

VLIELAND

NETHERLANDS INSTITUTE  
FOR SEA RESEARCH  
DEN HELDER

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ANNUAL REPORT 1965

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Reprinted from  
*Netherlands Journal of Sea Research*  
4 (1): 95-109 (1968)

## ANNUAL REPORT OF THE NETHERLANDS INSTITUTE FOR SEA RESEARCH FOR THE YEAR 1965

As in previous years, the annual report on the work of the Netherlands Institute for Sea Research may be divided into two parts, one scientific and the other non-scientific.

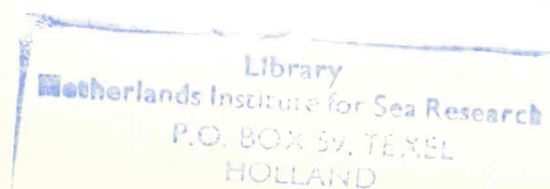
### PART I

#### DEPARTMENT OF HYDROLOGY

Mr. ROMMETS and Dr. POSTMA continued their research on primary productivity in the Wadden area by the  $^{14}\text{C}$  method. Additional measurements were carried out in the IJsselmeer and, together with Mr. F. VEGTER (Yerseke), in the Delta area. This is a quantitative study of the production of organic matter in the coastal waters of The Netherlands. For the Wadden area, the main point of interest is to compare this production with the supply of organic matter from both the North Sea and the IJsselmeer, and information is also obtained on the daily course of production, seasonal variations, and local differences. Special attention is paid to differences in production between the outer and inner parts of the Wadden Sea caused by differences in the quantities of plankton and suspended matter. This study is also expected to yield data on the influence on productivity of the discharge of fresh water from the IJsselmeer-sluices. Mr. FONDS has identified and counted a number of phytoplankton samples.

From November 1964 to February 1965, during two crossings with H. Neth. M.S. "Snellius" as part of the Navado Research program of the Royal Navy, Mr. ROMMETS collected water samples in the Atlantic for dissolved organic carbon and nitrogen analysis.

Most of the analytical work of Mr. EISMA's research on the composition, origin, and distribution of Dutch coastal sands was completed. Since the bottom sediments off the coasts of Texel and Vlieland contained no fine material ( $< 50 \mu$ ), water samples were collected in July and August along four sections taken at right angles to the coastline between Egmond and Vlieland for determination of suspended matter. To add to the data obtained off the coast between Hook of Holland and Ameland the "Ephyra" sailed for Zeeland in April to collect bottom samples offshore between Voorne and Zeebrugge. Because the weather proved unfavourable for work on the open sea, sampling was done in-



stead in the Westerschelde from Vlissingen to Antwerp for the Delta Institute. In September a number of bottom samples were taken in the southern part of the North Sea with the "Willem Beukelsz.", kindly put at our disposal by the Ministry of Agriculture and Fishery (Netherlands Institute for Fishery Research). Dr. H. VEENSTRA (Groningen) joined us for this trip to carry out his research on shingles in the North Sea. As in previous years, Miss Y. BOSCH, Mr. M. MANUELS, and temporarily Miss E. SMIT, assisted in the laboratory and during cruises. From 18 September to 5 November Mr. EISMA collected bottom samples in the Bay of Naples and in the Bay of Gaeta for a study of the bottom fauna and the origin and transport of sediment in this area. This work was made possible by a grant from the Naples committee of the Royal Netherlands Academy of Sciences. The research was carried out with the "Reinhard Dohrn" of the Zoological Station, Naples.

Dr. WESTENBERG continued his historical-geographical research, concentrating mainly on the incursion of the sea in the Middle Ages that led to tidal movements in the Zuyderzee. It is generally assumed that the critical stages in this process occurred around the thirteenth century. The available data from existing references and the Charters of Holland proved to shed more light on Kennemerland than on the more remote area of West-Friesland, because at that time the Counts of Holland had not extended their power farther North. Nevertheless, the data collected so far, in combination with sixteenth and seventeenth century maps, permit a tentative reconstruction of the history of the Kennemerland dykes, the earlier period of which suggests the establishment of tides in the Zuyderzee (as well as in the IJ). The excavation of the "Torp" south of Den Helder, carried out by the Archaeological Research Service (Amersfoort) at the instigation of Dr. WESTENBERG contributed one fact toward the solution of the puzzling history of the Zuyderzee: preliminary results of the investigation of a mound (terp) occupied in the eleventh century indicate that the breakthrough in question must have occurred after the first reclamation of former peat bogs in the vicinity (Anna Paulowna, Wieringerwaard, etc.) and before the time of the building of the dykes whose remnants survive in this area, and that this incursion of the sea is probably connected with similar events in North Kennemerland.

