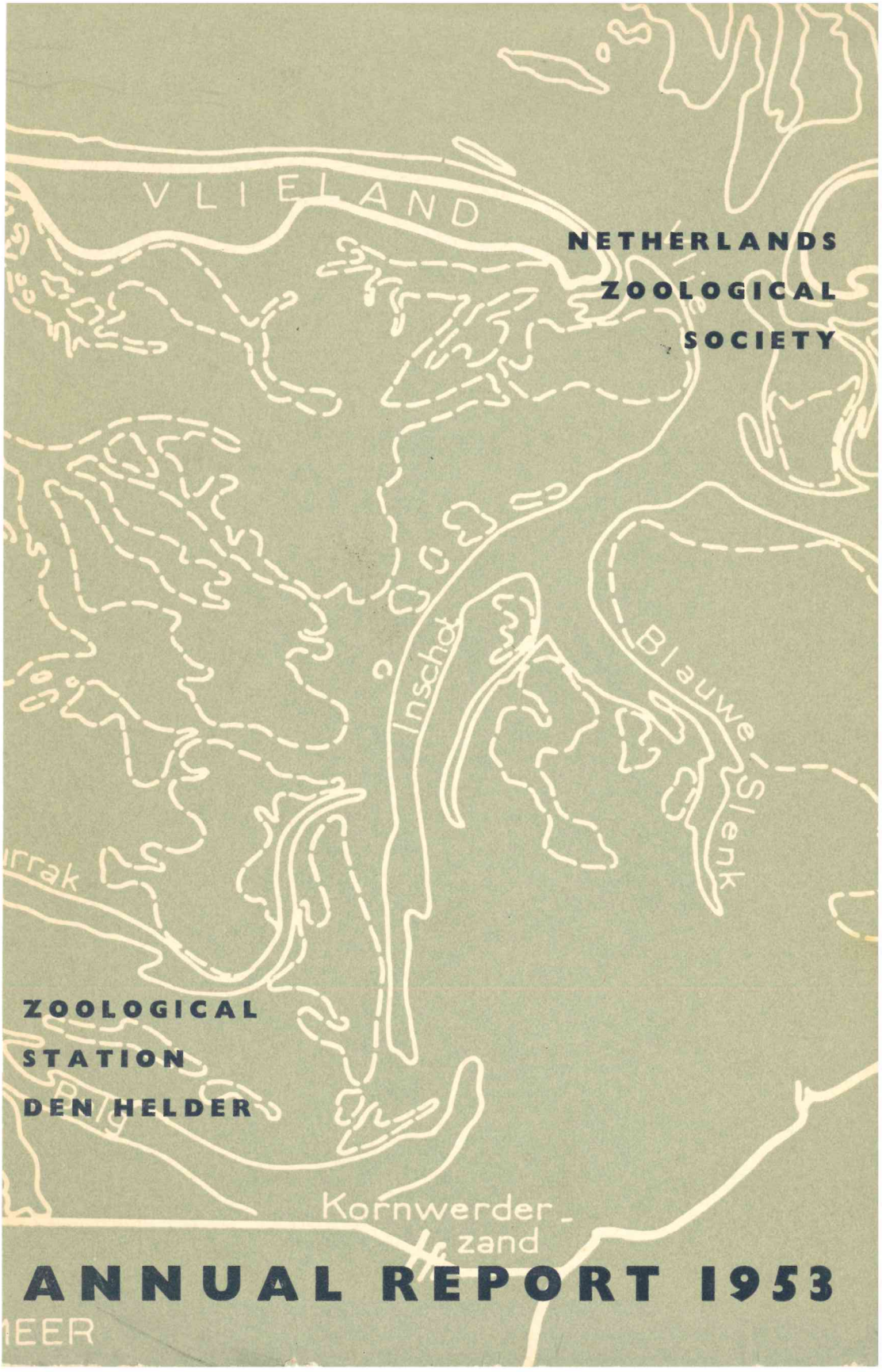

NETHERLANDS ZOOLOGICAL SOCIETY

ZOOLOGICAL STATION DEN HELDER

ANNUAL REPORT 1953


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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, 1e livraison, 1955, p. 143–153

