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6. Abstract  An annotated bibliography of translations of foreign-language articles is presented. The 29 listed entries are concerned with studies of vestibular function, optokinetic nystagmus, positional nystagmus, alcohol, determination of specific gravity, noise, physiology, bio-chemical analysis, vision, cardiology, driving safety, anatomy, anti-smoke hoods, flight safety, and animal behavior. Procedures for obtaining copies of the translations are included.					
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## FOREWORD

This annotated bibliography of recently translated, selected research papers is presented as a scientific service of the Civil Aeromedical Institute. The aims of the publication are: (a) to provide interested researchers with information concerning translations of foreign-language articles as soon as the translations are available; and (b) to prevent duplication of translation costs and efforts.

In achieving these aims, bibliographic listings such as the present one are necessarily limited in number. They are also limited by the range of activities represented in the agency preparing the material. Thus, selective factors exist. Further, no attempt is made to evaluate the scientific worth of a given article. By providing a central repository from which such translated material can be obtained, however, it is hoped that interested scientists will derive otherwise unavailable benefits.

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# AVIATION MEDICINE TRANSLATIONS: ANNOTATED BIBLIOGRAPHY OF RECENTLY TRANSLATED MATERIAL. VII.

Bättig, K., and H. U. Wanner. Die spontane Lokomotion von Ratten in einer Kombination von Labyrinthgängen und Offenfeld. (Spontaneous locomotion of rats in a combination of maze paths and open field.) *Helvetica physiologica et pharmacologica acta* (Basel), 25:249-261, 1967.

In order to measure the spontaneous exploration drive of rats, a complex and regular maze without start or goal, but with an open field in the center was used. In the alleys of the maze, the exploration was always very high at the beginning of a session, even if the sessions followed each other in quick succession, and diminished in the course of each session. On the open field the exploration was very low at the beginning of a session and remained so during the session if the field was illuminated. If the field remained in darkness, the exploration was low at the beginning but increased slightly. In general the characteristics of the individual behavior of each rat within a group remained the same from session to session. The results are discussed in the light of the more recent theoretical concepts about the exploratory behavior of rats. (Modified English summary.)

Baumgardt, E. Le phénomène de Broca et Sulzer en vision périphérique. (Broca and Sulzer's phenomenon in peripheral vision.) *Comptes rendus des séances de la Société de biologie et de ses filiales* (Paris), 157:506-509, 1963.

To study the Broca-Sulzer phenomenon with haploscopic vision and under dark and light adaptation, a standard stimulus with a luminance of 10 lux and a duration of 250 msec., and a variable stimulus with a duration of 10 to 750 msec. were presented 18° apart in several brightness matching sessions. With light

adaptation, a minimum luminance with the variable stimulus occurred at about 80 msec. (or at shorter durations with higher intensities) and the relation between that minimum and the luminance necessary for brightness matching at 250 msec. ranged from 2.5 to 4 lux. The Broca-Sulzer phenomenon was not apparent with dark adaptation.

Biörck, G. Värde av arbetsprov vid kornarsjukdom (6): Kliniska synpunkter på värderingen av elektrokardiografiska belastningsprov. (The value of exercise tests in coronary disease (6): Clinical views on the evaluation of electrocardiographic load tests.) *Läkartidningen* (Stockholm), 63:3355-3358, 1968.

In evaluating the diagnostic reliability of EKG load tests, comparisons with coronary angiography have not proved completely satisfactory and postmortem diagnosis is generally not available until considerable time after performance of the load test. The author feels that extensive prognosis studies appear to be the best method both to determine the reliability of the EKG load test as a diagnostic instrument and to establish evaluation criteria for its use.

Bode, H. Allgemeinerkrankungen als Lärmfolge? (General sickness as an effect of noise.) *Zeitschrift für ärztliche Fortbildung* (Jena), 54:1282-1284, 1960.

Accident and illness records of a test group of persons who worked in an area with a noise level of 90 phons were compared with records of a control group who worked in an area with a noise level of 70 phons. For the test group, there was a greater incidence of several types of illness and on-the-job accidents. An increase in sickness was evident with an in-

crease in time spent working in the presence of the higher noise level. It was suggested that noise be included as a pathological factor in diagnostic and therapeutic work, that people predisposed to certain illnesses work away from noise, and that noise control be used.