Up to his departure in November Mr. TAN continued his research on the "odour" thought to guide elvers from salt to fresh water. This study did not yield any definite conclusions, but it seems that this "odour" is not a constant component of fresh water. Samples of IJsselmeer water collected monthly throughout the year, were kept at a low temperature and used in the spring for elver experiments from the results of which it is assumed that the winter samples did not contain the "odour".

## DEPARTMENT OF RADIOACTIVITY RESEARCH

In February Dr. DUURSMA left for Monaco, and the chemical research of this department came virtually to a standstill. He had been occupied with problems concerning the absorption of elements to suspended particles and the development, in collaboration with the Mathematical Centre in Amsterdam, of mathematical models concerning the rate of ion transport in sediments.

Mr. VOSJAN carried out preliminary research on the accumulation of zinc and cobalt in suspended matter and cultures of algae.

## DEPARTMENT OF BIOLOGY

Mr. DE BLOK spent most of his time analyzing the results of his research on time-keys that synchronize lunar and semilunar periodicities in reproduction, especially in Molluscs. Mr. DRAL continued his research on the pumping and retention mechanism of the mussel. The extent to which small food particles are retained by the mussel is probably dependent on the rate of pumping. If this pumping rate surpasses a certain critical value, more and larger particles are admitted. Furthermore, the activity of the lateral cilia on part of the gill can be slowed down or stopped altogether while being maintained at the original rate in other places. This happens especially when large amounts of suspended matter are offered. The effect of this mechanism is that the water, after having been partly filtered, flows back into the mantle cavity and dilutes the incoming suspension. This dilution process probably facilitates the consumption of concentrated suspensions. An investigation to determine whether the septa in the exhalant opening of the mussel also play a part in this re-circulation is still in progress.

Nelson's observation that in water lacking suspended matter the gill of the oyster is not adjusted to filtration (as in the case of a highly concentrated food suspension), was confirmed for the mussel. It seems probable that the unicellular intrafilamentary muscles play a part in this adjustment of the efficiency of the gill-filter. Some experiments to study this point are in progress, but it is still too early to discuss the results.

A brief summary of the investigation on the movements of the latero-frontal cilia of mussel gills was submitted to "Nature"; a more extensive study, in which the function of these cilia is also discussed, is to appear in the "Netherlands Journal of Sea Research".

Mr. FONDS studied the biology of the Common Goby, *Gobius minutus*.

Data obtained during several fishing trips led to the conclusion, that this goby leaves the Wadden Sea to winter in the North Sea at depths over 7 m, and returns in March to the coast and the estuaries. Mating probably occurs in April in shallow water, and a month later no adult gobies are found in the catches. In July a new generation is very numerous off the coast, and apparently a great many of these fishes enter the Wadden Sea, where large numbers are caught in August and September. Preliminary experiments on environmental factors governing the migration of *Gobius* showed that at temperatures below 8° C and salinities below 7‰ Cl', *Gobius* burrows into the bottom and also that they show a strong positive rheotaxis after having traced the juice of molluscs or crabs. The influence of temperature, salinity, and oxygen content on the number of vertebrae was also investigated. There were some indications that high temperatures and increase in oxygen pressure leads to a lower average number of vertebrae and a decrease in oxygen pressure leads to a higher average number.

Mr. FONDS also supervised the preliminary work on a phytoplankton calendar for the Marsdiep.

Additional quantitative phytoplankton counts of surface samples from the North Sea off the coast near Egmond were carried out for Mr. EISMA. In this sampling area the sea had a deep wine-red colour that proved to be caused by the ciliate *Mesodinium pulex* Cl. et Lachm. (= *M. rubrum* Lohmann), living in symbiosis with a reddish-brown unicellular alga. Both ciliate and alga were already recorded in 1908 by LOHMANN as *Halteria rubra* and *Erythromonas haltericola* from the Baltic, where they may occur in large numbers locally.

Mr. SWENNEN finished his research on the distribution of *Polymorphus botulus* (Acanthocephala), a parasite of the Eider duck; the intermediary host of this parasite is the Shore crab, *Carcinus maenas*. The infection percentage decreases with the distance from the Wadden Sea, except in the Oosterschelde, where the infection may have originated from the Wadden Sea. Taken as a group, the older crabs have a higher percentage of infection than the young ones, but the number of mature parasites per crab, which varies from 1 to 60, seems to be independent of the age and also of the sex of the crab. The presence of full-grown cysts does not prevent the crab from spawning or to influence its behaviour in the environment. In the Wadden Sea the percentage of infected crabs had remained constant over a number of years and shows no variation within separate years. This means that in the Wadden area these crabs are a constant source of infection to eiders.

