XXVIII OPEN SEMINAR ON ACOUSTICS
Gliwice, 7-11 September, 1981

XXVIII Open Seminar on Acoustics (OSA 81) was held in Gliwice on 7-11 September, 1981. It was organized by the High Silesian Division of the Polish Acoustical Society and the Institute of Physics, Silesian Technical University. The Organizing Committee was headed by Dr. Wiesław KASPRZYK. The Organizing Committee also included Zdzisław JAKUBCZYK, M. Sc., — financial problems, Dr. Eng. Marian NOWAK — foreign correspondence and care of foreign guests and Dr. Józef TABIN — review of papers submitted to the Organizings Committee and edition of seminar proceedings.

130 persons, including 5 foreign guests, took part in the Seminar. The foreign guests were: Dr. Paul FRANÇOIS (France), Dr. Nazar AL-RAWAS (Iraq), Dr. Hamon DETLEV (GDR), Dr. Kaetzmer DIETER (GDR) and Dr. Ruser DETLEV (GDR). Sixty four papers, including three general ones, were delivered. In addition a film was shown on the history and research in the Institute headed by Dr. P. FRANÇOIS.

The Seminar was held in three paralell sessions, each beginning with a leading paper on a given subject.

Section A — physical acoustics, acoustooptics, crystals, sonochemistry, non-destructive testing, piezoelectric and piezomagnetic transducers.

Section B — electroacoustics, acoustics of speech and hearing and musical acoustics.

Section C — hydroacoustics, ultrasound in medicine, noise and vibration.

The papers which had been accepted for delivery by divisions of the Polish Acoustical Society and submitted to the Organizing Committee were published — due to the efforts of the Organizing Committee — in one volume and a supplement (in 150 copies). The proceedings included 90 papers submitted to the Organizing Committee. The traditional Marek Kwiek Competition was organized for which only 3 papers were entered; of which two were distinguished. Dr. Z. KLESZCZEWSKI supervised the Competition in terms of organization and substance.

Dr. J. BERDOWSKI was the Scientific Director of the Seminar, with the assistance of M. STROZIK, M. Sc, The Secretariat of the Seminar, Dr. J. GMYREK, A. KLIMASEK, M. Sc., A. KWAŚNIEWSKI, M. Sc., Dr. R. HNATKÓW and Mr. J. ROCZNIAK, saw to the organization and catering. The technical chores were performed by technicians K. KASPRZYK and J. WIERZBICKI.

On 7-9 September the Seminar was accompanied by an exhibition of acoustic equipment organized by Brüel and Kjaer which enjoyed a great interest.

Two organizational meetings: of the Executive Board of the Polish Acoustical Society and the Plenary Congress of the Delegates of the Polish Acoustical Society in which a new Executive Board was elected, were held on the first day of the Seminar.

A meeting of the Committee on Acoustics of the Polish Academy of Sciences was held on 9 September, 1981.

The Seminar was inaugurated officially on 8 September, 1981. On behalf of the Organizing Committee the guests and participants were welcomed by its president Dr. W. KASPRZYK and subsequently on behalf of the Executive Board by the new President of the Polish Acoustical Society, Prof. Z. JAGODZIŃSKI. Prof. F. KUCZERA inaugurated the Seminar with his general paper *Acoustic properties of a liquid in terms of the theory of a liquid state.* On 9 and 10 September, the sessions also began with general papers: *Application of acoustic methods in mining* by Dr. A. LIPOWCZAN and, *50 years of acoustooptics in Poland* by Prof. A. ŚLIWIŃSKI.

The subjects of papers delivered in the sections were very differentiated, including in effect all the fields of acoustics. The papers delivered and discussion showed the present state of acoustic research and the perspectives for its development.

During the meeting a new Executive Board of the Committee was elected.

The Organizing Committee wishes to express its gratitude to all those who assisted it in its activities and made possible the organization of the OSA'81.

