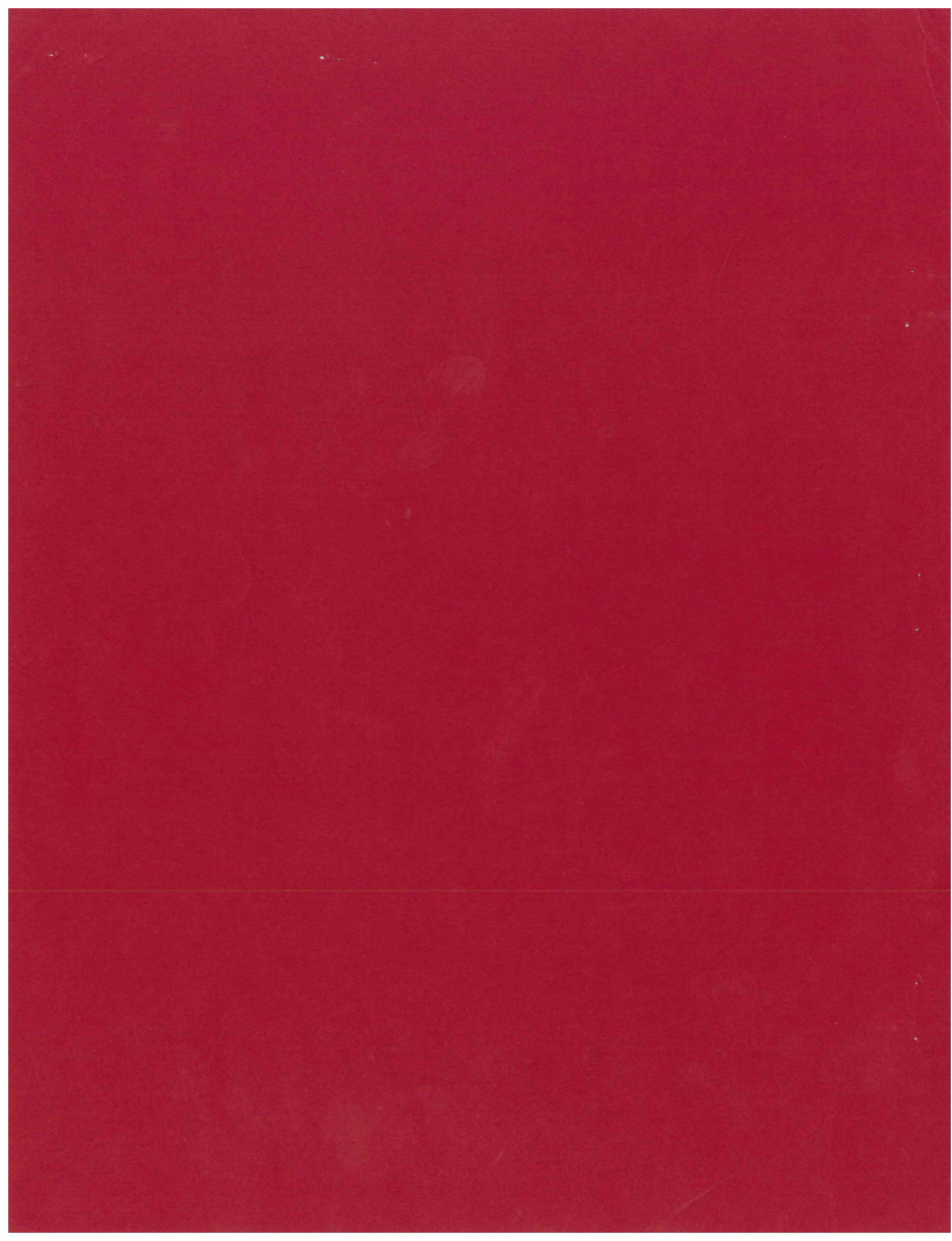


ACOUSTICS AND NOISE CONTROL
IN CANADA

L'ACOUSTIQUE ET LA LUTTE ANTIBRUIT
AU CANADA

JANUARY, 1973 VOL.1 NO.1
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ACOUSTICS AND NOISE CONTROLL'ACOUSTIQUE ET LA LUTTE ANTIBRUITIN CANADAAU CANADACONTRIBUTIONS

Articles in English or French are welcome. They should be addressed to a regional correspondent or to a member of the editorial board.

