

АКАДЕМИЯ НАУК УКРАИНСКОЙ ССР
ИНСТИТУТ БИОЛОГИИ ЮЖНЫХ МОРЕЙ
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ПРОБЛЕМЫ МОРСКОЙ БИОЛОГИИ

К СТОЛЕТИЮ ИНСТИТУТА
БИОЛОГИИ ЮЖНЫХ МОРЕЙ

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СТОЛЕТИЕ ИНСТИТУТА БИОЛОГИИ ЮЖНЫХ МОРЕЙ АН УССР

В. А. Водяницкий

Институт биологии южных морей имени А. О. Ковалевского (ИнБЮМ) создан в 1963 г. на базе трех биологических станций — Севастопольской, Карадагской и Одесской, с центром в г. Севастополе.

Севастопольская биологическая станция была организована в 1871—1872 гг. по решению II Съезда русских естествоиспытателей и врачей (1869 г.), поддержавшего инициативу молодого зоолога Н. Н. Миклухо-Маклая. Выполнение этого решения взяло на себя Общество естествоиспытателей — при Новороссийском (т. е. Одесском) университете, — в составе которого были в то время такие выдающиеся биологи, как А. О. Ковалевский, И. И. Мечников, И. М. Сеченов, В. В. Заленский, Л. С. Ценковский, принявшие непосредственное участие в основании первой биологической станции в России.

В течение последующих 20 лет станция выполнила замечательные исследования по фауне и общему описанию природы Черного моря (В. Н. Ульянин, С. М. Переяславцева, А. А. Остроумов и др.) и стала важным опорным пунктом для работ иногородних ученых. В 1892 г. она была принята в ведение Академии наук и ее директором был избран академик А. О. Ковалевский, при содействии которого в 1896—1897 гг. построено для станции специальное здание с аквариумом, в связи с чем значительно увеличились ее рабочие помещения (рис. 1). Расширились связи с учеными из других городов, а также возросло количество студентов, проходивших здесь практику, что сыграло большую роль в подготовке молодых кадров биологов.

После смерти в 1902 г. А. О. Ковалевского его преемником на посту директора станции стал академик В. В. Заленский, который вскоре привлек на должность заведующего станцией С. А. Зернова, занимавшего перед тем должность хранителя музея в Симферополе и опубликовавшего ценное описание крымского рыболовства. С. А. Зернов развернул крупные исследования на Черном

море. Его работа «К вопросу об изучении жизни Черного моря» (1912 г.), в которой описаны черноморские биоценозы, считается классической, она сыграла большую роль в развитии гидробиологии в России. В 1915 г. С. А. Зернов покинул Севастополь, а деятельность станции во время войны и революционных событий приостановилась, возродившись в 1920 г. после укрепления в Крыму Советской власти.

Директором станции был назначен академик Н. В. Насонов. Под руководством зоолога В. Н. Никитина станция развернула крупные исследования биологии планктона и гидрохимии Черного моря. Она приняла деятельное участие в комплексных океанографических экспедициях на Черном море, организованных проф. Ю. М. Шокальским. Пришли новые научные сотрудники разных специальностей, возобновились под руководством Л. И. Якубовой знаменитые студенческие практикумы.

В 1929 г. академик Н. В. Насонов передал свой пост директора тогда же избранному в академики С. А. Зернову. В связи с переходом В. Н. Никитина на работу в Батуми и Тбилиси на место заместителя директора был приглашен В. А. Водяницкий, и число научных сотрудников увеличилось до 10. Оказалось возможным сделать план работ станции более разносторонним. В 1934 г. она организовала I Всесоюзную конференцию по изучению Черного моря при участии около 120 иногородних ученых.

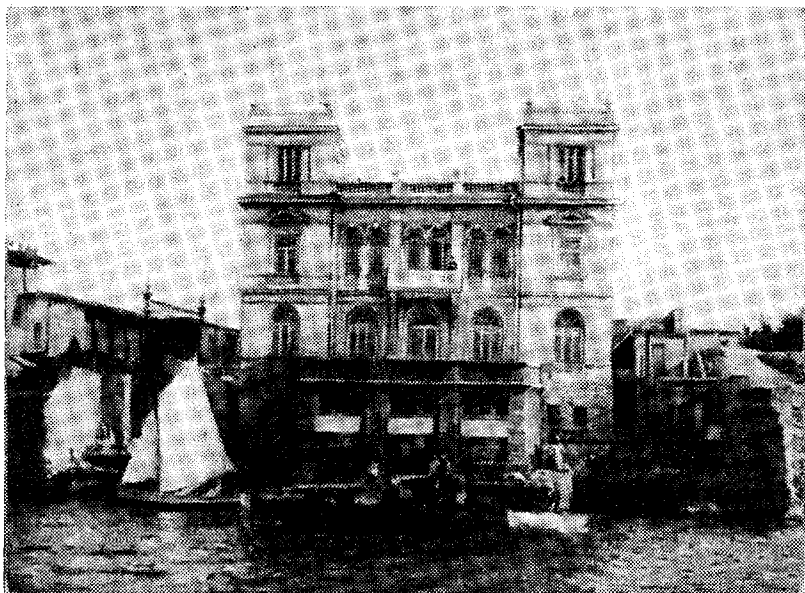


Рис. 1. Севастопольская биологическая станция в 1897 г.

Конференция подвела итоги исследованиям Черного и Азовского морей и наметила программу дальнейших работ, которая была опубликована и не потеряла значения до настоящего времени. В том же году здание станции было расширено, что дало возможность устроить лаборатории физиологии (под руководством академика Л. А. Орбели и профессора Е. М. Крепса), микробиологии и биохимии, значительно расширить помещения библиотеки, музея и гидрохимической лаборатории. Исследования станции все больше приобретали экспериментальный характер, будучи направленными на изучение экологии организмов. В то же время были развернуты крупные исследования макрофитов и фитопланктона, биологии рыб и дельфинов, количественные исследования зообентоса. Накопленные данные позволили подойти к изучению биологической структуры и продуктивности Черного моря, а в связи с этим и к пересмотру ряда существенных вопросов его гидрологического строения и гидрохимического режима.