ANNUAL REPORT OF THE ZOOLOGICAL STATION OF THE NETHERLANDS ZOOLOGICAL SOCIETY FOR THE YEAR 1953

As in previous years, the scope of the work done at the Zoological Station has covered mainly ecological problems, and the students' increased interest in these matters has certainly contributed to this year's progress. The line of research at Den Helder tends to show a markedly different development in comparison with the early years after its initiation. When the research program that had been initiated in the thirties got under way, the investigations undertaken aimed at a general orientation. At that time special attention was paid to the local distribution of certain animal species and to the underlying principles. In dealing with the causes of distribution it was customary to refer mainly to external, especially abiotic milieu factors. Gradually, however, another stage has set in, in which the study of the environment no longer predominates, but stress is rather laid on the animal's reactions to its environment. The line of research was thereby virtually switched over to physiology and ethology, although the problems remained ecological in essence. Part of the work, which is now being carried out, should be regarded from this point of view.

The investigation of the spatfall of the mussel *(Mytilus edulis)* was continued by Mr. VAN DONGEN and Mr. VAN HAAFTEN (both from Utrecht) and Mr. BAS (from Leiden). The work of VAN DONGEN and VAN HAAFTEN was a continuation of the attempt undertaken by Mr. ROOTH in 1952. In the preceding annual report it was stated that the very youngest spat mainly settle on algae and hydroids, but that after a certain amount of time they leave these and join the old musselbanks or found new ones. Now, it is likely that the depth, at which the spat find themselves when settling, depends on light intensity. In this connection the question arises whether the youngest spat, which settle preferably in very shallow water, require more light than the young mussels that shift over from the algae to the banks and apparently

settle deeper than the youngest spat. Therefore, data are now required on the settling at various depths, and it is a laborious job to obtain these. Hence, like Mr. ROOTH in 1952, Mr. VAN DONGEN and Mr. VAN HAAFTEN did not obtain decisive results. We hope that the work will be resumed in 1954, however.

Mr. BAS continued his 1952-observations concerning the settling of young mussels on old banks, the foundation of new banks and the growing up of the spat. His participation in the Station's activity has come to an end for the time being. His records comprise interesting details on the settling and shifting of the young on certain banks, which will be published in the "Archives".

Mr. BAS also terminated his experiments on the influence of light and darkness on the duration of life of young cockles and mussels already mentioned in the previous report. His results show that under experimental conditions the mortality of mussels and cockles after settling is not enhanced by darkness to any appreciable degree. Since the spat because of their need for high light intensities cannot but settle in shallow water, whereas mussels, when adult, are apparently not adversely influenced by absence of light, it may be queried whether for the grown-up specimens there is an additional advantage in settling in shallow water. It is assumed that, at least for the cockles, the shallow position may favour the perception of the approach of enemies. It is known that the cockle has well-developed eyes.

Our knowledge of nudibranch slugs entered a new phase thanks to the work of Mr. DE WOLF and Mr. VAN HAAFTEN. The work of Mr. DE WOLF was directed by Prof. TEN Cate and Dr. DE WILDE (Amsterdam). This investigation aimed at the localisation of smell and current perception in *Aeolidia papillosa* and *Cratena aurantia*, for which purpose sea anemones and hydroids were used as sources of scent. The chemoreceptors are situated in the rhinophores, whereas the sense of touch must be attributed to the oral tentacles. The rhinophores are not instrumental in the perception of currents; the localisation of this sense still remained uncertain.

The work of Mr. VAN HAAFTEN was a continuation of last year's endeavours of Miss DE KONING (Utrecht), who attempted to demonstrate that in running water slugs do not rely on a gradient of scent for finding their food. It was found that a slug, once it has been activated by scent, will head against the current, thus being guided to the source of smell. The data will be published in the "Archives" and need no discussion in full here. The result elucidates the general principle that in the sea scent or other factors like temperature or salinity changes may have a clear *stimulative* effect, but that *orientation* is a matter of current direction.

The behaviour of the common shrimp *(Crangon crangon)* under a diminishing head of water was studied by Mr. GLAS (Groningen). It is obvious that a species like the shrimp, which in summer mainly inhabits the Wadden Sea, should possess responsive faculties that guide the animal away from the tidal flats during the ebb-tide. This would require a reaction to the change in water level as well as a choice of direction determined by the current. Mr. GLAS only dealt with the former, the response to the falling of the water level. He found that shrimp actually react to excessive shallowness by departure and he also found out in what way they perceive the falling of the water level. No further discussion will be given here, as his contribution will appear in the "Archives".