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Editorial

Tony F.W. Embleton, National Research Council, Ottawa

Canadian Committee on Acoustics - Past and Present.

Some 70 acousticians attended the October 1972 meeting of the CCA held at McGill University: just over 80 were at the National Research Council in Ottawa for the annual gathering of 1971. There has been an increase in the number of people actively engaged in acoustics in Canada, in the number who wish to meet and discuss mutual problems with others similarly engaged, and in the number who have come to hear of the existence of the Canadian Committee on Acoustics. For both newcomers and old timers a review of our history seems appropriate as we launch our first attempt at sharing information, news and ideas on some regular schedule that is more frequent than the annual meetings.

The first meeting was called by Tom Northwood and met on 29 March 1962 at the National Research Council. Of the 18 persons attending all except one or two are still active in acoustics and still attend meetings of the CCA. The agenda was simple and the proceedings direct. We introduced ourselves, said where we worked and what our interests were, discussed in detail one or two topics that we felt were of importance - these turned out to be traffic noise, aircraft noise, sound insulation in buildings and the training and supply of future acousticians - and ended by deciding that the meeting had been useful and that future meetings should be held. The following year attendance had grown to 22 and subjects covered included underwater acoustics, hearing threshold studies, and a report on U.S. and international standards.

At this second meeting (1963) there was serious discussion of the future organization of the group. Several possibilities existed. It was decided to form a Canadian organization to meet once a year for informal discussions on topics of mutual interest, but that it should be formalized to the extent of having a definite title and a recognized chairman and secretary to provide some central core. The title "Canadian Committee on Acoustics" was adopted. Tom Northwood was elected chairman and Tony Embleton secretary.

The pattern was set and meetings have been held annually since in various locations including Bell-Northern Research Laboratories, University of Toronto, McGill University (once in conjunction with Université de Montréal), and the University of Western Ontario. During this time several other members have served as chairman and secretary, and deserve our thanks for cherishing the CCA through its early years - Herb Ribner and Dave Anderson, Bob Tanner and Joe Piercy, and currently John Foreman and Bob Donato.

And so we come to the present. This is the first issue of this newsletter, a new venture, though it may claim as ancestry the efforts of many people over a period of ten years to provide a forum for Canadian acousticians. It is our intention to circulate an issue of several pages each calendar quarter. These will contain editorials, articles on acoustical or related topics, lists of publications and book reviews, and also news of general acoustical interest such as government regulations, by-laws and court cases.

This newsletter is a means of communication among acousticians. What it becomes in the future (even whether or not it survives more than a few issues) is going to be determined by the support it receives from all of us. If as a reader, you want a Newsletter that has the breadth to be useful and interesting, then it is incumbent upon you to supply relevant material whenever you find something worth contributing. This should be sent preferably to your nearest regional contributing editor, whose name is listed on p. ii. Material can be submitted in either English or French. Having voted unanimously to have a newsletter it is now up to all of us to make it a viable reality.

Industrial Noise Legislation in Canada, 1972

William H. Langford, Canada Department of Labour

All over the world, rapidly advancing production techniques in modern industrial processes are generating known, as well as hidden, dangers in the work-place. In recent years improved preventive measures have been taken everywhere to secure safety in the face of such developments.

Industrial noise--one of the old, continuing plagues--has frequently been alleviated or even eliminated by technological change for reasons other than hazard prevention. For example, the replacement of rivetting by welding (which in turn generates its own particular hazards) reduced noise emission in such industries as boilermaking and shipbuilding.

Where prevention of occupational injury or disease is of prime consideration, the creation of new methods of fabrication or other processes is often the result of attempts to remove hazards at the source, which is the first line of remedial attack. If prevention of dangerous emissions at the source is not feasible or practicable for economic or other reasons, offending processes and equipment may be isolated or contained within strictly limited areas displaying bold hazard warnings, and effective personal protection gear issued to and used by all those persons who could be affected.

Intensified studies in accoustics have led to the introduction of new materials and methods of applying them in industrial establishments and in production equipment and personal protective devices.

In addition to sophisticated monitoring techniques being evolved and practiced by governmental health departments, manufacturers of industrial construction and agricultural equipment are active in the safety field. Among others, the Canadian Standards Association and the American Conference of Governmental Hygienists are involved in developing standards and threshold limit values. Numerous groups concerned with industrial hygiene are bearing down on problems related to the attenuation of sound levels. The International Labour Office has continuing programmes involving technical and legislative developments concerning the prevention of employment injury.