В 1938 г. станция была включена в состав Зоологического института АН СССР и ее заведующим был назначен китовед Б. А. Зенкович. В. А. Водяницкий и ботаник Н. В. Морозова-Водяницкая перешли на работу в Ростовский университет.

С началом Великой Отечественной войны большая часть сотрудников Севастопольской биологической станции выехала в восточные районы страны. При первых же бомбардировках ее здание было наполовину разрушено, внутри сгорело, снаружи было повреждено осколками. Еще до окончания войны на должность директора станции был избран В. А. Водяницкий, а вскоре после освобождения Севастополя (9 мая 1944 г.) на работу в Севастополь прибыли: проф. В. Л. Паули, канд. биол. наук. М. А. Долгопольская, докт. биол. наук Н. В. Морозова-Водяницкая, канд. биол. наук. Ф. И. Копп, гидрохимик М. А. Добржанская, зоолог Г. Н. Миронов, которые вместе с оставшимся в Севастополе канд. биол. наук М. А. Галаджиевым составили первоначальное ядро возрождавшейся станции.

Благодаря исключительному вниманию со стороны властей Севастополя и руководства Черноморского военно-морского флота уже в июне 1945 г. начались работы по восстановлению здания станции, которые осуществлялись по частям до 1947 г. В 1946 г. она возобновила экспедиционные работы в Черном море, открыв серию больших исследований фитопланктона и продуктивности, а также микробиологии моря.

В 1948 г. состоялось торжественное празднование 75-летия станции, были подведены итоги ее деятельности и намечены перспективы дальнейшего развития. В 1950 г. на станции учреждена аспирантура, в 1952 г. Президиум Академии наук СССР принял решение о создании на базе станции Института биологии моря и наметил необходимые мероприятия. Станция получила 400-тонный экспедиционный корабль и вскоре приняла участие в межве-

домственных длительных исследованиях на Черном море (рис. 2). Число научных сотрудников постепенно увеличивалось, главным образом за счет молодежи, оснащались лаборатории и расширялись экспериментальные исследования, заново создавалась библиотека, регулярно издавались «Труды СБС».

В 1956 г. станция выступила с инициативой по вопросу об изучении Средиземного и Красного морей с целью получения сравнительных данных о количественном развитии жизни и продуктивности в ряде морей средиземного типа, а с 1958 г. начала серию экспедиций в эти моря, осуществляя их совместно с рядом отечественных институтов. Средиземноморские и красноморские экспедиции не только дали существенные научные результаты, но оказались полезными и в ряде практических вопросов. В 1960 г. ее сотрудники начали принимать участие в исследованиях продуктивности Атлантического океана.

В 1961 г. Севастопольская биологическая станция была передана в ведение Академии наук Украинской ССР.

Карадагская биологическая станция была создана в 1914 г. при содействии и на средства врача И. Т. Вяземского (доцента Московского университета), который приобрел вблизи Коктебеля участок земли, построил дома, собрал отличную библиотеку и все это завещал Московскому обществу естествоиспытателей для создания научной станции. Первоначально сотрудники станции инте-

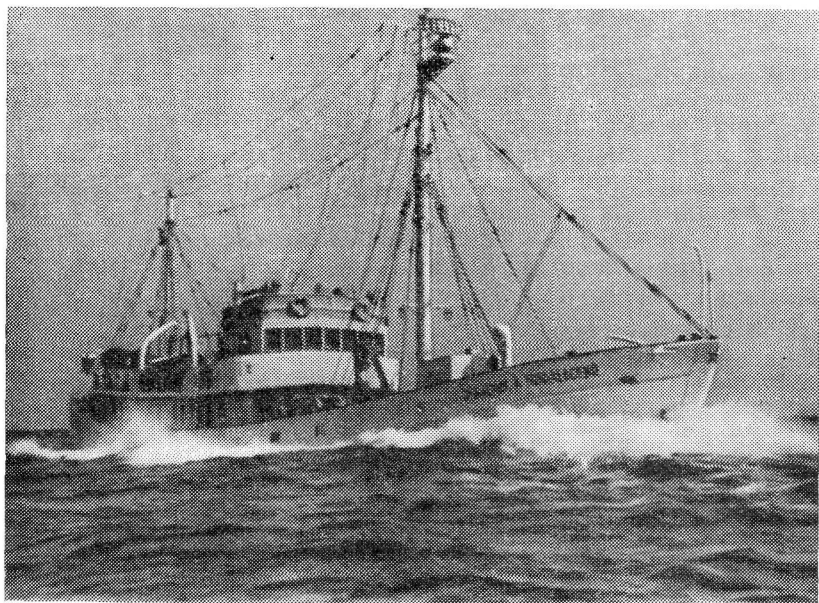


Рис. 2. Экспедиционное судно «Академик А. Ковалевский».



Рис. 3. Институт биологии южных морей АН УССР в 1968 г.

ресовались проблемами геологии и ботаники. После неоднократных изменений подчиненности она в 1926 г. была принята в ведение Украинского Наркомпроса и ее руководителем был назначен проф. Харьковского университета В. Л. Паули, после чего станция приобретает гидробиологическое направление и публикует ряд важных исследований по фауне Черного моря и экологии морских организмов. В дальнейшем она поступает в ведение Украинской Академии наук и плодотворно работает под руководством ученика В. Л. Паули — К. А. Виноградова. После переезда последнего в Одессу в 1956 г. станцией заведовали А. Н. Смирнов, В. Д. Гордеев, Д. В. Гирник и А. В. Чепурнов. После включения ее в состав ИнБЮМ (1961 г.) были приняты меры к объявлению района станции заповедной территорией. Проводились исследования в области ихтиологии, фотосинтеза, биохимии и бионики.

