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# INTRODUCTION TO THE RUSSIAN AND UKRAINIAN CONTRIBUTION

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The papers published in the current volume are the results of oceanic squid investigations carried out over many years by specialists in the ex-USSR, now Russia and Ukraine. The squid investigations in the former USSR are reminiscent of the supernova star: it flares up suddenly, shines brightly in the sky for a rather short time, then gradually fades, leaving only a weakly glowing nebula.

Until the 1950s there were few data about species composition of squid fauna in the seas around the USSR, let alone their biology. In the late 1950s, Soviet scientists ventured for the first time into the world's oceans, firstly in the Northwestern Atlantic and Northwestern Pacific (Kuroshio area) and then, in the late 1960s, into large areas of the Pacific. During the 1970s their studies embraced huge areas, from the Arctic to the Antarctic, including all tropical zones of the ocean. This broadening of the investigation area across the whole World Ocean coincided with, and was caused by, the appearance of new types of research and fishery vessels with unlimited voyage distance and new fishing tools, including large midwater and bottom trawls, which could operate at high speeds and at great depths. The investigations covered oceanic areas, continental and insular slopes and seamounts. After the fall of the USSR and cessation of funding of distant sea expeditions, these studies virtually ceased at the beginning of 1990s. Thus the period of flourishing Soviet cephalopod studies in the World Ocean embraced two decades, the 1970s and 1980s. Approximately 35–40 people were engaged in cephalopod studies and 300–400 research and reconnaissance cruises were made during these years.

Initially, cephalopods were not the main target of Soviet investigations of marine biological resources, but were studied in passing. However, when large squid stocks were discovered elsewhere, some investigations targeted at squid were organized. These studies were carried out mostly by the following fisheries institutions: The all-USSR (now Russian Federal) Research Institute of Marine Fisheries and Oceanography (VNIRO) in Moscow, the Atlantic Research Institute of Fisheries and Oceanography (AtlantNIRO) in Kaliningrad (Baltic Sea), the Pacific Research Institute of Fisheries and Oceanography (TINRO, now TINRO-Centre) in Vladivostok (Japan Sea), the Azov-Black Sea Research Institute of Fisheries and Oceanography (AzCherNIRO) in Kerch, Ukraine (Black Sea), and, to a lesser degree, the Polar Research Institute of Marine Fisheries and Oceanography (PINRO) in Murmansk (Barents Sea). They worked together with the P. P. Shirshov Institute of Oceanology of the USSR (now Russian) Academy of Sciences, Moscow, and the A.O. Kovalevsky Institute of Biology of Southern Seas (IBSS) of the Ukrainian (now National Ukrainian) Academy of Sciences, Sevastopol.

Most studies were conducted on oceanic squids, firstly on the abundant and ecologically and commercially important ommastrephids, and to a lesser degree on neritic loliginids, cuttlefishes and octopuses. Near-bottom squids were studied in all four 'corners' of the Atlantic Ocean: *Loligo pealei* and *Illex illecebrosus* off Canada and the USA; *Loligo patagonicus* and *Illex argentinus* off Argentina and the Falkland Islands; *Loligo vulgaris*, *Todarodes sagittatus* and *Illex coindetii* off Northwest Africa; and *Todarodes angolensis* off Angola and Namibia. In the northwestern Pacific and Far Eastern seas of

Russia the biology of *Todarodes pacificus* and *Berryteuthis magister* was studied in detail. *Ommastrephes bartramii, Onychoteuthis borealijaponica, Watasenia scintillans* and other species were also investigated. Large investigations were undertaken in the open Atlantic on *O. bartramii* and *Sthenoteuthis pteropus*. *Thysanoteuthis rhombus*, *Onychoteuthis banksii*, many species of Enoploteuthidae and related families and some cranchiids were studied throughout the World Ocean, as well as *Sepia officinalis* and *Octopus vulgaris* off Northwest Africa, loliginids and sepiids in the northwestern Indian Ocean. Extensive investigations were conducted in the eastern Pacific on *Dosidicus gigas* and on *Sthenoteuthis oualaniensis* throughout the entire Indian and Pacific oceans. The leaders of these studies were Yu. A. Filippova (VNIRO, Moscow), G. V. Zuyev (IBSS, Sevastopol), Ch. M. Nigmatullin (AtlantNIRO, Kaliningrad), G. A. Shevtsov (TINRO-Centre, Vladivostok), A. I. Arkhipkin (AtlantNIRO, now at Stanley, Falkland Islands) and others.

The phenomenon of intraspecies sympatric seasonal groupings was discovered and studied in detail, mostly in ommastrephids and also in some large Loliginidae, Gonatidae, Sepiidae and Octopodidae. Reproductive maturity indices were established for squids and octopuses and widely introduced into the practice of domestic and foreign investigations; for oceanic squids they were developed for the first time. The main features of reproduction (including oogenesis and spermatophorogenesis), trophic and parasitic connections were described for different families of oceanic and neritic squids. Original methods were developed for visual assessment of abundance of the epipelagic nektonic squids, *Ommastrephes* and *Sthenoteuthis,* from a drifting ship on night light stations, coupled with underwater observations on squid behavior. This enabled the construction of the first charts of quantitative squid distribution in the Atlantic and Indian oceans and the assessment of general abundance, biomass and production of the near-surface oceanic squids in the World Ocean.

A general scheme was developed of phylogenetic and taxonomic relations in the Ommastrephidae and an ecological classification for ommastrephids, separating the shelf-slope, nerito-oceanic, and oceanic species groups with many subgroups. General patterns of reproductive strategies and a scheme for describing reproductive system development in cephalopods were formulated. Improvement of the method of squid age determination using statoliths enabled information on growth rate, age at maturity and lifespan in many species of Ommastrephidae, Enoploteuthidae, Onychoteuthidae, Gonatidae, Thysanoteuthidae to be obtained. The structure and development of gladius were described for most squids and the possibility of using the gladius for squid ageing was demonstrated. A methodological direction and close connection with oceanological and general biological (plankton, fish) conditions was characteristic for these studies.

One of the major problems of science in the former USSR was an idiotic system of classifying of all sorts of data considered as ‘economic secrets’. Part of this system, which happily vanished long ago, was the practice of publishing of much important information in books of abstracts from numerous domestic conferences on marine biological resources. In the Western literature an abstract of a scientific report usually contains only a few lines and states not *what* but *about what* the paper is concerned; thus it not considered a work worth citing as a source. However, in the former USSR, these abstracts were routinely two typed pages long and contained important data, most of which were never published as full papers. Considering the low accessibility of such books of abstracts outside the USSR and language problems, it is clear that a very significant part of the information

collected by the USSR scientists remained unknown in the West, despite the fact that many results were published in about a dozen books and many hundreds of papers. However, many achievements of Soviet cephalopod workers, primarily methodological, entered the general paradigm of world cephalopod science without direct citation of their authors and sometimes under other scientists' names.

Of course, only a very small part of this wealth may be expounded in the papers contained in this volume. They contained mostly data on the distribution, biology and physiology of nerito-oceanic and oceanic ommastrephids: species of *Todarodes*, *Sthenoteuthis* and *Ommastrephes*. I hope they will serve as, at least partial and, regretfully, belated, surmounting of the barrier between the former USSR and Western squid science.

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