Joachim Gmyrek
(Gliwice)

THE MAREK KWIEK PRIZE

On December 1, 1981 the Jury of the Marek Kwiek Prize, Dr. Eng. Ryszard GUBRYNOWICZ – chairman, Doc. Dr. Hab. Edward OZIMEK and Dr. Eng. Jerzy ETIENNE – members, considered the papers entered for the prize and delivered at the XXVIIIth Open Seminar on Acoustics OSA'81 at Gliwice.

The Jury granted no prize of Ist or IInd degree and distinguished the following papers: Jacek MARSZAL, *An analog delay line for a multi-beam time-space sonar processor*; Zbigniew SOŁTYS, *A model of a sound source working in an interior.*

Chairman of the Jury
Dr. Eng. R. Gubrynowicz

Papers in sections

Section A (chairmen: Z. KLESZCZEWSKI, J. RANACHOWSKI, A. ŚLIWIŃSKI)

W. KASPRZYK, *Analysis of the work of an acoustic atomizer by the method of geometrical points.*
H. KRÓL, *An ultrasonic atomizer of fluid fuels in carburettor of internal combustion engines.*
K. TECHMAŃSKI, A. KOŁODZIEJ, B. KIBORT, B. MAJEWSKI, *Attempts to apply ultrasonic technique in the production of TV units.*
I. AUERBACH, W. SZACHNOWSKI, *Non-destructive ultrasonic control of plastic rotor blades.*
E. GIELATA, *Dimensionless acoustic criterion numbers in description of a thin-walled tube.*
R. PŁOWIEC, S. ERNST, M. WACIŃSKI, *The elasticity of diols, glycerols and glycerol electrolytes over the GHz range.*
W. BOCH, *Acoustic investigations of aqueous solutions of $ZnSO_4$ and $LiCl$.*
J. KOPYŁOWICZ, R. PŁOWIEC, *Anomalies of water viscosity determined by an ultrasonic viscometer.*
M. ŁABOWSKI, *Investigation of the acoustic properties of chosen critical mixtures.*

E. SOCZKIEWICZ, *Propagation of acoustic waves and stochastic characteristics of inhomogeneous media.*

T. ZAMORSKI, *The effect of the curvature of the wave-front on the transmission properties of a horn for frequencies close to the cut-off frequency.*

Z. KLESZCZEWSKI, A. KWAŚNIEWSKA, Z. JAKUBCZYK, *Acoustic and acoustooptic properties of semiconductor crystals.*

J. BERDOWSKI, M. STROZIK, *An acoustooptic modulator using surface waves.*

A. BORKOWSKI, W. PAJEWSKI, *The phase velocity of surface and pseudosurface waves in a quartz crystal.*

R. BUKOWSKI, Z. KLESZCZEWSKI, A. MLECZKO, *The diffraction of light of very high intensity by acoustic waves.*

Z. KLESZCZEWSKI, M. TOMASZEWSKI, *Nonlinear elastic and piezoelectric properties of certain crystals.*

M. ADAMSKI, J. DEPUTAT, *Structural sensitivity of the elasto-acoustic coefficient.*

L. LEWANDOWSKI, *The coefficient of attenuation of acoustic waves in solid stochastic media.*

Z. KUBIK, *A system for the measurement of the acousto-electric effect in a layered structure.*

Section B (chairmen: H. HARAJDA, W. JASSEM)

W. JASSEM, *A regressive model of isochronism in a speech signal.*

A. HAJDUKIEWICZ, *Investigation of visual analogies of a simple sound.*

H. HARAJDA, *The amplitude envelope of the sound of consonants in a lecture hall.*

H. KUBZDELA, *Automatic recognition of words based on binary spectograms.*

I. PECIAK, *Investigation of the masking level and reproduction quality of speech in a system of encoding telephone conversations by four-frequency periodic phase inversion using correlation-spectral methods.*

Z. SOŁTYS, *A model of a sound source working in an interior.*

AL-RAWAS, *Effect of angle of azimuth of a sound and/or its repetition coloration.*