В 1956 г. создана Одесская биологическая станция Института гидробиологии АН УССР, которая позднее вошла в состав ИнБЮМ. Целью ее было изучение приморских водоемов, устьев рек и контактных зон моря и суши. Под руководством К. А. Виноградова станция в короткое время развернула разнообразные исследования биологии северо-западной части Черного моря и в дальнейшем распространила свои работы на все Черное море,

в 1962 г. провела экспедиционные исследования в Каспийском море. З. А. Виноградова организовала широкие биохимические исследования морских организмов и сообществ. Ю. П. Зайцев создал новое направление — изучение гипонейстона — своеобразного скопления планктонных организмов в приповерхностном слое воды. Выполнены были также интересные исследования по гидрологии Черного моря, проливов и лиманов.

При организации Института биологии южных морей в его состав вошли следующие отделы: гидрологии и гидрохимии, планктона (с лабораториями — фитопланктона, зоопланктона, микробиологии и ихтиопланктона), бентоса, nekтона, экологической физиологии, радиобиологии, обростаний. В дальнейшем в Севастополе были организованы: отдел ихтиологии, лаборатории макрофитов, санитарной биологии, изотопного обмена, структуры и динамики сообществ, физиологии фитопланктона, кабинеты масс-спектрометрии и биолюминесценции.

В 1964—1965 гг. сотрудники института осуществили большие исследования в Мексиканском заливе и Карибском море и приняли участие в организации Института океанологии Академии наук Республики Куба.

В 1965 г. здание института было расширено (рис. 3). Одновременно создан новый аквариум, а старый стали использовать для экспериментальных исследований.

В 1967 г. В. А. Водяницкий оставил пост директора института, на эту должность был избран чл.-корр. АН УССР В. Н. Грезе, занимавший ранее пост заместителя директора, на который был назначен чл.-корр. АН УССР Г. Г. Поликарпов.

К началу 1971 г. в составе научных сотрудников ИнБЮМ имелось 14 докторов биологических наук и около 100 кандидатов наук; большинство из них приобрели квалификацию морских исследователей и ученые степени за время работы в самом институте или на биологических станциях, из которых он сложился. Работы ИнБЮМ характеризуются тесным соединением экспедиционных и экспериментальных исследований, стремлением сотрудников к углубленному изучению биологических процессов, а не только к внешнему описанию природы морей. В институте созданы некоторые направления исследований, сравнительно слабо представленные в других учреждениях. В целом деятельность института, включая одновременно и классические разделы гидробиологии, носит в значительной мере научно-поисковый характер. В связи с этим ИнБЮМ занимает одно из заметных мест в ряду морских биологических учреждений. Коллектив Института и в дальнейшем будет плодотворно трудиться на благо науки и народного хозяйства.

Основные сведения о первоначальной организации Севастопольской биологической станции и ее деятельности до 1915 г. были изложены С. А. Зерновым [1]. Им же были предоставлены

еще ранее необходимые данные для книги Кофонда [10]. В дальнейшем, в связи с юбилейными датами 50-летия, 75-летия и 90-летия станции, были опубликованы статьи В. Н. Никитина [2, 3] и В. А. Водяницкого [4—6, 9]. В книге К. А. Виноградова [7] также имеются сведения о возникновении станции и ее деятельности. Обширные списки работ, опубликованных сотрудниками биологической станции и Института биологии южных морей в послевоенные годы, приведены в упомянутых юбилейных статьях, а также в книге В. А. Водяницкого, Р. Ф. Поликарповой и Р. Е. Грига [8].

ЛИТЕРАТУРА

1. Зернов С. А. — Материалы для истории учреждений АН. Л., 1915.
2. Никитин В. Н. — Русск. гидробиол. журн., 1, 1922.
3. Никитин В. Н. — В кн.: АН за 10 лет, 1917—1927. Л., 1927.
4. Водяницкий В. А. — Тр. Севастоп. биол. ст., 6, 1948.
5. Водяницкий В. А. — Тр. Севастоп. биол. ст., 16, 1963.
6. Водяницкий В. А. — Гидробиол. журн., 4, 1, 1968.
7. Виноградов К. А. — В кн.: Очерки по истории отечественных гидробиологических исследований на Черном море. К., 1958.
8. Водяницкий В. А., Поликарпова Р. Ф., Грига Р. Е. — В кн.: Обзор исследований в Черном и Средиземном морях Института биологии южных морей им. А. О. Ковалевского за 1954—1968 гг. Киев — Севастополь, 1970.
9. Інститут біології південних морів. — В кн.: Історія АН УРСР, 2. К., 1967.
10. Kofoid Ch. A. The biological stations of Europe, 1910.

A CENTENARY OF THE INSTITUTE OF BIOLOGY OF SOUTHERN SEAS

V. A. VODIANITSKY

Summary

The idea of foundation of the Sevastopol Biological Station belonged to the young zoologist N. N. Mikloukho-Maklay, later the famous traveller.

In August 1869 on the initiative of Mikloukho-Maklay the II Congress of Russian naturalists set up a committee for discussing the problem on the Biological Station. The organization of the Station in Sevastopol was taken upon by the Novorossiisk (Odessa) Society of Naturalists. By the date of foundation (1871) the Sevastopol Biological Station was the first in Russia and the third in the whole world. Since 1875 the Station was admitted to the budget of the Ministry of Education.

Investigations on fauna, flora, biogeography, ecology and oceanography of the Black Sea and adjacent seas were carried out at the Sevastopol Biological Station. Such far-famed scientists as V. N. Ulianin, S. M. Pereyaslavtseva, A. A. Ostroumov, S. A. Zernov, L. I. Yakubova worked at the Station. At the Soviet time the work in this field has been continued by V. N. Nikitin, N. V. Morozova-Vodianitskaya and many others.