Bohnenkamp, H., and J. Schmäh. Untersuchungen zu den Grundlagen des Energie- und Stoffwechsels; das Reinvolumen sowie die spezifische Dichte des Menschen und die Bestimmungsweise dieser Grössen. (The pure volume and the specific density of a human subject and the method of determining these quantities.) *Pflügers Archiv für die gesamte Physiologie* (Berlin), 228:100-124, 1931.

Based upon the assumption that, in general, energy production is dependent upon the amount and nature of cellular content, the authors concluded that specific gravity is the best yardstick for measuring the quality of the tissues. For the determination of specific gravity, the authors decided that it was necessary to determine the pure volume of the living human body (excluding air in the lungs and intestinal gas, etc.). The only appropriate method was a process of immersion in a gas-filled space taking into consideration the laws of Boyle-Mariotte and Gay-Lussac.

The experimental equipment was described, a measurement was given as an example and the complete calculations were carried out with an accompanying explanation of all corrections. The procedure was checked out with the aid of models as well as being verified by means of a special investigation determining the specific gravity of organs taken from cadavers (I. D. Rachold). The precision of the volume determination (and hence of the specific gravity) was high. The error interval in the worst case was from 0.7 to 1% and within the error produced by the varying fecal and water content intrinsic to the biological conditions. (Modified translated summary.)

Bruhn, P. A. Forbedrede metoder til fremstilling af haematoxylinfarvet abortus-Bangringprøveantigen. (Improved method for production of the hematoxylin-colored abortus Bang ring test—antigen.) *Nordisk veterinærmedicin* (Stockholm), 3:609-616, 1951.

Hermann's method of production of the antigen used in the ring test of milk for diag-

nosis of Brucellosis in cattle has proved unsatisfactory. The author presented a technique for improving the chemical color reaction and a chemical procedure for producing specific color ring antigen.

Caporale, R., L. Bianco, and G. D'Apollò. Sulla funzione dell'apparato vestibolare ed i problemi dell'adattamento. (Function of the vestibular apparatus and adaptation problems.) *Rivista di medicina aeronautica e spaziale* (Rome), 32:562-643, 1969.

This article contains a review of the research relevant to vestibular adaptation and its importance in aviation. The forms of vestibular adaptation discussed include: elementary and complex vestibular adaptation and vestibular habituation to caloric and rotatory stimulation in animals and man. The authors also discuss their own research on vestibular adaptation in man which includes: stimulation of the vestibular apparatus with "square wave acceleration," adaptation of pilots, and adaptation of subjects with and without experience in rotatory tests.

Cession, G., and G. Schmitz. Dosage fluorimétrique des catécholamines plasmatiques. (Fluorimetric dosage of plasmatic catecholamines.) *Pathologie et biologie* (Paris), 18:451-460, 1970.

Various analytic modifications of Schaepdryver's method have improved the accuracy of a technique of measurement of catecholamines (adrenalin and noradrenalin) in plasma. The changes include the preparation of the reagents, the choice of the precipitating agent and great care in the selection of a control. Under these conditions the technique proposed is reproducible and specific. It is sensitive to about one nanogram which is necessary if one wishes to estimate plasma levels under physiological conditions. (Modified translated summary.)

Drahn, F. Der weibliche Geschlechtsapparat von Kaninchen, Meerschweinchen, Ratte und Maus. (The female sexual apparatus of rabbits, guinea pigs, rats and mice.) In: Holban, J., and L. Seitz (Eds.). Vol. 1 *Biology and pathology of the female. A handbook of gynecology and birth*. Berlin: Urban and Schwarzenberg, 457-490, 1924.

This translation is limited to the sections of Drahn's chapter which contain a description of the gross external and internal genital anatomy of the female rat, the mechanism of egg development in the rat and mouse, and a description of the blood vessels around the female sex organs in the mouse and rat.

Fiala, E., and W. Reidelbach. Methoden und Einrichtungen für Unfallversuche. (Methods and equipment for safety tests.) *Automobil-technische Zeitschrift* (Berlin), 66:203-209, 1964.

A well-equipped automobile safety test area has been built in Sindelfingen by Daimler-Berry AG. This paper describes procedures and equipment used at that installation for the propulsion of test vehicles, for film making with high frame frequency, and for the measurement of rapidly-varying, chiefly mechanical parameters. From among the technical aspects described in detail, the steam rockets which have proved superior in propelling the test vehicles are of special interest. (Modified translated summary.)

