regular serological tests to detect early or subclinical cases, rubber gloves for those who handle viscera, care of minor injuries, cleansing of packing premises, and control of brucellosis in animals. J. N. Agate.


Tests were made to determine the efficiency of soaps containing 2% each of the diphenols G-5, G-11, and an ethylene thiourea and silver nitrate mixture called A-151. None of the antibacterial soaps was significantly more bactericidal or bacteriostatic than ordinary soap. 'There was little difference in efficacy between the three antibacterial soaps. Repeated washing with 2% G-11 soap exclusively for a fortnight materially reduced the bacterial population of the hands after the first day, and maintained it at a low level so long as the soap was used. As soon as its use was discontinued the bacterial population of the hands immediately rose to the pre-existing level. It was not enough to use G-11 soap for scrubbing in the operating theatre only; to be effective it had to be used every time and everywhere the surgeon washed.

These antibacterial soaps are toxic when injected intravenously in small amounts into dogs, and are therefore not recommended for cleansing open wounds. Charles P. Nicholas.


The authors examined the hands of 323 radiologists, including those practising radiodiagnosis and radiotherapy. Changes found in the epidermal ridge pattern varied from areas of slight flattening to extensive atrophy or proliferation; 48% of radiologists had some such abnormality. The authors quote 18% for normal controls, the figure given by Harvey. There appeared to be little difference as regards changes in ridge patterns between radiotherapists and radiodiagnosticians. Very few of the latter stated that they used lead gloves regularly. Study of the nail fold capillaries showed that various degrees of distortion occurred with advancing years of work with x rays. Similar changes were found in elderly people not exposed to x rays, but the incidence of abnormality was higher among radiologists and changes became evident at an earlier age. No radiologist of the series who had been practising for more than 30 years was found to be free from abnormality of ridge pattern or nail fold. A. M. Rackow.

PROCEEDINGS OF THE ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

FIFTY-FOURTH MEETING

The Fifty-Fourth Meeting of the Association was held in London on Jan. 28 and 29, 1949. The Meeting was opened at the London School of Hygiene and Tropical Medicine by Prof. G. P. Crowden, who spoke on the physiological aspects of noise in industry. This was followed by a paper by Dr. D. R. Thompson, Medical Officer, De Havilland Aircraft Co., on Observations on noise on jet-engined test beds.

Dr. Thompson said that a jet engine was a very simple piece of mechanism. It consisted primarily of a tube open at both ends and in the centre of the tube a moving part resembling a cotton reel. The front end of the reel was provided with vanes and sucked in the air, compressed it and passed it backwards where it was mixed with paraffin vapour. This mixture was ignited and the resultant explosion caused a large increase in the volume of gas and this gas passed out through the rear end of the tube. The power of a jet engine was measured by thrust, and this thrust was the major actual motive power of the machine. A jet engine flung back a mass at speed and was thus flung forward.

In a jet engine there was only one moving part—the spindle on which the impeller and turbine disc were mounted revolving at 10,000 or more revolutions per minute, using 100 tons of air per hour at the speed of sound and ejecting gases at 1,000 miles per hour. It was, therefore, difficult to silence such an engine except by enclosing the engine itself and silencing both the intake end and the ejection end. This problem had been reasonably well controlled by building enclosed test beds of brickwork and using silencing methods. The intake end of which received the 100 tons of air per hour was muffled by a series of splitters. Splitters were longitudinal partitions consisting of a metal base covered by rock wool and faced by perforated metal plating, which acted by absorbing sound waves. The air thus received entered a fairly large chamber—the air filter room. The noise recorded in the air filter room was 120 to 130 D.B. with a frequency peak of 2,000 to 5,000 c/s. This intensity or loudness and frequency was quite intolerable without protection. The splitters were so effective that it was possible to talk in front of them and hear nothing but a faint hiss. The engine itself was enclosed in a brick built cubic on a concrete bed and the brick walls were covered with rock wool and perforated metal plates. The noise recorded here was 120 D.B. at 2,500 to 3,000 c/s. The crew were housed in an adjacent cubic, sound-proofed in the same way; the noise measured about 80 D.B. at 100 to 300 c/s and ordinary conversation was quite possible. The outlet tube was passed through a hole into a 14-inch brick building with a slatted roof, where the gases could expand and escape through the openings in the roof. Personnel were adequately protected from noise except when it might be necessary to do running adjustments to the engine in the engine cell. For this purpose individual protection was required in the form of ear-defenders, which were of two main varieties: those which were inserted into the ear, such as wax or wax and wool, plasticine, etc.; or metal and plastic cups.
covering not only the meatus, but the mastoid process as well and closely fitting to the skull.