Researches in hydrochemistry, biology of fish and productivity should be mentioned among the most important ones. On the initiative of the Station the development of fishery was set up in the Black Sea open waters, earlier erroneously considered as not worth attention. A revision of the Black Sea hydrological construction and metabolism in it was made.

The activities of many of the most eminent biologists was closely connected with the Station, to begin with its directors-academicians: A. O. Kovalevsky, V. V. Zалensky, N. V. Nasonov, S. A. Zernov.

The Sevastopol Biological Station has become the center where Russian zoologists and botanists have been welcomed for more systematic study of the Black Sea animals and plants. V. N. Ulianin, the nominated superintendent of the Station, was engaged in investigations of invertebrate's fauna in the Black Sea. The Ulianin work, being a summary in knowledge of the Black Sea's fauna, serves up to the present time as a necessary source for everyone who is interested in zoogeographical investigations of the South Russian Seas.

In 1880 Ulianin, being called to the post to Warsaw, left the Station, and S. M. Pereyaslavtseva, on the proposal of A. O. Kovalevsky, was elected superintendent chief of the Station and kept this post till 1891. S. M. Pereyaslavtseva was one of the first Russian women-scientists, eminent energetic worker and a gifted naturalist. The energy, with which S. M. Pereyaslavtseva carried out the faunistic investigations, and an unbroken continuation of this work during about 10 years of her work at the Station left deep traces. To the lists of fauna she added 205 new for the Black Sea invertebrates. She wrote fundamental works on Protozoa and Turbellaria.

At the conference of the Novorossiisk Society of Naturalists on February 25, 1889, Professor A. O. Kovalevsky was elected director of the Sevastopol Station. At the same sitting the Station was planned to be passed under the authority of the Academy of Sciences (St. Petersburg). In 1890 A. O. Kovalevsky was elected academician in ordinary. At the sitting on February 8, 1892, the Novorossiisk Society of Naturalists adopted the resolution to hand over the administration of the Station to the Academy of Sciences.

In spring of 1891 assistant professor of Kazan University A. A. Ostroumov was appointed superintendent of the Station. He had been working at the Naples Zoologic Station and had published his monograph on Bryozoa of Sevastopol Bay. He was familiar with researches on seas in general and on the Black Sea in particular. The Ostroumov activity opened a brilliant page in the Black Sea study and gave an example of astonishing energy, combined with highly scientific penetration into the main point of investigating subjects. The expeditionary activities of Ostroumov, the speed in processing collected materials are worth admiration. Simultaneously with accumulating information on the fauna composition in the Black, Marmara and Azov Seas, A. A. Ostroumov continued the study of fauna distribution in Sevastopol Bay undertaken by his predecessors Ulianin and Pereyaslavtseva.

In 1898 Ostroumov published "The specifier of the Black and Azov Seas fishes". The conception on the regularities in the vertical distribution of benthic animals was given in his work for the first time. The works by Ostroumov afforded opportunities to elucidate in general, but, indeed, in principal and essential

lines all the natural history and development of fauna in the Black, Azov and Marmara Seas, as well as in the Bosphorus and Dardanelles, nearly completely unknown until that time.

Academician A. O. Kovalevsky was greatly interested in all the aspects of the Station's management, took much care of its comfort, supplement for its library and of the construction of a special building for the Station. The construction of the building was begun in 1896 and completed in the main in autumn of 1897. The aquarium premises with its seaward projection consisted of 12 small pools with a total capacity of 25 m³ and a central one with a capacity of 22 m³.

A. O. Kovalevsky took much care of organizing the scientific work of the youth, who deeply venerated him as a perfectly honest and honourable man. More than ten works by Kovalevsky are connected with his sojourns in Sevastopol. He petitioned to obtain new staffs and salaries for the Station but suddenly died in November 1901.

Academician V. V. Zalensky was elected director of the Station in December 1901. V. V. Zalensky visited S. A. Zernov in Simpheropol and invited him to the post of superintendent of the Station. S. A. Zernov began his work at the Station in May 1902. In 1902—1904 he published his three "Reports on fishery investigations of Tauria province" containing some detailed evidences on economy and technique of fishery and on fish biology, as well as in very valuable summary table of fishery periods in the area from the Azov Sea to Sevastopol Bay. The principal Zernov's activity, however, developed in other trend of thought: S. A. Zernov's scientific work by scope expeditionary researches is similar to Ostroumov's and Ulianin's ones; by the intensity of the Sevastopol region's study, the activity of Pereyaslavtseva. Zernov stepped forward as ecologist and in his works the first outlines of a new science — hydrobiology appeared. Zernov's leitmotiv was the biocoenoses (the very word was introduced in Russia by Zernov), seasonal dynamics of life, species ecology.

For the first time for our seas S. A. Zernov applied the quantitative comparisons of the plankton catches. He published the works on the plankton of the Azov and Aral Seas. But the main Zernov's work was a detailed study of the distribution of benthic organisms in Sevastopol bays and adjacent part of the sea. Zernov achieved expeditions through all the area of the Black Sea, studying the distribution of benthic organisms. In 1906 S. A. Zernov got a mission to the Mediterranean Sea and inspected some biological stations there. In 1909 during his investigation work in the north-western part of the Black Sea, S. A. Zernov found and described unusual and unique thickets of Phyllophora in the area of 10 thousand km².

The voluminous Zernov's work contains data on biocoenoses, plankton, annual change of fish and on periods of their maturity, on ecology of invertebrate animals, on annual cycle of sea life.

Director Academician V. V. Zalensky not only helped much the Station by his assistance in the Academy of Sciences, but also was closely connected with the Station by his own scientific work. His famous "Morphogenetische studien an Würmern" was carried out in its most part during his sojourns in Sevastopol, as well as his series of purely embriologic researches.