Hearing loss from industrial noise is generally recognized in Canada and is usually compensable relative to the degree of impairment.

Protective legislative provisions that have existed in some Canadian provinces for a number of years have been progressively introduced in most jurisdictions. Recently, comprehensive regulations have been issued concerning noise control and hearing conservation in federal works, undertakings and businesses. The main federal provisions are recounted here briefly to indicate the scope of such legislation.

Where reasonably practicable, employers must not permit employees to work where the sound level is 90 dB(A) or more. Otherwise, permissible noise exposure is scaled from 8 hours per work day at 90 dB(A) to zero hours at 115 dB(A) or more. Exposure to 90 dB(A) or more may be permitted where hearing protection reduces the level to less than 90 dB(A) or where a test establishes no hearing impairment for employees exposed to 90 to 95 dB(A), and regular tests are made. Exposure to impact sound with peak sound pressures over 140 dB is prohibited without protection. Warning signs are mandatory at entrances to work sites where there are dangerous sound levels.

A list of Canadian industrial noise legislation is given below. Further information may be obtained from the report Safety and Health-Canada, Industrial Noise, Report C/S/H/2, Legislative Research Branch, Canada Dept. of Labour, January, 1973. Copies of this report are available on request from Legislative Research Branch, Canada Dept. of Labour, 340 Laurier Ave. West, Ottawa, Ontario, K1A OJ2.

Canadian Industrial Noise Legislation

Alberta

Workmen's Compensation Act (R.S.A. 1970, c. 397, am.)

General Safety Regulations (Alta. Reg. 370/72, sec. 104.18)
- Effective January 1, 1973

Lumber Regulations (Alta. Reg. 385/71, sec. 90.26)
- Effective December 31, 1971

Public Health Act (R.S.A. 1970, c. 294)

Regulations Respecting the Protection of Workers from the Effects of Noise (Alta. Reg. 30/71, am., Div. 29, secs. 1, 2 and 3)
- Effective January 28, 1971

British Columbia

Workmen's Compensation Act (S.B.C. 1968, c. 59, am.)

Accident Prevention Regulations (B.C. Reg. 64/72, secs. 12.28 and 14.26)
- Effective May 1, 1972

Mines Regulation Act (S.B.C. 1967, c. 25, am., Rule 94, secs. 1, 2 and 3)
- Effective March 23, 1967

Manitoba

Employment Safety Act (R.S.M. 1970, c. E-90)

Employment Safety Regulations (Man. Reg. 44/69, secs. 6.34 and 6.40)
- Effective March 13, 1969

New Brunswick

Industrial Safety Act (S.N.B. 1964, c. 5, am.)

Industrial Safety Regulations (N.B. Reg. 71-21, secs. 8.2.1
and 8.2.1.1.)
- Effective February 24, 1971

Newfoundland

Workmen's Compensation Act (S.N. 1962, c. 32, am.)

Accident Prevention Regulations (Nfld. Reg. 95/69, secs. 7.11
and 8.18)
- Effective December 18, 1969

Nova Scotia

Construction Safety Act (R.S.N.S. 1967, c. 52)

Construction Safety Regulations (sec. 205)
- Effective February 12, 1968

Industrial Safety Act (R.S.N.S. 1967, c. 141)

Industrial Safety Regulations (sec. 123 and 177)
- Effective February 11, 1969

Ontario

Industrial Safety Act (S.O. 1971, c. 43)

General Regulations (O. Reg. 259/72, sec. 111)
- Effective June 17, 1972

Prince Edward Island

Workmen's Compensation Act (R.S.P.E.I., 1951, c. 178, am.)

Industrial Safety Regulations (secs. 5.8 and 5.9)
- Effective May 18, 1968

Quebec

Public Health Act (R.S.Q. 1964, c. 161, am.)

Industrial Hygiene Division - Noise Study - Chart

Quebec (Cont'd)

Mining Act (S.Q. 1965, c. 34, am.)