Forster, B. Elektronystagmographische Untersuchungen über den Drehbeschleunigungsnystagmus nach Alkoholgaben. (Electronystagmographical experiments concerning the nystagmus rotation acceleration after doses of alcohol.) *Deutsche Zeitschrift für die gesamte gerichtliche Medizin* (Berlin), 47:282-288, 1958.

Rotatory nystagmus from 33 subjects was recorded employing electronystagmographic techniques. Duration, frequency, and total amplitude of nystagmus were evaluated both before and after ingestion of alcohol. Statistically significant reductions in all measures were obtained under the effect of alcohol. The magnitude of pre- to post-alcohol reduction is not thought to be related to blood alcohol level, but rather to alcohol tolerance.

Grüttner, R. Experimentelle Untersuchungen über den optokinetischen Nystagmus. (Experimental studies of optokinetic nystagmus.) *Zeitschrift für Sinnesphysiologie* (Leipzig), 68:1-48, 1939.

The behavior of human optokinetic nystagmus (induced by a rotating drum) was investigated as a function of the pattern of the

external stimulus conditions. Eye movements were recorded electrically. Results included: (a) Frequency, amplitude, and velocity of the slow phase at first increased and then decreased with increasing velocity of the rotating drum. (b) The maxima of amplitude and of velocity of the slow phase approximately coincided, while the frequency attained its greatest value at a lower drum velocity. (c) Within a certain average velocity range the beat sequence was very regular, but at lower and higher drum velocities it became irregular and ceased altogether when the drum speed increased beyond a certain point. (d) With increasing stripe width and decreasing number of stripes, the beat sequence on the whole became more irregular and the amplitude decreased. (e) The direction of rotation of the drum was of considerable influence on optokinetic nystagmus. The differences involved greater regularity, frequency, amplitude, and velocity of the slow phase when rotation was to the left than when it was to the right. (f) Within a great range of brightness no dependence of optokinetic nystagmus on the intensity of illumination was discernible. (g) With a narrowing of the field of vision there was a decrease in the amplitude and velocity of the slow phase but the frequency did not change. (h) After the optokinetic stimulus was activated the beginning of nystagmus had a minimum latency of 0.4 seconds. (i) During optokinetic nystagmus a deviation of the eyes in the direction of the fast phase was almost always present. (j) A postnystagmus was often observed following deactivation of the optokinetic stimulus.

A "self-regulating mechanism" which insures that the velocity of the eyes cannot exceed the stripe velocity was discussed in detail. A number of the findings concerning the dependence of the characteristic magnitudes of optokinetic nystagmus on the stripe velocity can be satisfactorily explained with the aid of concepts developed.

Haas, E., and H. Pfänder. Drehreizschwellenbestimmung und überschwellige Labyrinth-erregbarkeitsprüfung bei Normalpersonen. (Rotatory threshold determination and super-threshold tests of labyrinthine excitability in normal persons.) *Zeitschrift für Laryngolo-*

gie, Rhinologie, Otologie und ihre Grenzgebiete (Stuttgart), 44:180-189, 1965.

To determine the diagnostic value of rotatory threshold determination, 47 normal subjects were examined by rotatory threshold, caloric, and prolonged rotation tests. The results were compared to see whether any significant relationship existed between the various responses of the labyrinth. A statistically significant correlation was found between threshold values and "total amplitude" and "total number of deflections" in the thermally- or rotationally-induced nystagmus, while for "duration of nystagmus" no statistically significant relations to the threshold value could be found. The authors advance the view that the rotatory threshold test may be quite valuable in finding the answer to certain scientific questions but in general can be dispensed with in the diagnosis of vestibular disorders. (Modified translated summary.)

Hawel, W., and H. Starlinger. Einfluss von wiederholtem vierstündigem, intermittierendem, sogenannten rosa Rauschen auf Catecholaminausscheidung und Pulsfrequenz. (Influence of repeated four-hour intermittent "pink" noise on catecholamine excretion and pulse frequency.) *Internationale Zeitschrift für angewandte Physiologie, einschliesslich Arbeitsphysiologie* (Berlin), 24:351-362, 1967.