In 1910 the south wing, equal in volume to the half of the basic building,

was added to the Station's structure. In 1914 S. A. Zernov left the Station in order to advance the first in Russia chair of hydrobiology which had just opened at the Moscow Agricultural Institute. L. I. Yakubova was charged with management of the Station.

After the beginning of the war the Station had no possibility to work in the sea and receive the outside students.

In 1916 P. S. Galtsov was elected superintendent of the Station and entered on his duties in 1917. The period of war and the following events in the Crimea gave no opportunity to carry out scientific researches at the Station. Instead of Galtsov, having abandoned the Station in 1921, V. N. Nikitin was appointed manager of the Station. The systematic deep-water investigations of the Black Sea commenced in February 1923 were being carried out by means of hydrological sections from the Crimean to Anatolian and Caucasian coasts, keeping terms settled by the International Commission for the Investigations of the Sea. The annual course of changes in the vertical distribution of temperature, salinity and density was established, quantitative determinations of oxygen and hydrogen sulphide were obtained. The quantitative determinations of the vertical distribution of carbonates and sulphates allowed the problem of the hydrogen sulphide origin in the Black Sea to be approached, chiefly, as a result of the reduction processes of sulphates. The boundary of the vertical plankton distribution in the central part of the sea is at a depth of 160—140 m, rising up in some sections of the eastern part of the sea to 120—100 m. In the littoral area of the sea this boundary sinks to a depth of 200—175 m. The fundamental Nikitin's works threw light upon the problems of vertical plankton distribution, lower boundary of life, seasonal plankton migration, dependence of the plankton on a lot of factors (by field and experimental data). Together with E. F. Skvortsov and Yu. M. Shokalsky and in his own works, V. N. Nikitin elucidated and specified a series of basic problems on the Black Sea hydrology. For the first time spacious and very important researches on the contents of nitrogen and phosphorous compounds were carried out. The question on hydrogen sulphide has been reinvestigated.

Academician N. V. Nasonov, one of the most prominent zoologists, was elected director of the Station in 1925. The number of collaborators was increased. M. A. Galadzhiev, V. K. Popov, N. I. Chigirin were invited.

The experimental trend was developing in the activities of the Station. This told on the work of the collaborators fulfilling a series of interesting researches on ecological physiology. The foundation of the Experimental laboratory was begun, the hydrochemical laboratory was organized. Investigations along all the coasts of the Black Sea were carried out.

In 1930 Academician N. V. Nasonov decided to transmit the directorship of the Station to S. A. Zernov, elected Academician in 1929. In summer of 1931 V. N. Nikitin began his work at a newly organized Georgian Fishery and Biological Station in Batumi, joining this work with the function of professor in Tbilisi State University.

In September 1931 the Academy of Sciences appointed V. A. Vodianitsky to a newly set up post of vice-director of the Sevastopol Biological Station. At the same time N. V. Morozova-Vodianitskaya was invited to the Sevastopol Biological

Station who, together with V. A. Vodianitsky, having worked for 11 years at the Novorossiisk Biological Station.

In 1931 the staff of collaborators of the Station and the subjects of their works were as follows: L. I. Yakubova continued studying the Polychaeta fauna and biology of benthos organisms; M. A. Galadzhiev was engaged in zooplankton and infusoria and also continued the works on the study of boring worms and fouling of vessels, earlier commenced by V. N. Nikitin; V. K. Popov studied the parasitic crustacea and carried out the work on experimental morphology; E. N. Malm conducted the researches on experimental ecology and studied the dolphins of the Black Sea; N. I. Chigirin and M. A. Dobrzhanskaya were engaged in hydrochemistry; N. V. Morozova-Vodianitskaya continued her investigations on ecology of algae, V. A. Vodianitsky studied pelagic eggs and larvae of fish.

In 1932 F. I. Kopp was invited to work at the Station and organized the microbiologic laboratory — the first maritime microbiologic laboratory in the U. S. S. R.

During the following years the Station, while carrying out both expeditionary researches in the north-western part of the Black Sea and half-stationary ones in Karkinitzky Bay headed by L. V. Arnoldi and E. R. Fortunatova, was engaged in detailed study of the benthos.

After several visits of Academician L. A. Orbeli to the Station, the collaborators of the Physiological Institute under the direction of E. M. Kreps commenced the systematic work at the Station, studying physiology and biochemistry of marine animals.

In 1934—1935 the northern wing was built, which by the architectural design was the same as the southern one, and, besides, the fourth story was added to the central part of the building. The enlargement of the building afforded accommodation for synchronous work of 15 students and 20 scientists.

In 1932 the Sevastopol Biological Station addressed to all the scientific institutions studying the Black and Azov Seas, with proposal on holding a planned scientific conference. Preparatory brigades were organized on subdivisions: hydrography (V. A. Snezhinsky), oceanography and meteorology (B. P. Orlov, V. V. Shuleikin), geology (A. D. Arkhangelsky), hydrobiology (N. V. Morozova-Vodianitskaya), ichthyology (V. N. Tikhonov), estuaries and mouths (N. A. Zagorovsky). The conference was held in February 1934 in Sevastopol; 150 persons took part in it, with N. M. Knipovitch and Yu. H. Shokalsky, the prominent explorers of seas, among them.

In 1935 the collaborators of the Station participated in a great complex expedition on board the "Hydrographer". This expedition provided a lot of evidence on plankton, hydrochemistry and hydrology and, besides, succeeded in carrying out some interesting investigations near the Bosphorus on animal distribution and penetration of the Mediterranean water at a depth.