An investigation into the chemoreception of *Littorina obtusata*, formerly initiated by Mr. EBBINGE WUBBE and Mr. BARKMAN, was continued by Mr. VAN DONGEN. It was ascertained that *Littorina obtusata* reacts positively to the scent of Fucaceae and that the attraction varies according to the species of algae. The snail's preference for different species, however, apparently accords only partly with its preference for these species as food.

Our knowledge of the feeding mechanism of mussels, which was so much promoted by Dr. TAMMES during the previous season, was now enhanced in one respect. Miss BLOKZIJL (Groningen) tried to find out whether mussels, in waters with a high concentration of particulate matter, will reject a greater proportion of material (eventually taking up less) than in waters containing little matter in suspension. It has been a debated question for many years whether waters, teeming with suspended matter (plankton included), would be less favourable to the feeding of mollusks than those carrying relatively few particles. An attempt was made to solve the problem by separating faeces and pseudofaeces and to determine their relative quantities in waters of different silt content. It became evident that this quantitative relation indeed depends on the concentration of the medium, but individual differences are considerable. Since the results obtained so far are quite valuable it would be worth while to have these experiments continued.

Other investigations were undertaken by Miss KOOPMAN (from Utrecht), Mr. DEN HARTOG an Mr. HILLENIUS (both from Amsterdam).

Miss KOOPMAN made some observations on the cardiac rhythm in young mussels. The heart seemed to undergo a marked retardation when the shells were closed, but the experiments will have to be continued in order to obtain more reliable results.

Mr. DEN HARTOG studied the behaviour of two nudibranch slugs from the tidal flats, *Alderia modesta* and *Limapontia depressa*. The choice

of this item was entirely due to his own interest in these species, which mainly feed on algae of the genus *Vaucheria*. His observations are of importance in connection with our experience with other nudibranch slugs. They are likely to be continued in 1954.

Mr. HILLENIUS visited Den Helder in order to check his observations on ciliary movement in *Metridium senile* previously made in Amsterdam. This investigation was directed by Prof. TEN CATE and Dr. DE WILDE (Amsterdam); the observations made at Den Helder only served to complete his material. He was able to confirm that ciliary reversal is induced by various substances, as was formerly described by PARKER. This phenomenon is most remarkable in connection with the irreversibility of ciliary activity in general.

Finally, mention should be made of the work of Mr. MCKAY, an American Fullbright student, who stayed at Den Helder for almost a year. His activity concerned the annual migration of herring into the former Zuiderzee, more in particular the influence of external factors on the herring's first appearance. His material was based on the records of landings from 1880 to 1910 and the matter seems to resolve itself into the following. An annual periodicity in reproduction, induced by increasing temperature or daylength, should be considered the underlying principle. Superimposed on this rhythm there is the influence of temperature during a certain part of the winter, which determines whether reproduction will start early or late. The moon in its turn limits the earliest date of arrival to a certain range of its cycle, within which some shifting may again be caused by the actual temperature within that period. The matter is therefore complicated enough and the results cannot be accepted without reserve until the data have been studied in more detail. Valuable help was given by Prof. S. W. VISSER of the Royal Netherlands Meteorological Institute, De Bilt.

In connection with the foregoing details the work of Mr. DE BLOK should be mentioned. Thanks to a grant made by the Netherlands Organization for Purely Scientific Research (Z.W.O.) he was given a research assignment for investigations into lunar or tidal influence on reproduction in marine animals, as was already put on record in the previous annual report. In 1953 his energies were mainly devoted to orientation and preparation and it will still take considerable time before the installation apparatus designed will work to perfection. The execution of this research is directed by Dr. KORRINGA and the undersigned.

Apart from his main commission comprising problems connected with waste water disposal, which will be discussed later on in this report, Dr. TAMMES found time to study the development of gas in the airbladders of *Ascophyllum nodosum*; his experience has contributed to a

better understanding of known facts. Under natural conditions the oxygen content and pressure of the gas depends on the intensity of photosynthesis, and the oxygen liberated inside the bladder may in part be exchanged for nitrogen dissolved in the water outside. Loss of gas in the bladder may either be caused by diffusion or by respiration. When loss exceeds production the gas pressure will at a given moment be reduced below the pressure of the medium and the airbladders will then tend to deflate. The elasticity of the bladder wall will oppose the deformation with the effect that water enters the cavity. It was demonstrated that the bladder walls are permeable for gases, water, various salts and sugars. Details have been published in "Acta Botanica Neerlandica", **3**, 114–123, 1954.