Ten student men participated as subjects in an experiment studying the effects of 5-sec. bursts of "pink" noise. Four of the sessions were control sessions without noise, four were test sessions with noise present 30% of the time, and four were test sessions without noise. During the test sessions, the Ss studied for three hours and performed the Kraepelin-Pauli task (rapid addition of one digit numbers) for one hour. During the control sessions the Ss studied for four hours. The results indicated that there was a significant increase in adrenalin excretion in the urine and elevation of pulse rate during the second half of each test session with no significant differences between test sessions with and without noise.

Heifer, U. Oculovestibuläre Reaktion und Blutalkoholkonzentration. (Oculovestibular reaction and blood alcohol concentration.)

*Hefte zur Unfallheilkunde* (Berlin), 99:192-197, 1969.

The duration of postrotatory nystagmus was measured after visual fixation in alcoholized and nonalcoholized subjects. The author reports that the duration of postrotatory nystagmus was longer in subjects who had been drinking, that blood-alcohol concentrations above .05% could be detected in the resorption phase, and that a previous average concentration of .116% could be detected two-three hours after the person had stopped drinking. Individual differences in alcohol tolerance demonstrated the problems involved in, and also the need for, setting a blood-alcohol concentration level at which a driver could be considered legally incompetent to drive.

During the discussion that followed presentation of the paper, several participants made comments relevant to driving safety. One of these, H. J. Bochnick, stated that in over 93% of the punishable traffic cases the driver was at fault and that an outstanding personality characteristic of many of these drivers was "inconsiderate behavior." Another participant, K. Mayer, indicated that driving experience in itself was not enough to counterbalance this personality characteristic in drivers.

Jongbloed, J., and A. K. M. Noyons. Die Bestimmung des wahren Volumens und des spezifischen Gewichtes vom Menschen mittels Luftdruckveränderung. (Determination of the true volume and of the specific gravity in man by change in air pressure.) *Pflügers Archiv für die gesamte Physiologie* (Berlin) 240:197-201, 1938.

A method for calculation of true volume and specific gravity in man was developed by the authors. In this method, the following steps were employed: (1) net weight in the chamber was measured at standard temperature and pressure using a set of balance scales, (2) pressure was increased and weight was measured, (3) weight loss due to pressure increase with correction for weight loss from perspiration was calculated, (4) net volume was calculated, and (5) specific gravity was calculated.



The authors concluded that their measurements had a maximum deviation of  $\pm 1\%$  which made their method comparable to Bohnenkamp's in accuracy. The authors also concluded that their method was superior to Bohnenkamp's because less time and only one person was required for administration of the test.

Kamyshov, I., and V. Lazarev. Zritel'nye illiuzii v polete. (Visual illusions in flight.) *Aviatsiia i kosmonavtika* (Moscow), 53:37-38, 1970.

According to the authors, the main origins of visual illusions in flight are a misinterpretation of vestibular and visual signals and a lack of repetition of signals from different sources, following periods during which pilots are distracted from the aircraft instruments. To prevent the occurrence of these illusions the authors made the following suggestions: (1) limit distraction from instruments to a duration of 5 seconds, (2) have duplication and comparison of information, and (3) institute a series of control operations for use in cases of contradictory information. The authors concluded that more research in this area in the form of questioning of pilots was required.

Klein, K., and M. Grübl. Über hämodynamische Reaktionen unter akustischen Reizen. (Hemodynamic reactions to acoustical stimuli.) *Wiener klinische Wochenschrift* (Vienna), 81:705-709, 1969.

Circulatory rate in the aorta and internal carotid artery, peripheral and cephalic blood pressure, vascular resistance in the region of the internal carotid artery, and pulse rate were investigated in 40 subjects following exposure for 10 seconds to the sound of bells (noise maximum 75-88 dB SPL in the range of 1,000 to 16,000 Hz). Results indicated that the circulatory rate in the internal carotid artery was the most sensitive hemodynamic indicator for the vegetative reactions that occur under acoustical stimuli. Seventeen subjects exhibited a rise in rate, 11 exhibited a drop, and 12 exhibited no change. The authors concluded that the acoustical stress to which man is exposed in everyday life may cause and/or intensify vegetative disorders.

Kohlrausch, W. Methodik zur quantitativen Bestimmung der Körperstoffe in vivo. (Methods of quantitative determination of body substances *in vivo*.) *Arbeitsphysiologie* (Berlin), 2:23-45, 1930.