It is hoped that ringing of a large number of young and adult eiders will provide information about the distribution and longevity of these birds. So far, 2443 birds have been ringed and their feeding preferences

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work on a phytoplankton

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f young and adult eiders n and longevity of these their feeding preferences

are being studied. The cockle seems the main prey, followed by the mussel; crabs are of local importance. Bird held in a set of cages next to the laboratory are being used for experiments on the duration of parasite development in the eiders and its consequences for the birds.

In August 1965 Mr. VENEMA resumed his study of the distribution, migration, and osmoregulation of the Swimming Crab (*Macropipus holsatus*), which he had started in 1962 when working for his degree. This crab starts entering the Wadden Sea at the end of April, and their numbers increase up to October. In November, however, they have disappeared from the Wadden Sea and their numbers also show a sharp decrease just off the coast. The field work is being supplemented by experiments on the environmental demands of the crabs under different circumstances.

Dr. KRISTENSEN concentrated mainly on working out the data collected by himself and his collaborators in the area of the Antilles. He also completed a publication on a study done at Naples on changes in the heart-beat of the limpets *Patella* and *Diodora* accompanying desiccation; and started working out the data, collected by the N.I.O.Z. over a great many years, on annual variations in the occurrence of rays and of the Common Squid, *Loligo forbesi*.

Dr. VERWEY collected references on the vertical migration of mollusc larvae under the influence of diurnal tidal changes, and worked out earlier Institute observations on this subject.

Miss M. MAAS (Leiden) continued the research she started in 1964 on the settlement of spat and small metamorphosed specimens of *Mytilus* on threads of various thicknesses. As mentioned in the 1964 Annual Report, with increasing size the animals show a preference for thicker threads. The indications obtained in 1964 that settling on the threads continues until a certain density is reached, were re-examined in 1965. Experimental evidence failed to support the assumption that all the animals would leave the threads after a certain time. It is density of occupation that determines when the animals leave the threads.

Miss E. HEERES (Groningen) investigated the influence of temperature on the sign (positive or negative) of the geotaxis of species of *Littorina*, especially in *L. littorea* and *L. saxatilis*. JANSSEN had found that the geotaxis of *L. obtusata* is negative at 12° C and suddenly changes to positive somewhere near zero; at -1° C all the animals showed a positive reaction. Miss HEERES found that for *L. littorea* and *L. saxatilis* the sign also changes with decreasing temperature, but that this change is a very gradual one, starting at 23° C. Especially in *L. littorea*, an appreciable number start by reacting geotactically positive at a high temperature, but after some time this reaction usually changes to negative. This observation is of importance in connection with NE-