Dr. WESTENBERG has several times given a review of the overfishing problem. This year a Dutch version, revised with regard to recent literature, has appeared in "Statistica", **7**, 71–95, 1953. Another point that has his particular interest concerns the reactions of fish to natural sound signals. A contribution to this subject was published in "Journal du Conseil", **18**, 311–325, 1953. In connection with the desiderata raised by his suppositions the Netherlands Organization for Applied Research (T.N.O.) has developed a hydrophone sensitive to a wide range of frequencies.

As in former years, Mr. KRISTENSEN spent much of his time on the study of migrant species by means of our system of buying up landed specimens. The bream *(Brama raji)* was conspicuous by its absence in 1953, in striking contrast to the considerable invasion of this species witnessed in previous years. The large numbers of haddock *(Gadus aegle finus)* met with in 1953 were interesting, since the species hardly occurs in the southern part of the North Sea apart from periods of abundance as witnessed immediately after the world wars. Mr. KRISTENSEN assumes a connection between this year's increased occurrence of haddock and the excessive penetration of Atlantic waters into the southern North Sea from the North, which was at that time observed by the German research vessel "Gauss". Apparently, this penetration of Atlantic waters did not stop the immigration of southern species through Dover Strait, since the red gurnard, *Trigla cuculus*, which was rare in 1952, was numerous in 1953. It is remarkable, however, that the southern migrants, entering the North Sea through Dover Strait, arrived late in the season. Since the most important 1953-migration data are listed below, they are not further discussed here.

The hydrographic investigations under the direction of Mr. POSTMA mainly concerned the cycle of nutrients in the Wadden Sea. The chemical analysis of suspended matter is a laborious business, which is steadily proceeding thanks to the patience of Mr. BEKE. A series of

Species	Sex; Size (cm)	Locality
(LV = Lightvessel; ST means buoy on the Silverpit-Texel route)		
Southern migrants, supposed to have entered the North Sea through Dover Strait		
Alopias vulpes	± 150	from fyke, Texel island
Raia brachyura		between Texel Hole and Silver Pit
Raia montagui		between coastal waters and Silver Pit
Acipenser sturio	16 and 55 kg	near ST 3; N. of Terschelling, 33 m
Clupea pilchardus		near LV "Texel", from Texel Hole and Tea Kettle Hole
Merluccius merluccius	♂♂ 53–58	near ST 4 (2 sp.), Texel Hole, Black Bank
Hippocampus europaeus	14	Mouth of the Ems
Spondyliosoma cantharus	6; 16–35	smallest sp. from Wadden Sea, the others from Texel Hole-Tea Kettle Hole
Atherina presbyter	7–13	1 sp. from fyke near Den Helder, 9 sp. from brackish waters on Texel
Trigla cuculus		mostly from Texel Hole area (no data collected in August)
Solea lascaris	25 and 27	60 KM WNW of IJmuiden
Northern fishes likely to have entered the southern North Sea from the North		
Gadus virens	1 ad. + 4 juv.	ST 4 (1 ad. sp.); from fykes near Den Helder (4 sp. ± 20 cm)
Molva molva	30–35	Texel Hole – ST 5
Onos cimbrius		Texel Hole area
Anarhichas lupus	35–50, 75	SW border of Oyster Grounds (4 sp.); Black Bank (1 sp. 75 cm)
Fishes, whose direction of migration is uncertain		
Maurolicus mulleri	6	washed ashore at Texel
Raniceps raninus	7 and 27	near Texel; Texel Hole
Labrus berggylta	♀ 32.5	90 KM WNW of IJmuiden
Crenilabrus melops	15 and 16	from fykes near Den Helder
Scorpaena dactyloptera	8, 9, 16, 15	ST 3 (2 sp.); Texel Hole (2 sp.)
Lepidorhombus whiff-iagonis	♀ 47	near LV "Texel"
Zeugopterus punctatus	17	Texel Hole
Aphia pellucida	5.5	Wadden Sea
Evertebrates, "rare" in the area off Den Helder		
Portunus puber		coastal waters (3 sp.); LV "Texel"; Texel Hole (7 sp.); ST 2
Portunus depurator		near ST 4
Ebalia cranchi		Texel Hole
Diogenes pugilator		Texel Hole (in *Clathrus*- and *Lora*-shells).
Nephrops norvegicus		Texel Hole – ST 4
Pecten maximus	13, 14, 14	Pit-buoys P2–P4
Eledone cirrhosa		LV "Texel" – Tea Kettle Hole
Octopus vulgaris	2 ♀♀	Texel Hole; ST 5
Sepia officinalis	20 sp. < 13 cm	mostly from coastal waters
Loligo vulgaris		mostly from coastal waters (no data collected in Aug.–Sept.)
Loligo forbesi		mostly from Texel Hole area (no data collected in Aug.–Sept.)