A method is described for the quantitative analysis of body substances. By use of a constant and the resting metabolism, the amount of protein can be determined *in vivo*. A quantitative analysis of water content gives an average of 67.5% water for seven dogs analyzed. The glycogen—on the basis of statements in the literature—is assumed to be 0.5% of the weight of the body. The soluble salts, which make up 0.8% of the fluids of the body, are bound to the waters of the tissues. They can accordingly be computed from the amount of water in the body. The specific gravities of the substances contained in the body are in part determined and in part recalculated for body temperature from the data given in the literature. The remainder of the salts, principally insoluble salts of the bones, and the fat can now be computed from the specific gravity. When the values computed were checked by comparison with the values quantitatively determined after the dogs were killed, the agreement between the quantitative analysis and the calculation was good. (Modified translated conclusion.)

Malm, O. J. Mikrosirkulasjonen: Fysiologi og patofysiologi. (Microcirculation: physiology and pathophysiology.) *Tidsskrift for den Norske Lægeforening* (Oslo), 86:618-621, 1966.

Microcirculation has its own highly specialized rheology. Factors which do not influence significantly the flow of blood in the larger vessels (hematocrit, fibrinogen concentrations, sludge, viscosity, laminary flow, thixotropy) play a great role in the microvessels. In shock syndrome, these factors can have an additive effect which leads to a strong reduction or even a cessation of microcirculation. The fate of shock patients depends considerably on the extent to which the decreased nutritive flow in the capillaries is reversible in vital organs. (Modified translated conclusion.)

Pfleiderer, H. Methodik der Bestimmung des Spezifischen Gewichtes am Lebenden (Anthropopyknometrie). (Method of determining the

specific gravity of the living subject/Anthropopycnometry.) *Klinische Wochenschrift* (Berlin), 8:2191-2193, 1929.

The author describes a brief and relatively unstressful examination procedure for determining a living subject's specific gravity. The patient is placed in an airtight container and a known amount of water is allowed to flow into a connecting cylinder. The patient's specific gravity can be calculated using temperature and pressure measurements made before and after water entered the cylinder, the volume of the empty container, the patient's weight, and a correction factor for gaseous metabolism.

Plenkens, J. Über Lagenystagmus während akuter Alkoholintoxikation beim Menschen. (Positional nystagmus during acute alcoholic intoxication in man.) *Archiv für Ohren-, Nasen- und Kehlkopfheilkunde* (Leipzig), 152:197-206, 1943.

Positional nystagmus in acute alcoholic intoxication was investigated in 27 human subjects. In all cases, when the subject was lying on his side a horizontal nystagmus occurred, the direction of which was dependent on the amount of time which had elapsed since drinking. At the height of the intoxication the nystagmus was as a rule toward the same side, i.e., toward the right when the subject was lying on his right side, toward the left when on his left side. In contrast, when the intoxication was wearing off (approximately 10-20 hours after drinking), the nystagmus in that position was toward the opposite side, i.e., when lying on the right side, toward the left, and when lying on the left side, toward the right. No exact relationship between quality of the nystagmus and concentration of alcohol in the blood could be demonstrated. Nor could the threshold value of alcoholic intoxication be satisfactorily determined. (Modified translated summary.)

Rubino, A., and R. Balbi. Fluttuazioni nicterali del magnesio in rapporto con il ritmo sonno-veglia. (Fluctuating of magnesium in relation with the sleep rhythm—wakefulness.) *Acta neurologica* (Naples), 6:618-633, 1951.

After a review of the physiological effects of magnesium (Mg), the authors concluded that Mg (1) is indispensable to fundamental

reactions of living matter and (2) has a definite action on the neuro-muscular system. To provide data on the variations of Mg in the blood during the diurnal sleep cycle, the authors took four blood samples at six-hour intervals from 25 patients with pathological neuro-psyche symptoms. The blood samples were tested for Mg content using Lang's colorimeter method. In all cases, the highest value of Mg occurred during the night, particularly in the sleeping subjects.

Schweitzer, H. Graphologische, klinische und psychologische Untersuchungen unter Alkoholkwirkung. (Graphological, clinical and psychological investigations under the effect of alcohol.) *Öffentliche Gesundheitsdienst* (Stuttgart), 16:361-372, 1955.

