Preface and Acknowledgments

Shallow water acoustics is a very active area of underwater acoustics research, as
the continental shelves and slopes have great economic, social, and military impor-
tance to humans, and all these areas interact with ocean sound. However, books
dedicated to this specific topic are in short supply, and indeed the book “Shallow
Water Acoustics” published over two decades ago in Russian by the two Russian
authors of this present book was the first volume specifically dedicated to this
branch of underwater acoustics. The authors then had this book translated into
English, and it represented the state of the art up to about 1995. However, a huge
amount of research has been done in this area in the last 15 years, and so we thought
that it would be a good thing for the three of us to collaborate on a book that would
update the coverage of the field, as well as point out more strongly where we
thought the future might lie. As the Office of Naval Research (ONR) was publishing
a book series on underwater sound, and was amenable to the idea, we signed on with
them and produced this book, guided by a technical Editorial Board that reviewed
and critiqued our work.

It may seem strange to some that a book on underwater sound was written jointly
by an American and two Russians, but in fact it is a rather natural development
given the history of the last 50 years. During the Cold War era, both the USA and
Russia developed considerable expertise in underwater sound, and had large com-
unities working in the area. And though (obviously) any transfer of classified
work was and is strictly prohibited by both countries, the transfer of basic research
knowledge was and still is fairly open. Indeed, American researchers studied the
works of the famous Russian acoustician Leonid Brekovskikh, while Russian
researchers were just as familiar with the textbooks by Bob Urick and Clarence
Clay. When the Cold War subsided in around 1990, actual meetings of Russian and
American investigators became common, and indeed that is when the three authors
of this book first met, at a port call of the Russian research vessel Akademik Sergey
Vavilov in Boston, MA. What struck us all was just how much we had in common
scientifically – we spoke one common language well, even if the Russians’ English
was poor and the American’s Russian nonexistent. We were excited about the basic
acoustics science, and as the international doors had opened sufficiently, we started
to collaborate.

In the post-Cold War era, Russian support for experimental ocean acoustics
dropped precipitously, and seagoing efforts became few and far between. However,
a strong community with a good understanding of experiments and a sterling
knowledge of theory existed, and started to look outwards for collaboration and
funding. US funding also dropped some, but ONR still maintained a vibrant ocean
acoustics program, including a strong experimental and technological component.
Given the data coming out of the US program, and the analysis capabilities of the
Russian researchers, a natural partnership was possible, and indeed came to fruition
in many cases, not just for this book. This bit of technological symbiosis has been
good for all concerned, and we fervently hope it will continue.

Regarding the book itself, we have written a book that is intended for graduate
students, postdocs, and more advanced researchers, that is also a cross between a
research monograph and a textbook. As there are few textbooks in this area (see the
above remarks), we thought that covering the elements of the field, but at an
advanced level, would be useful. On the other hand, we also wanted to provide a
monograph that showed the state of the art in research, and also tried to point the
way for future efforts. This made the book a bit of a balancing act, and we hope that
it has succeeded.

We also have couched much of the physics of this book in terms of the modal
picture, which we think is the most natural one for shallow water. That is not to say
that we have avoided ray theory or WKB, but that our emphasis has been on lower
frequency modal work. We also note that some of the physics can be explained in
the ray picture as well as the mode, and indeed one of our Editorial Board members,
Dr. Ira Dyer, is a strong advocate of looking at things that way. Our feeling is that,
once you have understood the physics in one picture or the other, you can under-
stand it both ways – the picture translation is not so hard.

One might also notice a bias in the experimental data discussed to the Barents
Sea and the East Coast of the USA. This is because these are the places that
were most frequented experimentally by the authors and their home Institutions
(Voronezh State University, the General Physics Institute and the Woods Hole
Oceanographic Institution). We are most familiar with the data from these areas,
and so naturally used them first for examples.

Next, you will note in reading this book that it speaks with both a Russian and an
American (New Jersey) accent, depending on the section. We have tried hard to
make things grammatically correct, and clear as well, but the “linguistic lilt” of the
various sections we left intact. As all of us are fans of the great physicist Richard
Feynman, we think that speaking in your own voice is no crime, and has a noble
precedent. Feynman would have contended, as we do, it is what you say about the
science, and not the regional accent that counts.

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