Regulations for the Safety and Protection of Workmen in Mines and Quarries (O.C. 4389, sec. 22)
- Effective December 31, 1971

Industrial and Commercial Establishments Act (R.S.Q. 1964, c. 150)

Regulation Concerning Industrial and Commercial Establishments (O.C. 3787-72, secs. 5.3, 12.5, 14.2 and Appendix 3)
- Effective January 1, 1973

Saskatchewan

Occupational Health Act (S.S. 1972, c. 86)

Accident Prevention Regulations (Sask. Reg. 282/69, sec. 26)
- Effective January 1, 1970

Forest "Accident Prevention" Regulations (Sask. Reg. 310/70, sec. 214)
- Effective January 1, 1971

Mines Regulation Act (R.S.S. 1965, c. 373, am.)

Regulations Governing the Operation of Mines (Sask. Reg. 87/71, sec. 53)
- Effective March 18, 1971

Federal

Part IV of the Canada Labour Code (Safety of Employees) (R.S.C. 1970, c. L-1)

Canada Noise Control Regulations (SOR/71-584)
- Effective November 2, 1971

Services Provided by the National Science Library

Inez M. Gaffney, National Science Library, Ottawa

The National Science Library (NSL) is the co-ordination centre for scientific and technical information transfer in Canada. If the library doesn't have the answer to a query it knows where to get it, either in Canada or through scientific and technical societies and libraries in all parts of the world.

NSL has a responsibility to develop services to ensure that the individual members of the Canadian scientific and technical community have the information they require in their daily tasks. This is achieved by providing back-up services for local and regional collections and expertise.

The library is well equipped with a collection of nearly 1,000,000 items - volumes of books, pamphlets, technical and research reports, journals and other serial publications. More than 17,000 journal titles are currently being received. The library is a depository for U.S. Government Research Reports including NASA and AEC as well as numerous international and other national series. These reports are normally received as microfiche at the rate of 50,000 per year.

Expertise in handling information has been developed since the library was established in 1925 to serve the then newly organized laboratories of the National Research Council. Located within NRC, in Ottawa, the staff have a built-in resource of specialists to assist with the interpretation of difficult problems or the location of worldwide expertise in any field of science or technology.

The total NSL resources can be accessed in a variety of ways. The physical collection is available for direct consultation in the library or through the Interlibrary Loan and Photocopying Service. In 1971 a policy of non-circulation of serials was adopted so that all requests for articles from the journal literature are satisfied via photocopies. Charges are set at \$1.00 minimum for up to 10 pages and 10¢ per page for longer articles. To assist local libraries in locating material a "Union List of Scientific Serials in Canadian Libraries" (ULSSCL) is maintained. This is a machine-readable data base that lists the title, locations and holdings of over 44,000 scientific and technical journals received by 235 libraries in Canada. A master file in card format is kept at NSL and is constantly being updated. A printed edition is produced at 2-year intervals.

The book and monograph collection is available for interlibrary loan. The National Library, the Canadian resource centre for the social sciences and humanities, maintains a Union Catalogue for Canada. The idea is similar to the ULSSCL listing of serials. Libraries report all new acquisitions to this Union Catalogue. Thus, if you require a book and it is not held at NSL or there is a long waiting list other locations will be found for you in the National Library Union Catalogue.

The report or microfiche collection is considered a non-circulating item. Service is offered either as duplicate fiche at 50¢ per report or as printed copies at 10¢ per page.

Placing a request is a simple matter. The use of standard request forms ensures that all necessary information is included to permit easy identification of a desired item. However, a telephone call or a telex message is equally acceptable.

A question-answer type service is offered by the Reference Department. Utilizing the library collection and employing their professional skills the staff of the Reference Department handles inquiries related to the whole spectrum of scientific and technological knowledge. More specifically these services include answering requests for specific information on a subject, compiling bibliographies and carrying out literature searches, identifying obscure references and linking a requester with the expert(s) on a subject. The library staff work in close collaboration with the NRC's Technical Information Service. Questions, particularly those from industry which require engineering know-how or industrial experience, are normally forwarded to the Technical Information Service's staff. In this area, in particular, the initial work should be done on the local level so that only true problems are forwarded to the NSL.