The investigation on flora and phytocoenoses progressed considerably due to the works by N. V. Morozova-Vodianitskaya. In 1937 she started the study of phytoplankton, the quantitative development of plant life and primary production in the Black Sea. The investigations on zooplankton were continued by M. A. Galadzhiev, who obtained a comparative quantitative characteristic of plankton in the open waters of the Black Sea and in Karkinitzky Bay.

Significant researches on the effect of the lower salinity of waters on invertebrates of the Black Sea were carried out by professor L. A. Zenkevich with his assistants. These researches, besides their theoretical importance, were connected with the problem of acclimatization of the Black Sea animals in the Caspian Sea.

In 1938 the Station was included into the system of the Zoological Institute. In 1939 V. A. Vodianitsky and N. V. Morozova-Vodianitskaya left the Station. L. V. Arnoldi was engaged in a detailed study of zoobenthos and together with K. R. Fortunatova — in study of fish nutrition.

A. P. Andriyashev investigated functional morphology of the pharyngeal apparatus in fish; M. A. Dolgopolskaya started studying stages of Decapoda development.

The treacherous invasion of the fascist airplanes at night on June 22, 1941, damaged at once the Station's building. A bomb, having fallen near the Station, destroyed its southern wing.

In summer of 1944 the Academy of Sciences passed a resolution about the restoration of the Sevastopol Biological Station and V. A. Vodianitsky was nominated director of the Station. The decision to restore the Station is a striking example of the importance which is attached to science in our country. In the city almost completely destroyed where there was no place to locate the population and establishments, where it was necessary to build everything anew, the miraculous renaissance of the Station can be explained only by deep and thorough attention of all the leading organs both All-Union and local ones.

The first post-war staff of the Station workers consisted of 6 scientists only: V. A. Vodianitsky, M. A. Galadzhiev, M. A. Dolgopolskaya, F. I. Kopp, N. V. Morozova-Vodianitskaya and V. L. Pauli. In 1945 there were no laboratories yet.

However, the problem was not only to restore the Station as it had been. It was necessary to determine the ways of the station own further development and to consolidate its position in studying the life of the sea, it was connected with the increasing and deepening of investigations and with necessity of widening of the fields of research in the other seas.

With great gratitude we should say about Academician L. A. Orbeli, vice-president of the Academy of Sciences of the U. S. S. R. and Academician-Secretary of the Section of Biology in that time. He supported the Station in first hard years of restoration and of setting right scientific activity.

The Station was founded in that period when the great evolutionary theory roused a particular interest for studying diversity of marine fauna. As it was shown above, the Station took an active part in successive development in the following fields of biological sciences: taxonomy, embriology, biogeography, biocoenology, ecological physiology, microbiology of the sea, hydrology and hydrochemistry too, which are closely connected with biology.

At the same time the Station conducted researches connected with the problems of national economy and fleet.

Many well-known scientists took part in the life of the Station, hundreds of young people acquired their first knowledge of the sea life and carried out

their first scientific works at the Station. Everything that was made at the Station is widely popular and traditionary for an Academy institution.

The first post-war expedition was accomplished in the summer of 1946 on board the trawler from Yalta to Batumi. Much work on microbiology was carried out. The initiator of this expedition A. E. Kriss set a task to find out the presence and role of bacteriophage in sea water. The work was widened and, in fact, that very expedition initiated broad researches on microbiology of deep-sea waters carried out next years by the Station together with the Institute of Microbiology of the Academy of Sciences of the U. S. S. R.

The works of this expedition were closely connected with a complex study of the problem of biological productivity of the sea which had been commenced by the Station before the war. As long as those years the assumptions were advanced which contradicted the conventional idea about a low productivity of the Black Sea. This complex problem demanded to reconsider many questions concerned to hydrology, hydrochemistry, biology and fishery of the Black Sea.

The development of relations with scientific institutions of the Mediterranean basin and the organization of expeditions in the Mediterranean Sea has played an essential part in the Station's activity since 1956.

In 1956 a representative of the Station made a report at the Session of the International Commission on studying the Mediterranean Sea. A review of knowledge concerning the Black Sea and peculiarities of its biological productivity were contained in the report. At the same time the report substantiated future participation of the Soviet scientific institutions in study of the Mediterranean Sea.

In 1958 the collaborators of the Station took part in the first Mediterranean Sea expedition on board research ship "Academician A. Kovalevsky".

In 1959 the investigations of the Mediterranean Sea by the Station extended to the West and South-East. We visited the institutes in Naples, Messina and Alexandria. In 1960 we were in the Adriatic Sea, shown round the institutes in Venice, and visited Split and Dubrovnic once more. The same year the hydro-biological institutes in Piraeus and on Rodos were visited by us. In winter of 1960—1961 the collaborators of the Station travelled to the western part of the Mediterranean Sea, having visited the institutes in Naples, Monaco, Marseilles and Tunis. In winter of 1961—1962 the researches in the Red Sea and Aden Bay were undertaken.

Planning the Mediterranean Sea expeditions we design to get data on development of life and biological productivity of the Mediterranean basin.

Now we can give a short review of many scientific papers published by the collaborators of the Station and Institute for post-war years.

Concerning study of phytoplankton and phytobenthos N. V. Morozova-Vodianitskaya's and her disciples' papers should be mentioned, where on the basis of a considerable body of evidence, the problems of taxonomic composition, quantitative development, distribution, seasonal change and daily production of phytoplankton and phytobenthos were considered.

A lot of data on phytoplankton collected for many years is available in some papers by G. K. Pitsyk, T. M. Kondratieva and E. V. Belogorskaya. They also present the results of processing data of many-day stations where daily regime

of phytoplankton and production were determined both in the sea immediately and in the experimental vessels set up at different depths. M. A. Dobrzhanskaya determined the production of phytoplankton by the oxygen method. Besides, under the leadership of G. G. Vinberg the primary production was determined by using radioactive isotopes (S. S. Finenko, T. M. Kondratieva).