Numbers per month											
J	F	M	A	M	J	J	A	S	O	N	D
—	—	—	—	—	—	1	—	—	—	—	—
5	5	1	1	3	—	—	—	—	1	1	1
9	2	2	4	1	4	—	—	1	3	12	10
—	—	—	—	—	—	—	—	—	1	—	1
—	—	—	—	8	10	—	—	—	—	1	—
—	—	—	—	1	2	1	—	—	—	—	—
—	—	—	—	—	—	—	1	—	—	—	—
—	—	—	—	—	—	—	—	4	5	2	2
—	—	—	—	—	10	—	—	—	—		—
1	—	1	1	23	397	208	?	1	1	7	1
—	2	—	—	—	—	—	—	—	—	—	—
—	—	1	—	—	—	—	—	4	—	—	—
—	1	—	—	—	—	—	—	1	2	—	—
—	—	11	1	2	—	—	—	—	—	3	—
—	—	5	2	—	—	—	—	—	—	—	—
—	—	1	—	—	—	—	—	—	—	—	—
—	—	1	—	—	1	—	—	—	—	—	—
—	1	—	—	—	—	—	—	—	—	—	—
—	—	—	—	1	—	—	—	1	—	—	—
—	—	—	—	—	2	—	—	—	1	1	—
—	—	—	—	—	1	—	—	—	—	—	—
—	—	1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	1	—	—	—	—	—	—
—	—	2	2	4	2	—	—	—	2	—	—
—	—	—	—	—	—	—	—	—	—	5	—
—	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	—	—	—	—	—	22
—	1	3	1	1	2	1	1	7	18	6	1
3	—	—	—	—	—	—	—	—	—	—	—
—	1	2	—	—	—	—	—	—	1	—	2
1	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	22	90	8	7	4	4	3	7
—	—	—	1	126	361	41	?	?	—	18	24
7	—	—	1	—	597	486	?	?	176	618	419

analyses of monthly samples from three stations between Den Helder and Den Oever is now available.

The salinity distribution within the Waddensea channels was studied in cooperation with the Royal Netherlands Meteorological Institute (K.N.M.I.), the Oceanographic Section of which has, in post-war years, developed a continuous recorder of temperature and salinity, to be used on board a running vessel (DORRESTEIN in: Meded. Verh. Kon. Ned. Met. Inst. **59**, 387–403, 1954). With this instrument Mr. POSTMA intends to investigate the formation and distribution of tide-rips. Provisional measurements made by Dr. DORRESTEIN of the K.N.M.I. and Mr. POSTMA have already demonstrated its suitability for this purpose.

Besides, Mr. POSTMA cooperated in investigations carried out in the harbour of Ymuiden by the Government Institution of Fisheries Research, the Government Institution for the disposal of waste water, the Rijkswaterstaat and the Zoological Station. This investigation was started with a view to assessing the extent to which fish suffer from harmful substances in waste water discharged by nearby industrial plants.

Considerable attention was again paid to the deteriorated condition of the Nieuwediep, which formerly used to furnish the water for the aquarium of the Zoological Station. This matter is becoming rather critical. In connection with the construction of the new naval base the Nieuwediep has been closed, as was already mentioned in last year's annual report. Its marine state was then seriously affected, but good water could at first still be obtained from the deep. This year, however, silt and low salinity became a regular nuisance, so that water had to be shipped almost constantly from the Marsdiep. As long as the new harbour is still under construction it is hard to make predictions, but it seems likely that in the future a regular water supply from the Marsdiep will be indispensable for our aquarium.

