and national insurance, which left *f* 21 500.— to defray further expenses. *f* 5 000.— of this sum was especially destined for some expensive instruments, so that *f* 16 500.— remained at our disposal for running the Station.

Den Helder, March 1955

J. VERWEY

The Netherlands Zoological Society has issued the following publications, which are obtainable from the Director of the Zoological Station, Den Helder, at the prices given below:

Tijdschrift van de Nederlandsche Dierkundige Vereniging

Series I, vols 1—7, 1874—1885, out of print	
„ II, „ 1—20, 1887—1927, partly out of print . .	8.50*
„ III, „ 1—3, 1928—1933, partly out of print . .	5.—
Supplement to vol. 1 (Ser. I), 1883—'84:	
Report on oyster research	6.—
Supplement to vol. 2 (Ser. I), 1888:	
Report on certain fisheries	6.—
Index to Tijdschrift, 1874—1909	1.20

Archives Néerlandaises de Zoologie, issued in cooperation with the Holland Society of Sciences at Haarlem:

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