The determination of the chlorophyll content in plankton was made by L. M. Sushchenya and E. V. Belogorskaya. N. P. Bessemyanova, L. V. Moshkina and D. C. Akinina studied the photosynthesis processes in some species of plankton algae under laboratory conditions. The works on algae cultures (L. A. Lanskaya) made it possible to fix the reproduction rate and find out a number of ecological peculiarities in many species. The collection of algae cultures permitted some experimental investigations to be carried out with both the algae proper and using them in investigations on nutrition of zooplankton.

The study of microbiology of the Black Sea which had been begun by F. I. Kopp before the war, was continued by A. E. Kriss, E. M. Markianovich, M. N. Lebedeva and L. N. Pshenin.

The taxonomy composition of bacterium population of the Black Sea is studied rather completely. Much attention was paid to studying quantitative development and distribution of bacteria in water thickness.

The works on zooplankton, besides investigations on quantitative development and distribution of organisms, were directed to studying ecology of main forms — their nutrition, respiration, development and reproduction (E. P. Delalo, G. N. Mironov, E. V. Pavlova, T. S. Petipa, L. I. Sazhina). Application of experimental methods deepened the knowledge of the plankton life.

Great attention was paid to studying pelagic larvae of mollusks (K. I. Zakhvatkina, V. D. Chukhchin), polychaetes (M. I. Kiseleva) and crustaceans (M. A. Dolgopolskaya) — those forms which are very difficult to be distinguished in plankton.

With the beginning of expeditions in the Mediterranean Sea the researches on plankton got a wider comparative-ecological aspect in both studying individual species (A. V. Kovalev, A. A. Shmeleva) and characteristics of productivity in different regions of the Mediterranean basin, biological structure of pelagial and mathematical interpretation of productivity problems (V. N. Greze, T. S. Petipa, V. S. Ten, V. E. Zaika, S. S. Finenko and others).

The papers on benthos investigations were mainly dedicated to a detailed quantitative study of biocoenoses and their distribution, much attention was attached to meiobenthos and biology of benthic organisms (M. I. Kiseleva, I. I. Greze, V. D. Chukhchin, G. A. Kiseleva, A. A. Kalugina). Biocoenosis of cystoseira was studied in detail (E. B. Makkaveeva).

Biology of organisms of fouling of vessels and submarine constructions and the methods of combatting them were studied at large (M. A. Dolgopolskaya, Z. S. Kucheroва, Yu. A. Gorbenko, A. Z. Shapiro, V. I. Braiko).

There were some different directions in the investigations on ichthyology. Various researches on ichthyoplankton were continued (V. A. Vodianitsky, N. N. Gorbunova, T. V. Dekhnik) in connection with the problem of dynamics in the fish quantity. Nutrition of fish was studied of both adult forms and larvae and fry (L. A. Duka, N. I. Lipskaya, V. I. Sinyukova). Biology and

taxonomy of *Trachurus* (Yu. G. Aleev), *Gaidropsarus* (V. D. Burdak), *Sargus* (L. P. Salekhova), *Bothus* (E. M. Kalinina) were investigated in detail.

Many researches on functional morphology of fish and other nekton animals (Yu. G. Aleev, A. V. Chepurinov, G. V. Zuev, V. V. Ovchinnikov, Yu. E. Mordvinov, V. D. Burdak and oth.) were carried out and generalized in the monograph by Yu. G. Aleev. This direction is connected not only with the theoretic problems, but is of practical importance. It was reflected in a study of geographical regularities of fish growth in different seas.

Recently an intensive study of parasitofauna of fish has been commenced (V. M. Nikolaeva, A. M. Parukhin and oth.).

Experimental researches on ecological physiology were of particular importance in the activity of the Station especially after V. S. Ivlev had organized the laboratory of physiology. Here we should mention the paper on nutrition, metabolism of marine animals, etc. (K. D. Alexeeva, G. N. Mironov, E. V. Pavlova, T. S. Petipa, L. M. Sushchenya, O. G. Karandeeva, I. V. Ivleva, N. N. Khmeleva, K. M. Khailov, G. E. Shulman and oth.). The behaviour of fish and the role of their sense organs were studied by M. P. Aronov.

Investigations on radiobiology have presented a new direction at the Station in the sixties after the establishment of a well-equipped laboratory under the leadership of G. G. Polikarpov. Both experimental researches and works describing the level of radiation under natural conditions (V. P. Parchevsky, G. V. Barinov, V. N. Ivanov and oth.), were carried out at the laboratory and generalized in great monograph by G. G. Polikarpov.

Traditional works of the Station on fauna of the Black Sea, revision of taxonomic composition of fauna were being continued. Some works were devoted to general problems of biogeography of the Black Sea and those of biological productivity, hydrology (A. K. Bogdanova, V. I. Satz) and sanitary biology (O. G. Mironov). Researches on hydro- and biochemistry were mainly about biogenous substances (M. A. Dobrzhanskaya) and dissolved organic matter (K. M. Khailov, A. T. Suprunov, D. M. Vityuk). The works on the regime of phosphorus compounds in the Black Sea and organic metabolites should be mentioned especially.

In general the works of the Station, being so various, were concentrated chiefly on some problems, the sea productivity and ecology of mass organisms being the main of them.

In 1961 the Sevastopol Biological Station was involved into the system of the Academy of Sciences of the Ukr. S. S. R.

The Institute of Biology of Southern Seas was established in 1963 on the basis of the Sevastopol, Karadag and Odessa biological stations, with its center in Sevastopol. There were the following departments in the Institute at that time: hydrology and hydrochemistry, plankton (with phytoplankton, zooplankton, microbiology and ichthyoplankton laboratories), benthos, nekton, ecological physiology, radiobiology, fouling of vessels. Next years the ichthyological department (T. V. Dekhnik), laboratory of macrophytes (A. A. Kalugina), laboratory of sanitary biology (O. G. Mironov), laboratory of isotope exchange (G. V. Barinov), laboratory of structure and dynamics of plankton societies (T. S. Petipa), laboratory of phytoplankton physiology (S. S. Finenko), cabinet of mass-spectro-

metry (L. N. Pshenin) and cabinet of bioluminescence were organized in Sevastopol.