T. LIPIŃSKI, K. MUZALEWSKI, *Amplitude distortions in time-frequency compression and expansion.*

R. MAKOWSKI, *Objective investigations of the effect of localization of sound sources.*

I. SOBOLEWSKI, *Estimation of the autocorrelation function of stationary and ergodic processes.*

I. C. TARGOŃSKI, *Detectability of a sinusoidal signal against a noise background by the free choice method.*

J. ŻERA, T. BOEHM, T. ŁĘTOWSKI, *Conditions of coupling a transducer with the loading medium.*

Section C (chairmen: T. CEYPEK, Z. JAGODZIŃSKI, A. LIPOWCZAN, B. NOSOWICZ)

B. NOSOWICZ, T. WRONA, W. GLIŃSKI, *Chosen examples of designs for noise abatement in Silesian industry.*

A. RUDIUK, *The problem of noise certificate of aircraft.*

D. TRYNKOWSKA, R. MICHALSKI, *Technical parameters and real-ear attenuation of ear muffs.*

W. BEBLO, *Vibrational dosimetry.*

J. DYŻEWSKI, A. HAJDUKIEWICZ, W. WITKOWSKI, *Investigation of the acoustic properties of the music theatre in Gdynia.*

Z. JUSZCZYK, *The usefulness of ultrasonic investigations in diagnostics of some disorders of the abdominal cavity.*

J. KAZIMIERCZAK, *Acoustic identification of events in a working machine.*

W. CHOLEWA, *Application of the Camac system in vibroacoustic investigations.*

E. ZALEWSKA-PACIOREK, *Analysis of the path of a sound ray in a perpendicular-walled interior.*

D. RUSER, *A listing of stochastic measurement methods with information reduction in hydrolocation.*

A. KOWALSKI, *Classification of underwater objects.*

J. MARSZAL, *Analog delay line with sampling for a multi-beam time-space processor of a sonar.*

F. CHINCHURETA, W. MARTIN, R. SALAMON, A. STEPNOWSKI, *Transmission of broad-band signals in hydrocommunication systems.*

A. DYKA, *Experimental investigations of a filter for improving the depth resolution of hydrolocation systems.*

E. KOZACZKA, *Application of the cepstrum function in the investigation of the evolution of pulse hydroacoustic signals.*

J. MARSZAL, R. SALAMON, *A digital time-space processor with the "end-fire" order of microphones.*

J. MORAWIEC, E. KOZACZKA, *Application of the pulse method for determining the sensitivity characteristics of hydrophones.*

K. MUŻA, *Investigation of chosen characteristics of a measurement basin by means of a pulse sound source.*

J. TABIN, *The reflection of elastic waves.*

A. BORKOWSKI, A. PILARSKI, *Analysis of the angular dependence of the coefficient of reflection of ultrasonic waves on the interface between a liquid and a solid.*

B. SIKORA, M. HAGEL, *The reflection of ultrasonic waves from the blurred boundary between two media.*

J. TABIN, *New aspects of the reflection of elastic waves from a sphere.*

J. TABIN, *The directionality of the detection of ultrasonic waves by an oblique probe.*

R. SALAMON, F. CHICHURETA, *Analysis of layered system by the method of differential equations.*

A. KOŁODZIEJSKI, E. KOZACZKA, *Investigations of vibration of a cylindrical liner excited by a vibrating system of pulses.*

Z. KACZKOWSKI, *Dimensions vs resonance frequencies of chosen singleaperture piezoelectric transducers.*

W. LIS, *The effect of the casing on the pulse response of a transducer.*

A. DOBRUCKI, C. SZMAL, I. MORAŃSKI, *The effect of braces and absorption on the vibration of the walls of loudspeaker casings.*

S. BARTNICKI, E. DANICKI, *The effect of the mass of electrodes on the propagation of surface acoustic waves.*

A. STEPNOWSKI, Z. WOJAN, *The frequency response of a cylindrical transducer for radial and longitudinal polarisation.*

DOCTORAL DISSERTATIONS OF POLISH ACOUSTICIANS

ANDRZEJ PUCH

The effect of the operating conditions of axial dynamic generator with the horn and pressure chamber common for all stator channels on its accoustic parameters

This thesis presents a theoretical model (based on electroacoustical analogies) of the acoustic system of a dynamic flow generator in which the horn and pressure chamber (both of annular cross-section) are common for all stator channels. Experimental tests proved the correctness of the model derived in the range described by the assumptions under which it was built. Moreover, the effect of the shape of rotor and stator ports on the power and acoustic efficiency have been analysed. In the case of the port shapes giving rectangular time-depen-

dence of active air-flow area, the twofold increase of power and acoustic efficiency of generator was obtained. The case of power and efficiency drop was also determined in the range of higher frequencies.