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<i>Belone belone</i>	9	77	± 988	± 642	± 498	± 579	± 413	± 266	± 201	± 59	± 2403
<i>Gadus callarias</i>		41	30	4	57	302	344	251	± 117		± 3463
<i>Gadus luscus</i>					4	±	4	2	4	14	± 1214
<i>Gadus merlangus</i>		30	± 288	102	41	23	± 190	± 680	± 254	7	± 1615
<i>Gadus minutus</i>								1			1
<i>Gadus virens</i>	16	1			26	96	± 164	± 281	± 152	6	± 807
<i>Gadus pollachius</i>	14	165	14	18	31	98	± 173	± 402	± 259	31	± 1384
<i>Onos mustelus</i>			62	23						± 157	2
<i>Entelurus aequoreus</i>			1				3	1			3
<i>Syngnathus acus</i>		2	159	66	20	10	6	36	5		300
<i>Syngnathus rostellatus</i>		10	4	8	21	11	8		1		64
<i>Morone labrax</i>			8	197	732	577	± 849	± 224		2	± 2587
<i>Caranx trachurus</i>			± 14	± 53	± 3584	± 760	± 40	± 1			± 4452
<i>Annodontes lancea</i>											
<i>Apodys lanceatus</i>											
<i>Chelalabius melip</i>											
<i>Gomphoscorpius</i>											
<i>Callionymus lyra</i>											
<i>Centronotus gunnellus</i>	1		1	10	2	29	6	14	1		23
<i>Zoarcetes viviparus</i>	540	± 1893	± 722	± 501	267	225	± 344	± 430	± 231	± 92	± 5245
<i>Mugil ramada</i>	2	33	260	135	47	67	96	65	11	5	± 715
<i>Atherina presbyter</i>		12	56	1	70	± 346	11	1		1	± 497
<i>Gobius minutus</i>		3				5					± 9
<i>Trigla lucerna</i>		3	9	2	1		1				± 16
<i>Trigla cuculus</i>			11	1							± 12
<i>Cottus scorpius</i>	114	± 722	± 803	± 543	± 367	± 230	± 221	± 550	± 690	± 331	± 4571
<i>Cottus bubalis</i>									1		1
<i>Agonus cataphractus</i>	1	4	2		1		2	13	1		± 24
<i>Cyclopterus lumpus</i>	5	4	7			13	41	68	20	43	± 201
<i>Liparis liparis</i>		116	± 139	± 40	1	1			± 62	± 182	± 244
<i>Gasterosteus aculeatus</i>	33	1393	± 2127	± 1551	± 1679	± 1823	± 828	± 496	± 195	± 15	± 400
<i>Pleuronectes platessa</i>	135	± 1393	± 2127	± 1551	± 1679	± 1823	± 828	± 496	± 195	± 170	± 10397
<i>Pleuronectes flesus</i>	403	± 2511	± 2608	± 1672	± 1733	± 1536	± 735	± 668	± 154	± 88	± 12108
<i>Pleuronectes limanda</i>	13	± 1800	± 2866	± 927	± 620	± 467	± 182	± 227	± 196	± 251	± 7549
<i>Scophthalmus maximus</i>											2
<i>Scophthalmus rhombus</i>		14	40	46	26	9	6	1	8	3	± 153
<i>Solea solea</i>	1	28	52	± 531	± 851	± 577	± 284	± 35		2	± 2361
<i>Sepia officinalis</i>											1
<i>Sepiola atlantica</i>											1
<i>Alloteuthis subulata</i>			3	± 90	1	1					± 95
<i>Crangon crangon</i>			40						± 25	± 74	± 139
<i>Macropipus holsatus</i>		3	2	1					± 6		± 423
<i>Carcinus maenas</i>	± 123	± 6100	± 9125	± 14180	± 5120	± 7415	± 7790	± 11195	± 2599	± 61	± 63708
<i>Rhizostoma pulmo</i>					64	± 2813	± 433	± 201			± 3511
<i>Cyanea capillata</i>					117	± 47					± 187
<i>Cyanea lamarckii</i>					406	± 65					± 472
<i>Chrysaora lysosocella</i>					1111	± 224					± 1335
<i>Aurelia aurita</i>			± 50	9	5						± 64
<i>Pleurobrachia pileus</i>			± 340	± 3900	± 40					2	± 4282

WELL's experiments on *L. littorea*. The assumption that *L. obtusata* would show a positive geotaxis at sufficiently high temperatures similar to the reaction at low temperatures, was not confirmed. To investigate the problem of whether the jelly-fish *Rhizostoma pulmo* has some mechanism to keep it in coastal waters, Mr. P. VAN DER WIELEN (Groningen) studied the displacement of this jelly-fish during the course of both a single tidal period and the summer season. In the Wadden Sea the percentage of young animals was high during the second half of June, after which it decreased quickly; no young animals were produced after the 5th of August. Young animals and the next stage were observed in the Wadden Sea and not in the North Sea, whereas larger animals were found not in the Wadden Sea but in the North Sea. Apparently the Wadden Sea loses animals of the intermediate size to the North Sea. This finding is confirmed by the observation that on the 5th of August in the Texelstroom the largest average diameter of the jelly-fishes was found at the end of the flood and the smallest at the beginning of the ebb. It must be kept in mind that in 1965 an abnormal amount of freshwater was discharged by sluices into the Wadden Sea, which may have caused a greater loss of jelly-fishes to the North Sea than occurs normally. The observations do not support the assumption of a mechanism by which jelly-fishes remain in coastal waters. Both *Rhizostoma pulmo* and *Chrysaora hysoscella* took about 45 days to reach their adult sizes of 40 and 44 cm, respectively, starting from a diameter of 1 cm.

Throughout the year the crew of the Texel lightship collected macroplankton, taking 12 samples every week, whenever possible during consecutive tides and so far only at the surface. Most of the identification was done by Miss VAN DER BAAN; fish larvae were dealt with by Mr. FONDS, crab-larvae by Mr. SCHRIEKEN, and amphipods by Mr. W.J.M. VADER, now at Espesgrend, Norway.