As an extension to these standard reference services, a mechanized current awareness system known as CAN/SDI was initiated in April 1969. This service matches an individual's interests expressed in terms or phrases linked by logical connectors against commercially-available data bases and selects on a weekly, biweekly or monthly basis items - books, reports, journal articles, patents - of potential interest. It is a scanning service that helps eliminate time spent on locating and perusing current literature, alerts researchers to important papers in peripheral publications and material not locally available and helps the subscriber build a personalized file of references for present and future use. The system now utilizes 10 data bases covering all the major disciplines and serves more than 3,500 Canadians. Costs vary from \$45.00 per year to \$117.00 depending on data base(s) chosen.

To facilitate the storage and transmittal of material that may be considered as supplementary to journal articles a Depository of Unpublished Data is maintained for the use of Canadian authors and publishers. Detailed calculations, numerical data on which graphs are based, detailed descriptions of methods or extensive tabular material not essential to the text are examples of material suitable for deposit. A footnote or text reference indicating availability of such material from the National Science Library permits interested readers to obtain this material. In submitting a manuscript for publication an author should indicate those portions of the text that could be deposited. Deposits are accepted from editors only and must include a full citation to the published article. There is no deposit fee but charges, similar to photocopying costs, are levied for copies.

Translation work is expensive. To avoid unnecessary duplication the Canadian Index to Scientific Translations Section will answer inquiries about the existence and location of translations of specific papers. The Index, which now totals over 200,000 cards, is filed by first author and covers translations done in Canada, other countries of the Commonwealth and Europe and the United States.

The NSL, by working with and through local resources can answer most of the information problems made known to it. Mechanized and manual techniques are being developed to provide better and faster services. You can help yourself

and the Canadian information system by making your requirements known so that new services can be developed that reflect true Canadian requirements. Libraries and information centres are established and supported to provide service to you - the Canadian scientific community.

Further details may be obtained by writing to the National Science Library, National Research Council of Canada, Ottawa, KIA 0S2 or phoning (613) 992-7200.

Publications of the Acoustics Section,

Division of Physics, National Research Council

(Editor's note: we intend to print lists of publications, when available, in the form illustrated below. Send in your list if you want it publicised. Long lists may be truncated to fit space available.)

The following is a partial list of reports, reprints, etc. available from Acoustics Section, Division of Physics, National Research Council, Ottawa, Ontario KIA OSI:

1. Suction Roll Silencing in Principle and Practice. Thiessen, Pulp & Paper Magazine, July 1955.
2. Noise Control by Phase Control of Extended Sources. Thiessen, Noise Control, Vol. 3, No. 2, March 1957. NRC 4218.
3. Control of Suction Roll Noise in Paper Mills. Thiessen & Embleton, Pulp & Paper Magazine of Canada, July 1957. NRC 4360.
4. Methods of Noise Control. Embleton, Can. Jr. of Chem. Eng., Feb. 1959
5. Effect of Environment on Noise Criteria. Embleton et al. Noise Control, Vol. 5, No. 6, 37-40, 51, Nov. 1959. NRC 5375.
6. Reduction of Noise at the Listener's Ear. Thiessen, NPL Symposium #12, Control of Noise, June 1961. NRC 6689.
7. Train Noises and Use of Adjacent Land. Embleton and Thiessen, Sound, Jan.-Feb. 1962. NRC 6644.
8. Sound Radiation from a Rectangular Array of Incoherent Sources. Embleton & Dagg, Sound, Vol. 1, No. 2, 32-36, March 1962. NRC 6738
9. Efficiency of Circular Sources and Circular Arrays of Point Sources with Linear Phase Variation. Embleton and Thiessen, Jr. Acoust. Soc. Am., Vol. 34, No. 6, June 1962. NRC 6851.
10. Relation of Mechanical Power of a Propeller to Radiated Power of the Resulting Acoustic Sources. Embleton, Jr. Acoust. Soc. Am., Vol. 34, No. 6, June 1962. NRC 6861.