To show alcohol-induced decrements in performance by clinical investigation, a battery of cognitive, performance, and perceptual tests was administered to 250 intoxicated drivers; the results of three tests (handwriting, rotatory nystagmus, and drawing) were reported. The alcohol-induced changes in handwriting and writing errors were most prevalent at blood alcohol concentrations of 1.5 and 2.0mg%. The duration of rotatory nystagmus increased almost constantly and regularly with increasing blood alcohol concentration. In 40% of all cases, intoxicated subjects were unable to recognize and reproduce a common object suggested by dots and incorrect solutions (drawing the wrong pictures) were observed at blood alcohol concentrations of 0.8mg% and above. When presented with the results of the test session, subjects were astonished and had to admit that they had been too intoxicated to drive.

Sjöstrand, T. Värdet av arbetsprov vid kornarsjukdom (1): Historik och problemställning. (The value of exercise tests in coronary disease (1): history and problem presentation.) *Svenska läkartidningen* (Stockholm), 63:3330-3334, 1966.

After a historical survey of the use of the EKG with exercise tests in the diagnosis of coronary disease, the author specifies the evaluation criteria, including the degree of lowering of the ST level and the T-peak in various leads during exercise, and the precautions for administration, such as familiarity with the

rest EKG, knowledge of insufficiency symptoms, and availability of oxygen mask, which he thinks should be set for a diagnostic exercise test so that optimal results will be obtained with minimum risks.

Timbal, J., and J. Colin. Essai d'un moyen de protection individuel contre l'incendie: La cagoule antifumée. (Test of a means of individual fire protection: the smoke hood.) *Revue de médecine aéronautique* (Paris), 9:131-134, 1970.

Tests were conducted studying the effectiveness of a transparent, plastic, cylindrical-shaped, protective smoke/flame hood for use during aircraft evacuation. Results indicated that there was: (1) an adequate air supply for use during light effort for a maximum duration of two minutes; (2) very good heat resistance for all of the hood except the collar during the first heat exposure; (3) considerable protection against thermal radiation; (4) low attenuation of visibility from sides of hood and water vapor condensation. The authors conclude that instruction of passengers in proper use of the hood was necessary.

Walter, H. W. Alkoholmissbrauch und Alkoholnystagmus. (The abuse of alcohol and alcoholic postural nystagmus.) *Deutsche Zeitschrift für die gesamte gerichtliche Medizin* (Berlin), 43:232-241, 1954.

Experimental positional alcohol nystagmus (PAN) was induced in 43 subjects using pure alcohol diluted to 40%. PAN occurs after drinking when the subject is lying on his side. The three phases of PAN were (1) PAN I, during which nystagmus was directed toward the ground; (2) transpositional period, during which no nystagmus was present; and (3) PAN II, during which nystagmus was directed toward the ceiling. The use of an examination

for PAN in combination with the blood alcohol test was suggested for evaluating the traffic safety of drivers because the combined process considers individual differences in sensitivity to alcohol.

Yuganov, Y. M., S. S. Markaryan, E. V. Lapaev, and I. A. Sidel'nikov.

(Outlook for the development of vestibular selection methods in aviation.) *Voenno-meditsinskiy Zhurnal* (Moscow), (12):57-61, 1969.

As a vestibulometric test, tolerance to "continuous cumulation of Coriolis acceleration" (CCCA) was measured by rotating each subject in a chair at a constant velocity of 180°/sec. while he simultaneously kept bending his head (30 bendings/min.) toward the right and left shoulders at an angle of 30° or greater from the vertical. Results indicated that when used in combination with hypoxic hypoxia, CCCA is an effective technique for detection of vestibulo-vegetative imbalance. Since latent forms of vestibulo-vegetative instability were found chiefly in persons whose CCCA tolerance was within 2-5 minutes under ordinary conditions, the authors suggest that only these persons be tested for tolerance of CCCA in hypoxic conditions.

Zwicker, E. Ein Beitrag zur Unterscheidung von Lautstärke und Lästigkeit. (On the distinction between loudness and annoyance.) *Acustica* (Zurich), 17:22-25, 1966.

Subjects rated single noise pulses and noise pulse trains on the basis of loudness or annoyance. Single noise pulses were given equal subjective ratings on both scales but noise pulse trains were rated higher on the annoyance scale. The authors concluded that subjects should be instructed "not to rate annoyance" during sound level measurements.

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