The Institute accomplished wide researches in the tropical part of the Atlantic Ocean, in the Gulf of Mexico and Caribbean Sea (V. N. Greze, G. K. Pitsyk, A. N. Kolesnikov, L. M. Sushchenya, V. V. Murina, V. M. Nikolaeva, G. G. Polikarpov, Yu. P. Zaitsev, M. I. Roukhijainen and oth.).

In 1965 the Institute building was enlarged by lengthening the wings and the fifth story was added above the central part of the building. Simultaneously new aquarium premises were built and the old one is used for investigations now.

In 1967 V. A. Vodiansky left the post of director of the Institute and V. N. Greze, Corresponding Member of the Academy of Sciences of the Ukr. S. S. R., was elected director of the Institute and G. G. Polikarpov, Corresponding Member of the Academy of Sciences of the Ukr. S. S. R., was appointed assistant director of the Institute.

The Karadag Biological Station was founded in 1914 by doctor I. T. Viazemsky, the lecturer of Moscow University. He bought a plot of land near Koktebel, built a house, collected an excellent library and left all these to the Moscow Society of Naturalists to found a scientific station. At first the interests of the Station were directed to geology and botany. In 1926 the Station was passed under the authority of the Ukrainian Commissariat of People's Education and V. L. Pauli, professor of Kharkov University, was elected director of the Station. After this the Station acquires hydrobiological direction and published some important works on fauna of the Black Sea and ecology of marine organisms. Then the Station was transmitted into the systems of the Ukrainian Academy of Sciences and worked successfully under the leadership of K. A. Vinogradov.

When K. A. Vinogradov left for Odessa in 1956, directors of the Station were: A. N. Smirnov, V. D. Gordeev, D. V. Hirnik and A. V. Chepurnov. After including the Station into the system of the Institute of Biology of Southern Seas (1961) main attention was concentrated on investigations on experimental ichthyology, photosynthesis, biochemistry and bionics.

The Odessa branch of the Institute at first was founded as a biological station of the Institute of Hydrobiology of the Academy of Sciences of the Ukr. S. S. R. and aimed at studying estuaries, littoral zone of the sea. Under the leadership of K. A. Vinogradov the Station in a short time accomplished various investigations in the north-western part of the Black Sea and then extended its researches all over the Black Sea. In 1962 the expedition in the Caspian Sea was carried out. Z. A. Vinogradova was an initiator of the biochemical investigations of marine organisms and societies. Yu. P. Zaitsev set up a new trend — a study of hyponeuston — those organisms which concentrate in a superficial stratum. Some interesting investigations on hydrology were carried out.

By the beginning of 1971 there were 14 doctors of biological sciences and about 100 candidates of sciences in the staff of scientific workers at the Institute of Biology of Southern Seas. Most of them got the qualification of marine investigators and scientific degrees, working at the Institute and its stations. The researches of the Institute of Biology of Southern Seas as distinguished from those of other marine biological institutes may be characterized by close contact of expeditionary and experimental investigations, the tendency to an extensive

study of biological processes. Some directions of investigations comparatively poorly represented in other institutes are found at the Institute. On the whole, the Institute activity, including classic aspects of hydrobiology, may be characterized as scientific-search one and in this respect the Institute occupies one of the noticeable position in a line of marine biological institutions. The collective members of the Institute are sure in the further fruitful development of its activity in the interest of science and national economy.

Principal information on the initial organization of the Sevastopol Biological Station and its activity till 1915 were given by S. A. Zernov [1]. The necessary facts for Kofoed's book were presented by him too. Then, in connection with the 50th, 75th and 90th anniversaries of the Station, V. N. Nikitin's [2] and V. A. Vodianitsky's [4—6, 9] articles were published. In K. A. Vinogradov's book [7] there are also some information on the history of the Station and its activity. Long lists of works published by the collaborators of the Biological Station and then the Institute of Biology of Southern Seas during post-war years were given in the articles mentioned above and in V. A. Vodianitsky's, R. F. Polikarpova's and R. E. Griga's book [18].

РОЛЬ СЕВАСТОПОЛЬСКОЙ БИОЛОГИЧЕСКОЙ СТАНЦИИ В ПОДГОТОВКЕ ГИДРОБИОЛОГОВ

И. И. Пузанов

До 70-х годов XIX века морских биологических станций не было не только в России, но и во всем мире. В 1868 г. русский натуралист Н. Н. Миклухо-Маклай работал в Мессине, расположенной на берегу пролива, известного богатством своей фауны. Здесь он встретился и подружился со знаменитым впоследствии зоологом Антоном Дорном. Оба молодых ученых вполне единодушно пришли к заключению о необходимости для науки организовать в подходящих местах хорошо оборудованные биологические станции. И через год, 23 сентября 1869 г., Н. Н. Миклухо-Маклай выступил в Москве на заседании II Съезда русских естествоиспытателей и врачей с докладом о результатах своих исследований, указав на срочную необходимость организации и у нас, в приморских местностях, научных биологических станций. Первыми на призыв Миклухо-Маклая откликнулись зоологи молодого в то время Новороссийского университета (Одесса): приват-доцент И. И. Мечников и профессор И. А. Маркузен, которые уже в 1870—1872 гг. основали первую Черноморскую биологическую станцию, состоявшую, однако, не при Новороссийском университете, а при основанном в этом же 1870 г. Новороссийском обществе естествоиспытателей. С дня основания станция помещалась в Севастополе, в частных домах, которых сменилось