Finally, Mr. POSTMA spent much time on working out his observations made during the geological expedition to the Caribbean area, already placed on record in the previous annual report, and some hydrographic data of the Snellius Expedition.

Bij October 1st Dr. TAMMES finished his investigations on the influence of industrial waste water on marine life. By this time we are free to state that this item was connected with industrial efforts to win potassium from seawater. In this procedure potassium is precipitated with the aid of a certain reagent which can only be recuperated in part. Thus the necessity of waste diposal led to the study of the reagent's toxicity and decomposition under natural conditions. In the two and a half years that he devoted to the subject Dr. TAMMES gained an

understanding of the process of intoxication, the dependence of toxicity on temperature, the susceptibility of several species, the decomposition of the reagent under aerobic and anaerobic conditions, and its ready adsorption by organic matter. Part of the results concerning the dependence of toxicity on temperature will be published in "Physiologia Comparata et Oecologia". The investigation has yielded a reliable basis for assessing the risk involved in discharging this waste substance into the sea. Industries become more and more inclined to drain their wastes into the sea without realizing the need of precautions against the consequences. This attitude would, within a few decades, spoil our coastal waters if the Government should not intervene.

The number of students attending this year's summer courses amounted to 19; 10 of them were from Leiden, 8 from Utrecht and 1 from Amsterdam. On account of illness of the director the courses were given by Messrs. KRISTENSEN, POSTMA, TAMMES, WESTENBERG, and DE BLOK.

Apart from our own program Dr. KIPP organized courses for 1st and 2nd year students from Utrecht; 40 of them were split up into four groups, each group visiting the Station for three days. Also from the Free University (Amsterdam) 9 students came for 6 days under the direction of Mr. ANTHEUNISSE.

The total number of man-days for individual investigators and summer course participants in 1953 amounted to 1514. There is, from year to year, a striking variation in number, the average being 1016 for the period 1947–1953; in 1952 the number was 736, against 1514 in 1953. For this reason it is hard to state whether there is progress or decline, as was attempted in the previous report.

Close cooperation was again maintained with several public agencies, especially with the Government Institute of Fisheries Research and the "Rijkswaterstaat". On many occasions our Station was in touch with the University laboratories. Our special acknowledgments are due to Mr. VAN LIESHOUT, Commissioner of Pilotage at Den Helder, for his courtesy and helpfulness. The Netherlands Educational Film Company has, for several years, taken advantage of the Station's installation, and has, in exchange for facilities granted, kindly promised copies of the films made at Den Helder. The German research vessel "Gauss" again visited Den Helder in 1953. The investigations of the German Hydrographical Institute in the southern part of the North Sea are most interesting and again it was a privilege to have the work explained. The English research vessel "Sir Lancelot" called at Den Helder several times. Among the other foreign visitors we only mention Dr. B. H. KETCHUM of the Oceanographical Institute at Woods Hole (Mass., U.S.A.).

The building required considerable expenditure, especially for repairs in the caretaker's rooms. Other parts of the building were also improved during this and previous years, which has made things look a good deal better. The gale of February 1st caused rather serious damage to the roof. Finally, repairs of the seawater supply-piping through the dike were rather expensive.

The students' lodge "Potvis" (= Cachelot) has not cost a great deal this year. In summer it houses quite a number of students and we only wish it could accomodate twice as many.

The Station's vessel "Max Weber" did not require much either after last year's replacement of her crank-shaft. Mr. VAN BREDA, the new skipper, gave her a general overhaul, which restored her good appearance. The vessel spent 56 days at sea during the year; she is quite indispensable for the Station's ecologic and hydrographic activities. The rowboat "Pelk"[1] underwent thorough repairs at the end of the season.

There have been some changes in personnel during the past year. In the first place Dr. TAMMES finished his investigations on waste water influence, carried out by contract with Mekog Ltd., Ymuiden, on October 1st. His departure was felt as a severe loss since we all benefited from his dexterity in experimental technique. Dr. TAMMES joined the staff of the Phytopathological Service at Wageningen. Mr. G. VAN DER WAL, student analyst, equally working for Mekog, was taken over by the Station. He stepped into the place vacated by the student analyst T. DE BOER, who was appointed analyst at the Government Institution of Fisheries Research. Miss C. NAGTEGAAL left for Australia; she was succeeded by Miss C. M. PLANKEN. Mr. C. K. A. VAN BREDA was appointed resident caretaker-skipper; together with his wife he moved into the Station on June 1st. Finally, mention should be made of the director's absence for three months on account of illness. Fortunately his administrative and scientific activities went on for the greater part during this period.