Dr. Thompson said that the sensation of noise was produced by the pressure in air of compressional waves set up by some vibrating body. When several noises arrived at the same point of equal intensity or loudness the combined noise was only slightly above that of any one component. Generally speaking, the effects of vibration could be grouped into: (a) those felt—coarse vibrations—low frequency; (b) those heard—threshold of audibility, 20 D.B. and frequencies 30 to 20,000 c/s (threshold of pain—130 D.B.); and (c) those neither heard or felt—ultrasonic.

In regard to (a), this was a question of vibration which affected the peripheral proprioceptive mechanism and would cause physical and mental fatigue which was to some extent under control of the person himself. The body reacted to compressional waves in the same way as auditory apparatus; therefore it was assumed that tissues such as the eyeball, lungs, etc., responded to vibrations and might cause disturbances of sensation: this we were not yet in a position to verify.

In regard to (b); the human ear had a sensitivity range from about 30 c/s (a whisper) to 16,000 c/s in a young adult which lessen as the subject grew older, coming down to about 10,000 c/s at the age of 60. The B.B.C. "pips" were just under 1,000 c/s: speaking voice was about 400 c/s.

Prolonged exposure to noise of high intensity and frequency produced temporary and, if prolonged, permanent damage to the organ of Corti. Sections from mice and guinea-pigs exposed to 500 c/s at 150 D.B. showed degeneration of the basilar membrane and distortion of the hair cells. No results of post-mortem examinations had been possible or even practicable in man, but surveys had been done on Service personnel exposed to jet engine noise under Service conditions, and compared with similar men not so exposed. These men had been observed over a period of twelve months, and audiography, encephalography, and clinical reports had been compiled. The results showed that where there was a small loss in the higher frequencies at the beginning amongst both exposed men and controls— at the end it was found that the loss was distinctly greater among those exposed to noise. The loss amounted to 10% of the 4,096 band areas in the Controls the loss was much less and even stationary. This suggests that the natural loss of high frequency tones was more rapid in those exposed to noise if they were susceptible. This finding was much the same as in pilots of reciprocating engines. High frequency waves of low intensity were fairly easily screened by air, walls, and glass. Noise might reduce work efficiency up to 25 per cent., depending on intensity, frequency, and continuity. It was noticed that the low drone of engines and props—high intensity and low frequency—produced sleepiness.

Dr. Thompson went on to say that the psychological effects of noise were largely controlled by the emotional background and stability of the subject. It had been proved that men with a balanced outlook on life and work did not show psychological symptoms when subjected to noise in which they were accustomed. Clinical observations of test bed personnel and a careful examination of sick absence over seven years had not shown any evidence of abnormal absence or sickness, and the percentage of lost time was lower in each period than that of other sections of the factory.

High-frequency vibrations in the upper sonic range, plus vibrations in the ultra-sonic range, but to

the best of our present knowledge the vast majority of vibrations occurred in the sonic range. We had so far no evidence to show that ultra-sonic frequencies of the intensity so often encountered in industry and aero-

nautical conditions were harmful to personnel or produced any symptoms.

On Jan. 29, the Meeting continued at St. Mary's Hospital, Paddington, when Mr. J. F. Simpson, Surgeon in Charge of the Ear, Nose, and Throat Department, spoke about the deafened worker.

Mr. Simpson said that the war had helped towards a better understanding of traumatic deafness, and the present industrial drive should give opportunities for applying this extended knowledge. It was important to detect and prevent occupational deafness. Vocational rehabilitation enabled the deaf worker to take his rightful place in industry.

Cases fell into three groups: (1) where deafness was present before entry into industry: (2) where it began, or at least was first noticed, during employment, although not caused by it; and (3) where it directly resulted from the occupation.

The first group was composed mainly of young adults suffering from hearing damage due to noise. The group contained those who were severely or totally deafened as the result of congenital or meningeal disturbances, who would have been pupils at special schools and would have received vocational training. The second group contained chiefly older employees developing otosclerosis or nerve deafness, the latter sometimes associated with arteriosclerosis.

