

Contents

Preface to the English Edition	v
Preface to the Russian Version: A Word to the Reader	ix
I. Introduction: Underwater Acoustics and the Ocean	1
Hydroacoustics: What is it?	3
<i>M. V. Zhurkovich</i>	
Listening to the Great Unknown: The Ocean	7
<i>L. M. Brekhovskikh</i>	
II. Hydroacoustics in Russia from the 19th Century to the Present Time	17
A Brief History of Russian Hydroacoustics	19
<i>Ya. S. Karlik, V. A. Semendyaev and Yu. F. Tarasyuk</i>	
III. The Physics of Underwater Sound	69
The Development of Sound Propagation Theory in the USSR and in Russia	71
<i>V. V. Goncharov</i>	
Soviet and Russian Studies of Underwater Sound Scattering and Acoustic Signal Fluctuations	121
<i>E. P. Gulin and Yu. P. Lysanov</i>	

Russian Investigations of Ocean Noise <i>B. F. Kuryanov</i>	197
IV. Laying the Scientific and Practical Foundation for Home Hydroacoustics	235
Vodtranspribor — The Alma Mater of Engineering of Home Hydroacoustic Instrument <i>V. A. Bersenev and B. Ya. Golubchik</i>	237
The Morfizpribor Central Research Institute (CRI) and Its Role in the Development of Home Hydroacoustics <i>Yu. A. Koryakin, A. I. Shamparov and G. V. Yakovlev</i>	287
Development of Investigations in Hydroacoustics at the Acad. N. N. Andreyev Institute of Acoustics <i>N. A. Dubrovsky and V. I. Mazepov</i>	303
The History of Creation and the Work of the Sukhumi Marine Research Station of ACIN RAS <i>Yu. M. Sukharevsky</i>	354
Development of Some Topics in Hydroacoustics at the Acad. A. N. Krylov CRI <i>B. P. Grigoryev, V. S. Ivanov, V. A. Kolyslunitsyn, V. M. Platonov, V. N. Romanov, A. V. Smolyakov and V. Ye. Yakovlev</i>	373
SRI Atoll and its Role in the Creation of Stationary Hydroacoustic Facilities for Submarine Surveillance <i>L. Sh. Gumerov</i>	400
The P. P. Shirshov Institute of Oceanology: Its Place and Role in Home Hydroacoustics <i>I. I. Tynyankin</i>	411
The Laboratory of Acoustic Wave Propagation of the P. P. Shirshov Institute of Oceanology <i>V. M. Kurtepov</i>	418

Hydroacoustics Development at the Institutes of Nizhny Novgorod <i>V. A. Zverev</i>	429
A Brief Overview of Hydroacoustic Investigations at Research Institutions of the Sakhalin <i>Yu. S. Shumilov</i>	444
Overview of Hydroacoustic Investigations Conducted by Research Organizations of the Kamchatka <i>A. D. Konson, G. Ye. Smirnov and Yu. S. Shumilov</i>	448
V. Submarine Hydroacoustic Equipment	453
Hydroacoustic Systems for Submarines of the Pre-World War II and First Post-War Generations <i>V. E. Zelyakh</i>	455
The Sonar System <i>Kerch</i> : The History of its Creation <i>B. Ya. Golubchik</i>	471
The Birth of <i>Rubin</i> <i>Yu. A. Mikhailov</i>	484
Remembering <i>Yenisei</i> <i>V. B. Idin</i>	494
About the Sonar <i>Rubikon</i> <i>Yu. A. Mikhailov</i>	502
Third Generation of Acoustic Systems for Submarines: The Sonar System <i>Skat</i> <i>M. V. Zhurkovich, V. E. Zelyakh, V. B. Idin and I. N. Dynin</i>	508
Creation of the Sonar System <i>Skat-3</i> <i>V. A. Kakalov</i>	536
Creation of First Domestic Classification Systems for Submarine Sonar Systems <i>Yu. S. Perelmuter</i>	545