11. Effect of Reverberation on Assessment of Repetitive Impulse Noise. Thiessen & Subba Rao, Jr. Acoust. Soc. Am., 34, 1761-1763, Nov. 1962. NRC 7047.
12. Experimental Study of Noise Reduction in Centrifugal Blowers. Embleton, Jr. Acoust. Soc. Am. 35, 700-705, May 1963. NRC 7373.
13. Sound Propagation in Homogeneous Deciduous and Evergreen Woods. Embleton, Jr. Acoust. Soc. Am. 35, 1119-1125, Aug. 1963. NRC 7500.
14. Survey of the Traffic Noise Problem. Thiessen, Oral Paper presented at the ASA, Washington, D.C., June 1965.
15. Community Noise - Surface Transportation. Thiessen and Olson, Sound and Vibration, Apr. 1968. NRC 10823.
16. A Brief Study of a Rational Approach to Legislative Control of Noise. Acoustics Section, APS-467, 1968. NRC 10577.
17. Effect of Noise from Passing Trucks on Sleep. Thiessen, Oral Paper, presented at the ASA, Jr. Acoust. Soc. Am. 46, 1(A), July 1969.
18. Role of the Vibrational Relaxation of Nitrogen in the Absorption of Sound in Air. Piercy, Jr. Acoust. Soc. Am. 46, 602, 1969. NRC 10776.
19. Statistical Study of Traffic Noise. Olson, with Appendix: Theoretical Model for Steady State Urban Noise. Shaw and Olson, APS-476, 1970. NRC 11270.
20. Snowmobile Noise - Its Sources, Hazards and Control. Acoustics Section, APS-477, 1970. NRC 11272.
21. Effects of Impulsive Noise on Sleep. Berry and Thiessen, APS-478, 1970. NRC 11597.
22. Noise Reduction of Compressors Using Segmented Stator Blades. Embleton, Can. Aeronautics & Space Jr., Nov. 1970. NRC 11833.
23. The Problem as it exists. Olson, Oral paper at the Sym. Noise Pollution of the Urban Environment, University of Wisconsin, Nov. 1970.
24. An Acoustical Study of the Machinery on Logging Operations in Eastern Canada. Embleton et al, Apr. 1971, Report APS-485. NRC 11835.
25. Performance of Segmented Stator Vanes of Airfoil Section. Embleton, Oral Paper, ASA meeting, Washington, Apr. 1971.
26. Man's Reaction to His Acoustical Environment. Thiessen, Oral paper given at the Sym. I.S.I.M.E.P., Ottawa, June 1971, NRC 12229.
27. Noise in the 70's. Thiessen, Oral paper given at the Symp. of the Conservation Council of Ontario, Toronto, June 1971.

28. Absorption Coefficients of Surfaces Calculated from Decaying Sound Fields. Embleton, Jr. Acoust. Soc. Am., Sept. 1971. NRC 12003.
29. The Noise Thermometer, A Large-Display Sound Level Meter. Brammer & Toole, Jr. Acoust. Soc. am. 51, 1777-1780. NRC 12512.
30. Comparison of Standard Methods of Calculating the Absorption of Sound in Air with Lab. Measurements. Piercy, Oral paper presented at the ASA meeting Oct. 1971.
31. Noise and Vibration of Chain Saws. Brammer, Olson, Piercy & Toole. Oral paper, Oct. 1971.
32. Non-Linear Effects in Helmholtz Resonator Mufflers for Internal Combustion Engines. Brammer, Olson, Piercy and Toole. Oral paper presented at the ASA, April 1972.
33. Theory of Steady-State Urban Noise for an Ideal Homogeneous City. Shaw and Olson, Jr. Acoust. Soc. Am. 51, 1781-1793. NRC 12502.
34. Legislative Control of Noise-Feasibility and Recommendations. APS-500, 1972. NRC 12761.
35. The Absorption of Sound in the Atmosphere. Piercy, Oral paper presented at the ASA Symp. Sept. 1972.
36. Noise Problems in the Community. Thiessen, Oral paper presented at the Air Poll. Cont. Assoc. Sept. 1972.
37. Noise Radiation from Engine and Drive Train. Brammer, Oral paper presented at the ASA, Nov. 1972.
38. In-Ear Monitoring of Noise Exposure. Brammer and Piercy, Oral paper presented at the ASA, Nov. 1972.
39. Effect of Noise on Sleep. Thiessen. Summary of oral paper presented at ASA, Nov. 1972.
40. Community Noise - Surface Transportation. Thiessen, Oral paper presented at the ASA, Nov. 1972.
41. Effect of the Ground on Near Horizontal Sound Propagation. Piercy, Embleton and Olson. Oral paper presented at the ASA, Nov. 1972.
42. Noise Propagation in the Open Atmosphere. Piercy, Oral paper presented at the ASA, Nov. 1972.

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Complete mailing list of all addressees.
Minutes of annual meeting, Montreal October 1972