Some deafness in the last group was only indirectly occupational: for example deafness from industrial accidents causing a fractured skull; rupture of the tympanic membrane by blast; otitis media either resulting from repeated upper respiratory infections following exposure to cold or damp working conditions, or from sudden and extreme changes of temperature or poor ventilation. Allergic rhinitis might act similarly. Certain industrial poisons acted directly on the neural mechanism or on the blood vessels supplying the cochlea, and caused deafness. These included arsenic, lead, phosphorus, carbon monoxide, carbon bisulphide, mercury, and the aniline dyes.

Barotraumatic otitis caused by flying in non-pressure-ized aircraft or diving in non-rigid suits, was temporary, but repeated attacks and secondary infection might effect permanent damage. The sudden decompression of Caisson workers could result in permanent deafness from the embolic effect of nitrogen bubbles (on the cochlea).

The most important hearing hazard in industry was acoustic trauma, which resulted from either: (1) sudden intense or explosive noises causing immediate and often permanent deafness, or (2) continuous exposure to a high-level noise, though often below that causing pain, producing an insidious, progressive, and permanent deafness.

It had been shown by animal experiments that the injuring sound led to degeneration of the sensory hair cells of the cochlea together with secondary degeneration of the associated nerve cells. That part of the cochlea concerned with the hearing of high tones was the most susceptible, and it was here in the basal turn that the effects of continued exposure to loud noises were first apparent. Curiously enough drugs (salicylates and quinine) and poisons attacked this same part first. The tones for which hearing was first lost were higher than those employed in speech; thus some damage
could be done before the sufferer was aware of any defect in hearing, although such a defect was detectable and was not by modern methods of testing. The early detection of this high-tone loss, and the withdrawal of the subject from noisy surroundings, would prevent further deterioration. A ringing tinnitus was frequently an annoying accompaniment of deafness.

Harmful noise levels were found in: (1) the metal-working industry, especially chipping; (2) pneumatic tool employment; (3) spinning and weaving; (4) the bench testing of engines; (5) aviation; (6) locomotive and tractor driving; and (7) under service conditions when automatic weapons and artillery etc. were in use. Switchboard operators might suffer as a result of sudden loud cracklings and screams in the earphones. Protection in noisy occupations could be obtained by using moulded ear plugs or by reducing the noise generated and reflected by sound-proofing and screening, employing various types of foundations, and using rooms of a size appropriate to the amount of machinery.

If a reliable quantitative hearing record were made of all new employees in an industry, this would be a help if a claim were made later for loss of hearing through employment. There could be no doubt as to the desirability of regular periodic testing of those exposed to the hazard of acoustic trauma.

Older and more refined methods of measuring hearing by the spoken voice, tuning fork, watch tick, etc., were inaccurate. Today an accurate method of measuring hearing loss was provided by the pure-tone audiometer. Audimetry was not a lengthy procedure, but required uniformity in conditions and use. The shape of the graph or audiogram obtained was sometimes characteristic of certain types of deafness, but the audiometer had not replaced the routine diagnostic clinical examination, which must include the taking of a past and family history, otoscopy, examination of the Eustachian tubes, and the various qualitative tests carried out with tuning forks.

If deafness were discovered and its type and degree correctly diagnosed, there would be opportunity for the correct placing of the deafened individual as well as the chance of treatment.

People suffering from a simple conduction or obstructive type of deafness as results from otitis media and otosclerosis were very suitable for working in a loud noise. The middle-ear dysfunction acted as an ear plug damping the intensity of the noise and so protecting the inner ear from injury. These patients heard conversation in a noise better than those with normal hearing (paracusis). On the other hand those with an inner-ear or perceptive type of deafness would be rendered uncomfortable by the distortion of sounds and their deafness might be further increased by noise.

Individuals with normal hearing but with a predisposition towards noise deafness might be detected by tests designed to show any increased tendency to aural fatigue.

The essence of the auditory function was the understanding of speech. The loss of hearing in one ear only, even if total, was very little handicap except in recognizing the direction of a sound and in the bad red light. The good ear became deprived.

It might be questioned whether pure tone audiometry could show just how well or how badly an individual could hear speech, or if he would be helped with a hearing aid. In the conduction or middle-ear type of deafness there was an approximately equal hearing loss at all speech frequencies, whereas in cases of the inner-ear type the audiogram gave a good indication of the hearing of speech and of the help to be expected from the hearing aid. In perceptive or inner-ear deafness the pure tone audiogram was not such a reliable guide. These cases did not have a sharp transition from the normal to the pathological. Selective amplification of the higher frequencies was required. This high tone boost could, in fact, be provided by the modern electric aids.