Equipment for Sound Signal Detection (SSD) <i>I. M. Strelkov</i>	557
VI. Sonar Systems for Surface Ships	567
Development of Surface Ship Sonar Systems for Submarine Detection <i>Z. A. Yeremina, V. G. Solovyev, I. S. Shkolnikov and A. D. Yakovlev</i>	569
History of Development of Sonar Systems Production at the Taganrog Priboy Plant <i>N. N. Borisenko</i>	590
VII. Stationary Sonar Systems	599
Stationary and Self-contained Sonars for Submarine Detection <i>L. B. Karlov and Ya. S. Karlik</i>	601
The History of the Development of the <i>Volkhov</i> Land-Based Sonar <i>V. N. Kanareykin and E. V. Yakovlev</i>	609
The History of the Development of the <i>Liman</i> Land-Based Sonar System <i>G. I. Afrutkin and V. S. Kasatkin</i>	614
The <i>Liman M</i> Infrasonic Stationary Sonar <i>G. I. Afrutkin</i>	623
The <i>Amur</i> Land-Based Passive Sonar <i>E. V. Batanogov and L. B. Karlov</i>	628
The Birth of the <i>Agam</i> Sonar <i>V. V. Demyanovich</i>	637
The Beginning of the Development of the <i>Dnestr</i> Sonar System <i>B. I. Lashkov</i>	668

The <i>Dnestr</i> — A Breakthrough in Early Sonar Detection <i>R. Kh. Balyan</i>	677
The Story of the Participation of the Lazurit CDB in the Development of Array Systems for Stationary Sonars <i>G. V. Vityugov, Yu. K. Druzhinin and N. I. Kvasha</i>	683
VIII. Specialized Hydroacoustic Systems	691
Sonars for Anchored Mines <i>V. E. Zelyakh</i>	693
<i>Krab</i> : A Fuse for Acoustic Mines <i>Z. N. Umikov</i>	713
Hydroacoustic Navigation and Positioning Aids with Transponder Beacons and Emergency Signal Sources <i>Yu. A. Nikolayenko</i>	722
From the History of the Engineering of Domestic Echo Sounding Equipment <i>I. M. Korotkin, P. M. Nefedov, Yu. M. Tarasyuk and L. S. Filimonov</i>	729
From the History of the Creation of Domestic Echo Sounders <i>Yu. F. Tarasyuk and L. S. Filimonov</i>	737
On the History of the Creation of Domestic Hydroacoustic Communication Systems (Designer's Notes) <i>V. Z. Krants</i>	742
On Search and Survey Sonars <i>A. V. Bogorodsky</i>	773
Domestic Hydroacoustic Sound Speed Meters <i>V. A. Komlyakov</i>	784
Hydroacoustic Doppler Logs <i>A. G. Zatsepin</i>	801

Sonar Countermeasures and Deception Aids <i>A. O. Markovsky</i>	807
Aspects of the History of Passive Hydroacoustic Systems with Emphasis on Adaptive Processing <i>V. I. Klyachkin and Yu. P. Podgaisky</i>	813
IX. Sonar Arrays	831
The Types of Sonar Arrays and the Stages of Their Development <i>A. A. Shabrov</i>	833
Results are Born in Research <i>V. I. Klyachkin</i>	842
On the Basic Themes in Submarine Bow Sonar Array Development <i>M. D. Smaryshev</i>	857
A History of Creation of Towed, Flexible, Extended Arrays <i>V. I. Pozern</i>	867
The History of the Stepped Array <i>G. Kh. Golubeva</i>	880
About Parametric Arrays <i>D. B. Ostrovsky</i>	886
A Nostalgia for Domes <i>V. T. Malyarova and Ye. L. Shenderov</i>	924
Sonar Array Screens <i>V. Ye. Glazanov</i>	931
Piezoactive Materials in Hydroacoustics <i>I. A. Serova</i>	941
Notes on the Development Over the Last 35 Years of Methods for the Manufacture of Piezoelectric Transducers <i>M. K. Busher</i>	961

Some Thoughts on the Strength of Sonar Equipment <i>V. I. Kirillov and Yu. P. Mezhevitinov</i>	974
About the Acoustics Department of the Vodtranspribor Plant <i>D. I. Kalyaeva and L. D. Stepanov</i>	982
The History of Development of Hydroacoustic Measurements at the CRI Morfizpribor <i>N. N. Fedorov and R. I. Eikhsfeld</i>	987