In 1965 Miss VAN DER BAAN gave much attention to the two species of *Sagitta*, *S. elegans* and *S. setosa*. *S. elegans* seems occur at the lightship mainly during the first half of the year, with a possible maximum around March, when temperatures and salinities are generally lowest, but *S. setosa* occurs mainly in the second half of the year, when temperature and salinity are relatively high. It is not yet certain whether this indicates a periodicity of the two species within the area or a distinct supply of species from outside the area.

Dr. VERWEY used Miss VAN DER BAAN's data for an investigation of the occurrence of blue coloration in *Cyanea lamarckii*. In this species the colour appears at diameters of between 11 and 60 mm; a great many, but not all of the animals measuring over 60 mm are blue. This blue colour seems to appear more rapidly in summer than in winter, as

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 sumption that *L. obtusata* at high temperatures similar confirmed. To investigate *ma pulmo* has some mecha- DER WIELEN (Groningen) uring the course of both a . In the Wadden Sea the g the second half of June, g animals were produced d the next stage were ob- North Sea, whereas larger ea but in the North Sea. of the intermediate size to the observation that on the st average diameter of the and the smallest at the be- that in 1965 an abnormal ices into the Wadden Sea, lly-fishes to the North Sea ot support the assumption in in coastal waters. Both k about 45 days to reach 7, starting from a diameter

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ttention to the two species ems occur at the lightship with a possible maximum nities are generally lowest, of the year, when temper- ot yet certain whether this thin the area or a distinct

data for an investigation of *amarckii*. In this species the nd 60 mm; a great many, ) mm are blue. This blue mmer than in winter, as

ØSTERGREN already supposed. The blue also becomes more intense in the summer.

Our fisherman, Mr. BEUMKES, continued his fishing with hoopnets and fish-traps on the southeastern side of Texel; the catches are summarized on pages 100, 101. Mr. VERWEY intends to tabulate the results of the kom catches for recent years. The acquisition of species that are interesting for distribution or fluctuations in population density, was continued; the data will be published separately. *Eledone cirrosa*, an octopus occurring in relatively high numbers in 1964, continued to be caught in the beginning of 1965, sometimes quite near the coast, but in the second half of the year it was no longer recorded. Of the species entering the North Sea by the Southern entrance in spring, only small numbers were caught in 1965. Migrants from the North were also scarce. On the other hand, the Goose-Barnacle (*Lepas anatifera*), which is passively transported into the North Sea from the South, was decidedly numerous in 1965, just as in 1947, 1950, 1954, 1958 and 1963.

The 1964 Annual Report mentioned the occurrence of young Blue Whiting (*Gadus poutassou*), a species not previously known to occur in the southern part of the North Sea. In 1965 this invasion came to an end, only one specimen being brought in, but another Gadid, a young *Gadus minutus*, was found for the first time in our coastal waters. This species may not be as rare as it seems, because it is difficult to distinguish the young specimens from those of the Bib (*Gadus luscus*), a common species here.

The find of a fairly undamaged skull of a Walrus (*Odobenus rosmarus*) should also be mentioned. This skull was found on July 18th, 27 km N of Heligoland, and is now in the collection of the Museum of Geology and Mineralogy at Leiden.

#### Publications in 1965

- |                                   |  |
|-----------------------------------|--|
| DRAL, A.                          | <i>Xenomystus nigri</i> , een belangwekkende lastpost.—Aquarium, Den Haag <b>36</b> : 89-91.                       |
| DUURSMA, E.K.                     | The dissolved inorganic constituents of sea water. In: Riley & S'Karrow, Chemical Oceanography: 433-475.           |
| EISMA, D.                         | Shell-characteristics of <i>Cardium edule</i> L. als indicators of salinity.—Neth. J. Sea Res. <b>2</b> : 493-541. |
| EISMA, D.                         | Eolian sorting and roundness of beach and dune sands.—Neth. J. Sea Res. <b>2</b> : 541-556.                        |
| FONDS, M.                         | Indrukken van de Ivoorkust (West-Afrika).—Aquarium, Den Haag <b>36</b> : 80-85.                                    |
| JONG, K. M. DE<br>& I. KRISTENSEN | Gegevens over Mariene Gastropoden van Curacao.—RIVON-mededeling (218): 1-56.                                       |