The Library gained a further extension of exchange relations. It is clearly noticeable that the staff of the Station can avail themselves of the services of a librarian of scientific training in the person of Dr. WESTENBERG, who is specially detailed for the purpose. He and Miss STOLL together settle quite a lot of affairs, which would have remained undone in the absence of a special worker.

The supply of study materials again scored a considerable turnover. The purchases of animal specimens amounted to about fl. 3300.—, while fl. 450.— were spent on freight, packing, preserving solutions,

[1] This boat has been named "Pelk" in memory of TER PELKWIJK, a promising junior biologist, who was killed in action south of Java in 1942.

etc. The expenditure, including amounts paid for specimens for our own use and aquarium food, totalled fl. 3750.—. The income amounted to fl. 4500.—. Hence the profit realized was about fl. 770.—. This part of the affairs, and especially the study of the specimens received, is in the hands of Mr. KRISTENSEN, assisted by Mr. BUHRE.

The Government grant for 1953 amounted to fl. 74,550.—, of which fl. 60,000.— was destined for salaries and National Insurance, the remaining part for the Station's exploitation. The further income consisted of the Society's contribution to the library and to the publishing of her periodical, some 300 copies of which are used for exchange. For 1953 there was, moreover, an extra-sum from the National Rehabilitation Fund. Thus the Station's income totalled over fl. 80,000.—. The budget is likely to call for another fl. 10,000.— in 1954. The status of the Zoological Station has gradually changed, so that its new function in Holland should justify increased expenditure. The statement of income and expenses is appended.

Statement of Income and Expenses

Income		Expenses	
Government grant	fl. 74,550.—	Salaries	fl. 54,587.62
Grant from Roy. Netherl. Bot. Society	,, 100.—	Auditing	,, 532.50
Contribution to salaries from Reservefund	,, 500.—	Contribution to National Insurance	,, 5,659.18
Contribution from National Rehabilitation Fund	,, 1,213.46	Rates, taxes, and insurance	,, 1,219.24
Study Material	,, 4,516.40	Lighting, heating, telephone	,, 3,888.84
Staff contribution to Pensionfund	,, 1,984.95	Buildings & furniture	,, 3,868.59
Sickness Benefit	,, 258.57	Ships & nets	,, 2,139.01
Contribution for Library from the Society	,, 300.—	Instruments, glass utensils, chemicals	,, 1,964.42
		Fitting shop	,, 541.54
		Study materials	,, 3,745.91
		Postage, freight, packing, writing & drawing materials	.. 1,272.32
		Library	,, 1,241.15
		Travelling expenses	,, 234.10
		General	,, 90.52
		Pension fund	,, 1,984.95
		Balance in hand	,, 453.49
Total	fl. 83,423.38	Total	fl. 83,423.38

Den Helder, February 1954
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:

Vols. 1—7,	1934—1947	22.—
„ 8,	1947—1951	25.—
„ 9—11,	1948—1955	30.—
Suppl. to vol. 3,	1938	10.—
„ „ „ 7,	1946	2.—
„ I „ „ 10,	1953	8.50
„ II „ „ 10,	1953	8.50

Flora and Fauna of the Zuiderzee. In Dutch. 4°. 460 pages, 1922. Out of print.

Supplement to Flora and fauna of the Zuiderzee. In Dutch. 4°. 258 pages, 1936 . . . . . 7.—

Changes in the flora and fauna of the Zuiderzee since its closure in 1932. In Dutch, with English summary. 4°. 359 pages, 40 figures, 11 plates and many maps and tables, 1954 . . 15.—

De Biologie van de Zuiderzee tijdens haar drooglegging, parts 1-6, 1928-1944 . . . . . Per set 10.—
Per part 2.—

Mededelingen Commissie faunistisch onderzoek Zuiderzeepolders, parts 1-2, 1949 . . . . . Per set 1.50

Catalogue of the Society's library. 1907. 1924. Out of print.

*) Prices in Dutch guilders per volume, reduced prices for members. Postage extra.