Although those with nerve deafness could not hear high tones when faint, they frequently heard the really powerful high tones just as loudly as anyone else. The transition from hearing little or nothing to hearing very well was abnormally abrupt. This condition where faint or moderate sounds could not be heard while at the same time there was no loss in the sense of loudness for loud sounds was called recruitment. It explained why old people complained one moment that they could not hear the speaker and the next that he was shouting too loudly. It also explained why a hearing aid was harder to fit when the deafness was of the nerve type. It was therefore important that we should have some reliable gauge for the hearing of speech when considering the necessity of using a hearing aid. It has always to be remembered that aids could not do everything, they could not activate dead hair and nerve cells, nor would they help if amplification had to be pushed to the point of discomfort.

Under the National Health Service any choice of instrument had been largely done away with as there was only one Government electrical hearing aid, and any choice would be restricted to those who wished to buy commercially manufactured instruments privately. There were certain basic principles which an efficient electric aid had to fulfil. It had to be small, light, and durable, amplifying sound without unnecessarily impairing quality. In America aids were examined and accepted or rejected by the Council on Physical Medicine; as yet no such system existed here.

The National Institute of the Deaf did try to protect the hard-of-hearing public by insisting among other things upon a trial before purchase. At present the usual way of assessing whether an aid was satisfactory was to see if the patient obtained real benefit after a trial of about ten days. Though this allowed the patient to try out the instrument under various listening conditions, it was not a very satisfactory method as the patient had to find out everything for himself. Ideally the patient should be encouraged by a trained instructor and properly taught how to use the aid and how to take care of it. Whenever possible he should be taught to lip-read; the importance of this could not be overemphasized.

Auditory rehabilitation had been enthusiastically taken up in America, especially in connexion with ex-service men. American naval and military auditory training centres had been established where groups of patients underwent an eight-week course. These organisations were perhaps the most extensive and had large staffs which included otologists, psychologists, psychotherapists, and instructors in auditory training, speech reading, and speech correction, not to mention social and recreational workers and vocational and educational counsellors. To deal with young men relatively pliant and eager, and who had not yet really made up their minds, was a very different matter from training a middle-aged or older working man who was trying to support a
family. There was opportunity of improving the lot of the deafened workman in this country on less ambitious lines than those offered to the American veteran. There was no large scale or national service for the rehabilitation of the deafened workman, but when such a service did come into being it should include means for gathering cases into groups, as group teaching was probably best.

In deciding what vocation was best suited to the individual it would be necessary to know something of his work capacity and tolerance, and whether he had become psychologically readjusted to his handicap. The industrial medical officer was in a unique position to act as the vocational councillor. He had intimate knowledge of the conditions inside the workshops and factories, and understanding of the medical aspects of the problem. There should always be a follow-up and supervision of the deafened worker.

Mr. Ian G. Robin then read a paper on hearing tests and hearing aids. He outlined the disadvantages of commonly-used tests of hearing and continued with an account of the advantages and disadvantages of pure-tone audiology. He went on to describe the essential properties of "Medresco," the Government hearing aid, and of proprietary aids. The testing of hearing aids by individuals, together with certain psychological aspects, were described. Mr. Robin concluded by pointing out that a happy deaf person is an efficient worker, and then showed on the screen a representative selection of audiograms illustrating such conditions as high-tone loss from severe trauma, bilateral radical mastoid cavities, and otosclerosis before and after the fenestration operation.

A paper on "The Treatment of Chronic Suppurative Otitis Media" was read by Mr. J. L. Wakelin. Mr. Wakelin said that regular and frequent aural toilet was the essential factor in treatment, but the haphazard instillation of drops or insufflation of powder into a chronically diseased ear was useless and in some cases might even lead to an exacerbation of symptoms. In many cases the chronicity of an ear infection was due to constant re-infection from a focus in the nose, nasopharynx, or mouth. The patient with a clear and intermittent discharge was much more likely to respond to treatment than the patient who had the foul discharge often associated with cholesteatoma. Working in an atmosphere irritant dust or fumes might lead to chronic nasal congestion, with subsequent obstruction of the eustachian tube and impairment of drainage from the middle ear. The extent and site of any perforation should be diagrammatically recorded; central anterior and inferior perforations showed a good response to conservative treatment, whereas those of the posterior-superior part of the membrana tensa and those of the membrana flaccida had a bad prognosis and were usually associated with chronic suppurative lesions in the mastoid antrum and air cells and in the attic region. Apart from cases with polypi, granulation tissue, and cholesteatoma, the greater percentage of patients with C.S.O.M. would be found suitable for conservative treatment in a factory clinic. Mr. Wakelin then went on to give an account of the detailed procedures necessary in carrying out an aural toilet.