- KRISTENSEN, I. Habitat of the tidal gastropod *Echininus nodulosus*.—*Basteria* 29: 23-25.
- KRISTENSEN, I. De "Jack in the Box", *Opisthognathus aurifrons* (Jordan en Thompson), een muilbroeder in zee.—*Aquarium*, Den Haag 36: 28-30.
- KRISTENSEN, I. *Rivulus memoratus* (Poey) in zijn natuurlijke milieu.—*Aquarium*, Den Haag 36: 74-76.
- KRISTENSEN, I. Der maulbrütende "Jack in the Box", *Opisthognathus aurifrons*.—*Aquar. u. Terrar.-Z.* 18: 321-323.
- KRISTENSEN, I. Onderzoek in het Flamingo-meer van Bonaire.—*Levende Nat.* 68: 184-189.
- POSTMA, H. Water circulation and suspended matter in Baja California Lagoons.—*Neth. J. Sea Res.* 2: 566-605.
- SCHRIEKEN, B. Spinkrabben en zeeanemonen.—*Levende Nat.* 68: 276-279.
- SCHRIEKEN, B. Koornaarvissen.—*Aquarium*, Den Haag 36: 77-79.
- SWENNEN, C. *Armadillidium album* op Vlieland.—*Het Zeepaard* 25: 112-113.
- SWENNEN, C. De vondsten van zeenaaktslakken in de afgelopen periode.—*Het Zeepaard* 25: 80-82.

## PART II

1. *Personnel*.—Dr. J. VERWEY retired on 1 October, after having been director of the Institute for about 35 years. To mark the occasion, the staff was invited by Dr. and Mrs. VERWEY for a trip to Terschelling. The staff presented Dr. VERWEY with a bench and a flagpole to be placed appropriately in the grounds of the new Institute under construction at 't Horntje. The Netherlands Zoological Society held a very successful farewell symposium on 16 October at Den Helder, with papers read by J. VERWEY, O. KINNE, G. THORSON, G.P. WELLS and H. POSTMA, and about 500 participants.

Dr. VERWEY was succeeded by two directors: Dr. G.P. BAERENDS (appointed 1 September), also head of the Biology Department, and Dr. H. POSTMA (appointed on 1 October), head of the Hydrology Department. Like Dr. VERWEY, the two directors will be assisted by the administrator, Mr. TH.G. MENTING, and Mr. M. HONINGH will be architectural advisor for the Texel building scheme. The directorship of Dr. BAERENDS being temporary, he will be succeeded in 1966 by Dr. C. GROOT, presently employed in Nanaimo, Canada. The changes in internal organization, required by a joint directorship, will be effected gradually.

The following list shows all the mutations in the staff:

	<i>entered service</i>	<i>left service</i>
Dr. R.E. WEBER, biologist	1-1-65	—
Mrs. H.W.M. MAKELAAR-HENGELVELD, typist	15-1-65	—

*vininus nodulosus*.—Basteria 29:

*us aurifrons* (Jordan en Thompson), Den Haag 36: 28-30.  
atuurlijke milieu.—Aquarium,

Box", *Opisthognathus aurifrons*.—

van Bonaire.—Levende Nat.

matter in Baja California La-  
605.

levende Nat. 68: 276-279.

Haag 36: 77-79.

Het Zeepaard 25: 112-113.

in de afgelopen periode.—Het

October, after having been  
To mark the occasion, the  
for a trip to Terschelling.  
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new Institute under con-  
logical Society held a very  
ber at Den Helder, with  
HORSON, G.P. WELLS and

tors: Dr. G.P. BAERENDS  
Biology Department, and  
ead of the Hydrology De-  
ors will be assisted by the  
Mr. M. HONINGH will be  
scheme. The directorship  
be succeeded in 1966 by  
no, Canada. The changes  
int directorship, will be

in the staff:

red service left service  
1-1-65 —

5-1-65 —

	entered service	left service
Mrs. C.C.M.J. v.d. JAGT-VINKEN, typist (occasional work)		27-1-65
W. BREMER, apprentice fisherman	1-3-65	18-10-65
P. BOK, casual labourer	10-3-65	31-12-65
G.L. DE VRIES, sailor, casual employ- ment	22-3-65	—
J.J. MÖLS, assistant laboratory tech- nician, returned from military service	—	—
J. HEGEMAN, laboratory assistant	1-5-65	—
Miss W. SEVENHUYSEN, laboratory technician	—	1-6-65
S.C. VENEMA, postgraduate research assistant	16-8-65	—
Prof. Dr. G.P. BAERENDS, co-director	1-9-65	—
P. BOER, laboratory assistant, returned from military service	1-9-65	—
F. VEER, apprentice electronic engi- neer	1-9-65	—
Miss I. DEN HARTOG, assistant labora- tory technician	—	15-9-65
Prof. Dr. H. POSTMA, co-director	1-10-65	—
G.W.L. SIEBEL, cleaner	15-9-65	—
A. GERNLER, cleaner	—	1-10-65
Mrs. J. AGEMA, canteen manager	13-10-65	—
W.C. DE KOCK, temporary biologist	27-10-65	31-12-65
S.C.A. TAN, chemist	—	1-11-65
TH. EILANDER, apprentice fisherman, casual employment	1-11-65	—