X. The Role of the Radio Engineering Department and the Naval RI in the Creation of Hydroacoustic Equipment **1009**

The Naval Radio Engineering Department and Development of Hydroacoustics <i>A. I. Barantsev and G. N. Korolkov</i>	1011
The Naval Research Institute of Radio Electronics and its Role in Home Hydroacoustics Development <i>A. A. Baranenko</i>	1020
The Contribution of Researchers and Specialists of the Naval Institutes to the Creation of Submarine Hydroacoustic Systems <i>K. P. Luginets</i>	1024
The Contribution of Researchers and Specialists of the Naval RIE to Solving Problems of Target Classification <i>A. I. Mashoshin</i>	1033
Contribution of Hydroacoustics Researchers of Naval RIE to Experimental Investigation of the World's Oceans <i>V. N. Matvienko</i>	1037
Hydroacoustic Investigations Carried out by the State Research Institute of Navigation and Hydrography of the RF Defense Ministry <i>P. S. Volosov and A. V. Fedotov</i>	1046

The Work of the Military Agency at CRI Morfizpribor 1054
L. B. Karlov and I. A. Yakovlev

XI. Organization of Hydroacoustic Equipment Development 1063

The 10th Main Department of the Ministry of Shipbuilding Industry of the USSR: Its Role and Place in the Development of Home Hydroacoustics 1065
N. N. Spiridov and B. I. Trushchelev

XII. Training of Hydroacoustics Engineering and Research Personnel 1071

The Department of Electroacoustics and Ultrasonic Engineering at SPb SEU (LETI) and its Role in the Development of the Acoustic Instrument Industry 1073
S. K. Pavros and Ye. D. Pigulevsky

The Branch Department of LETI at CRI Morfizpribor and its Role in Training Hydroacoustics Specialists 1078
M. D. Smaryshev

The Training of Engineers and Researchers in Applied Hydroacoustics at the N. G. Kuznetsov Naval Academy 1083
V. B. Mit'ko

The Chair of Acoustics at Moscow State University and Its Role in Training Hydroacoustics Specialists and the Development of the Vector-Phase Method for Acoustic Field Research 1096
V. A. Gordienko

Training of Engineering and Research Personnel in Applied Hydroacoustics at the Marine Technical University <i>K. I. Rogozhnikov and G. M. Sverdlin</i>	1118
The History of Development of the Chair of Hydroacoustic Equipment at the A. S. Popov Naval School of Electronic Engineering <i>V. A. Bledny, I. S. Zakharov and N. A. Ivanov</i>	1129
The Training of Specialists and Hydroacoustic Research at the Naval School of Underwater Navigation (NSUN) <i>V. V. Rotin</i>	1137
The History of Teaching the Fundamentals of Hydroacoustics and Hydroacoustic Equipment at the M. V. Frunze Naval School <i>A. V. Lavrentyev, A. S. Pravodelov and V. V. Samsonov</i>	1141
XIII. Veterans Remember	1145
Russia's First Hydroacoustic Laboratory: The Forging of Specialists for the Industry <i>M. V. Zhurkovich and Z. N. Umikov</i>	1147
Project <i>SIGAK</i> : The First Use of the Underwater Sound Channel in Support of Navy Needs <i>V. B. Idin</i>	1160
Our Help to the People's Republic of China with Developing Hydroacoustic Equipment <i>V. N. Kanareykin and A. N. Maksimov</i>	1166
Neptune's Underwater World through the Eyes of a Chief Designer <i>Ya. S. Karlik</i>	1173

Northern Fleet Training with the Participation of the Naval Institute of Electronics and CRI Morfizpribor <i>L. B. Karlov</i>	1179
Military Application of Hydroacoustics: The First Non-Periscope Attacks by Soviet Submariners <i>V. F. Martynyuk, Yu. F. Tarasyuk and L. S. Filimonov</i>	1187
Dolphins and Humans <i>N. A. Dubrovsky</i>	1193