Under supervision of Roman Wyrzykowski, D. Sc.,
at the Institute of Physics, Gdańsk University, 1978.

MARIA WYKOWSKA

Equivalent models of machines treated as cylindrical sources of noise

The present work is an attempt to replace a sound source consisting of three electric machines of different dimensions, connected in series by means of elastic couplings on driving shafts, by a cylindrical source. The criterion of directivity is adopted to find a solution to the problem. This criterion is based on the principle of conformability of the measured directional pattern of a real source with the patterns obtained from calculations performed for the adopted model.

Under supervision of Zbigniew Engel, D.Sc.,
at the Institute of Mechanics and Vibroacoustics,
Academy of Mining and Metallurgy, Cracow 1978.

TOMASZ ZAMORSKI

Finite length horn effect on the operating conditions of acoustic siren

The subject of the dissertation is an analysis of the horn part in the construction of dynamic axial generators, so called dynamic axial sirens. The work consists of two parts: the theoretical and experimental. The theoretical part is devoted to an analysis of acoustic wave propagation in hyperbolical horns of annular cross section with the emphasis placed upon the effects of the finite horn length. The experimental part of this work starts with a description of the experimentally examined siren. The experimental methods of determining the power and the acoustic efficiency of generator are also discussed. The results of the power and efficiency measurements have been compared to the discussion carried out in the theoretical part. It was proved that this discussion gives a reliable description of the horn properties as well as it allows foreseeing the influence of these properties upon the generator power and efficiency. The paper ends with a formulation of a set of criteria for the optimum horn choice in the future siren constructions.

Under supervision of Roman Wyrzykowski, D. Sc.,
at the Institute of Physics, Warsaw Technical University, 1979.

URSZULA JORASZ

Psychoacoustic analysis of the Doppler effect in the case of a monochromatic signal

The starting point for theoretical considerations and experimental investigations performed is a specific case of the Doppler effect for a tonal signal. Psychoacoustic experimental investigations consist in the study of a stationary observer's perception of a signal emitted by a moving source; more specifically, a study of the perception of pitch variations in a signal under the conditions of time variation of the loudness of this signal. The investigations were performed in laboratory using a purpose-built electronic model of a moving source.

It follows from investigations that dynamic generalized frequency discrimination thresholds, dependent, on the parameters of the motion of the source with respect to the observer, i.e. the motion velocity, distance, and on whether the source approaches or moves away from the observer were determined. In addition initial data were obtained for further investigations of the coupling between the loudness and pitch of tones in dynamic conditions.

Under supervision of Halina Ryffert, D. Sc.,
at the Department of Acoustics, Mickiewicz
University, Poznań 1980.

ALICJA CZAJKOWSKA

Psychoacoustic analysis of the perception and evaluation of simultaneous variations in the intensity and frequency of a tone

The investigations presented in this work were based on the conception of the existence of a mutual coupling between simultaneously evaluated variations in the loudness and pitch of the same tonal signal with varying intensity and frequency. As an example, some elements of this coupling, related to the perceptibility and evaluation of the magnitude of variations in loudness and pitch, were investigated for a chosen tone. The results obtained were expressed in the form of new, so-called generalized, discrimination thresholds and the curve of loudness and pitch variations sensed to be equal. These permitted to find that it is possible to sum up the subthreshold effects caused by simultaneous intensity and frequency variations in a signal and to obtain thus a superthreshold effect in the form of a sensation of pitch variation. For greater variations in the physical parameters a sort of mutual "masking" of simultaneous loudness and pitch variations of the same tone was found, while in the case when both variations were perceptible it was found that it was possible to compare them in terms of magnitude.

Under supervision of H. Ryffert, D. Sc.,
at the Department of Acoustics, Mickiewicz
University, Poznań 1980.