## 2. Official travel abroad.—

1. J.W. ROMMETS; from 26 November 1964 to 5 February 1965, for oceanographic research on board H. Neth. M.S. "Snellius" between the African coast and the Caribbean (Navado III).
2. Dr. I. KRISTENSEN; 1 February to 15 March, to the Netherlands Antilles by invitation of the Netherlands Government.
3. Miss G.M. BOERMAN; 1 February to 1 August, to assist in the research of the Biological Station of the University of Bergen, at Espegrend, Norway.
4. Dr. E.K. DUURSMA; 1 February to 31 December, in the service of the laboratory of Marine Radioactivity of the International Atomic Energy Agency in Monaco (until 1 March 1966).

5. D. EISMA; 15-18 February and 18 September to 5 November, at the Zoological Station, Naples, for geological research in the Bay of Naples and adjoining waters; 6-10 November in Monaco to visit the International Laboratory of Marine Radioactivity.
6. Miss C.J. BOSCH; 1 March to 31 December, employed at the Laboratory of Marine Radioactivity, Monaco (until 1 March 1966).
7. Dr. H. POSTMA; 3-16 October, Netherlands deputy to the 4th Intergovernmental Oceanographic Conference in Paris.
8. Dr. R. WEBER; 1 September to 31 December, at the University Zoophysiological Laboratory in Copenhagen (until March 1966).

3. *Postgraduate work.*—The number of students doing research in Den Helder toward a degree increased considerably, as appears from the following list:

- 23 April-30 September: Miss M. MAAS (Leiden), Settlement of mussel spat on thread-like material.
- 3 June-1 December: P. v.D. WIELEN (Groningen), Displacement of jelly-fishes.
- 12 July-1 November: M. I. VROOM (V.U., Amsterdam), Water and silt displacement near Den Oever.
- 30 August-31 December: Miss. M. HEERES (Groningen), Temperature and taxis in species of *Littorina* (to be continued in 1966).
- 30 August-31 December: R.G. RIEMENS (G.U., Amsterdam), Forces involved in the opening of mussels by *Asterias rubens* (to be continued in 1966).

#### 4. *Student courses.*—

A large number of students attended the courses, which, as usual, were organized partly by the institute and partly by the visiting universities. Our courses were attended by 35 students, 20 of whom came from Groningen, 5 from Utrecht, 4 from Nijmegen, 3 from Amsterdam (2 from the Free University and 1 from the Municipal University), 2 from Ghent, and 1 from Leiden. The relatively large number of students from Groningen is due to the fact this course is compulsory at that University.

12-15 April	Physiology, Amsterdam, Municipal University	21 participants
20-23 April	Physiology, Amsterdam, Municipal University	18 participants
30 May-2 June	Excursion Amsterdam, Free University	19 participants

2-5 June	Excursion Amsterdam, Free University	23 participants
8-17 June	Marine Oecology, N.I.O.Z.	17 participants
21-30 June	Marine Oecology, N.I.O.Z.	18 participants
10-15 July	Zoology, Nijmegen University	23 participants
15-19 July	Zoology, Nijmegen University	18 participants

5. *Visitors from abroad.*—In the course of the year the following foreign scientists visited the Institute:

Dr. J. E. LUNETTA, University of São Paulo, Brazil.  
 Dr. F. KNOWLES, University of Birmingham, England.  
 Dr. K.F. WIBORG, Institute for Fishery Research, Bergen, Norway.  
 Mr. B. BÖHLE, Institute for Fishery Research, Bergen, Norway.  
 Dr. W.V. BURT, University of Oregon, U.S.A.  
 Dr. R. MORITA, University of Oregon, U.S.A.  
 Mr. D. MOORE, U.S. Naval Electronics Laboratory, San Diego, U.S.A.  
 Mr. W. HUCKABAY, Dallas, U.S.A.  
 Dr. F.B. PHLEGER, Scripps Institution of Oceanography, La Jolla, U.S.A.  
 Dr. H. BRATTSTRÖM, Biological Station, Espesgrend, Norway.  
 Dr. S. GERLACH, Bremerhaven, Germany.  
 Dr. K. MANGOLD, Laboratoire Arago, Banyuls-sur-Mer, France.  
 Dr. B.E. SKUD, Bureau of Commercial Fisheries, Maine, U.S.A.  
 Dr. O. KINNE, Biologische Anstalt Helgoland, Hamburg, Germany.  
 Dr. G.P. WELLS, University College, London, England.  
 Dr. M. BILIO, Institut für Meeresforschung, Kiel, Germany.

6. *Buildings in Den Helder.*—Accommodation of the expanding staff becomes more difficult every year. Since the buildings on Texel will be ready in a few years it would be uneconomical to spend money on expensive repairs in Den Helder. Nevertheless a moderate improvement and extension of the capacities could not be avoided. For Mr. SWENNEN's research on eiders an experimental pond was constructed and provided with pumping installations and filters. The seawater circulation for the student courses was renewed and the classroom renovated. Behind the aquarium building, a large roofed storage space was made. The space in the workshop was extended and the carpenter's room removed to a separate shed. Several rooms were repainted and improved, and a deep-freeze storage unit for study material was built. Elsewhere in the town, a storage room for archives and periodicals was rented.

7. *Student hostel.*—The student hostel was booked for 1824 days, of

September to 5 November, at biological research in the Bay of Monaco to study Marine Radioactivity. In December, employed at the University of Monaco (until 1 March

Netherlands deputy to the 4th Conference in Paris.

In December, at the University of Copenhagen (until March

Students doing research in Den Helder, as appears from the

(Helder), Settlement of mussel

(Groningen), Displacement of

(Amsterdam), Water and

(Groningen), Temperature continued in 1966).

(G.U., Amsterdam), Forces of *Asterias rubens* (to be con-

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Municipal	21 participants
Municipal	18 participants
Free Uni-	19 participants

which 1376 were for students, 8 for guests, and 440 for staff members as temporary lodgings.

8. *Library*.—The library completed the acquisition of the "Discovery Reports". Periodicals: The Netherlands Journal of Sea Research issued only one overdue number (Vol. 2, no. 4), which ought to have appeared in 1964.

9. *Boats and conveyances*.—The research vessel "Ephyra" was again used extensively. Of the 254 working days available, 148 were used for research, of which 10 on behalf of the K.N.M.I., de Bilt, 8 for the Reactor Centre in Petten, and 10 for the Hydrobiological Institute, Division Delta-research, Yerseke. On 33 days unfavourable weather prevented use of the ship, the other 73 days were either needed for repairs and overhaul or the ship was not used.

The vessel was again used mainly in the Wadden Sea, as far as the Dollart in the Eems area. For 3 weeks the ship worked in the Zeeland estuaries. When weather permitted, a relatively large amount of work was done on the North Sea off the Dutch coast, but the "Ephyra" is not suited for off-shore work. Thanks to the co-operation of the Institute for Fishery Research, Mr. EISMA was able to use the research vessel "Willem Beukelszoon" in the southern part of the North Sea. Dr. H. VEENSTRA, of the Geological Institute in Groningen participated in this research. The future work of the Institute will probably cover more and more of the North Sea.

In the course of the year only minor technical alterations were made on the "Ephyra".

The motor-launch "Griend" put out to sea 122 times for research purposes, mostly short trips (in 6 cases the night was spent on board). The launch was used 18 times for crossing from Den Helder to the construction site on Texel. To improve the accomodation, the "Griend" was provided with a canvas awning.

The watertender "Curlew" made 45 trips to fetch seawater for the aquaria, on 13 of which no seawater of a sufficient salinity (over 16‰ Cl') could be found. A total of 3200 cargos of seawater were supplied. The exhaust pipe of the engine was moved from the waterline to the funnel on the cabin, which made it possible to load an additional 8 tons of water. The van drove 11,612 km for research purposes and 11,941 km for transportation of goods, including study material. The department bought 77,000 animals for a total of 6,000 guilders and sold 60,000 animals for 20,000 guilders.

10. *Buildings on Texel*.—Preparations for the new institute on Texel (architects Mr. and Mrs. Pot, Amsterdam) progressed slowly. A survey of the stages in which the construction will be carried out could be given, the first being a storage-shed for nets and fisherman's cottage near the new harbour.

The ferry and bridge already mentioned in the previous annual report, were established in the new harbour. Electricity for the installations was laid on, and part of the building site for the student hostel was purchased. As part of the scheme for the acquisition of houses and building sites for the staff, two cottages at Den Hoorn were bought. The municipality of Texel finished a number of houses near 't Horntje, 6 of which are intended for personnel of the institute.

DEN HELDER, March 1966

G. P. BAERENDS  
H. POSTMA

NORTH SEA



Eierlands

T E X E L

Marsdiep

Texelstroom

den  
Helder

Malzwin

Amsteldiep

Vierbalg

NOORD HOLLAND

den Oever

Vlieter

USSE