The last paper in the symposium was given by Mr. D. V. Gideon, who spoke on "Acute Otitis Media." Mr. Gideon emphasized the importance of careful treatment of the acute ear and pointed out that it was only through the failure of the treatment of the acute condition that the chronic one was allowed to exist and persist. He went on to give an account of the treatment of acute otitis media, mentioning the points for and against the use of penicillin and sulpho-drugs. Finally, Mr. Gideon stressed the criteria of cure of acute otitis media, which were a healed tympanic membrane and normal hearing.

A demonstration of audiometers and hearing aids was given by Mr. Simpson, and the President thanked the speakers for their interesting papers.

SCOTTISH GROUP

Chairman: Dr. D. Gordon Robertson, I.C.I. (Explosives Division), Stevenston, Ayrshire.
Hon. Secretary: Dr. William Hunter, William Collins Sons and Co., Ltd., Glasgow.

On Jan. 12, 1949, the Scottish Group visited Stobhill Hospital where Dr. A. S. Rogen and his assistants gave a review of cardiac disease with special reference to all groups of pathological types seen in industry. His remarks were illustrated by cases, case records, and radiographs.

On Feb. 16, 1949, the Scottish Group visited Kilmarnock, where a tour of Messrs. Blackwood Morton's carpet factory had been arranged. After a tour of the works a short discussion took place on the rehabilitation of the disabled person in the carpet industry.

BIRMINGHAM AND DISTRICT GROUP

Chairman: Dr. W. Jeaffreson Lloyd, Messrs. Guest, Keen, and Nettlefolds Ltd.
Hon. Secretary: Dr. J. G. Billington, General Electric Co. Ltd., Witton.

On Feb. 15, 1949, at the Birmingham Accident Hospital, twenty members of the Group together with some Works Engineers and Designers, heard Mr. W. E. Awde, Industrial Officer of the Council of Industrial Design, speak on the aims and activities of the Council. The Council was set up in December 1944 by the President of the Board of Trade. It is financed by the Government, and the annual report on its activities is made to Parliament. The purpose of the Council is to promote by all practicable means the improvement of design in the products of British industry. The word design is taken to cover the many processes in the planning of goods for hand production by machine and to include structure, texture, form, and decoration. Good design is taken as meaning both practical convenience and beauty.

The industrial division offers manufacturers, designers, and interested bodies a general advisory service for the promotion of improved industrial design. A list of designers, each of whom has been interviewed and his work seen, is kept and is continually enlarged. Refresher courses for designers in industry are arranged. This Division welcomes enquiries from management and industrial medical officers, in the design and adaptation of canteens, rest rooms, and works surgeries.

The education division seeks to teach the general public design appreciation. So schools, adult education institutes, and other such bodies are offered a wide variety of visual aids to achieve this purpose. The Council also publishes its own monthly magazine Design, and many pamphlets for the Stationary Office.
MERSEYSIDE GROUP

Chairman: Dr. E. Holland,
Mersey Docks Medical Service, Liverpool.

Hon. Secretary: Dr. J. V. Manning,
Pilkington Bros. Ltd., St. Helens, Lancs.

The first meeting of the recently established Merseyside Group was held on Jan. 26, at the Liverpool Dock Offices through the courtesy of the Mersey Docks and Harbour Board. Thirteen members were present. When the minutes had been approved, the officers of the previous Merseyside Sub-Group resigned, and the Chairman, Dr. Morris-Jones, indicated that he did not wish to stand for re-election. Dr. E. Holland was elected Chairman, Dr. F. A. Wilson re-elected Hon. Treasurer, Dr. J. V. Manning elected Hon. Secretary, and Dr. N. MacDonald representative on Council.

There was considerable discussion on the best way to help the work of the industrial nurses in the area, and on the proposal of Dr. MacDonald it was decided to hold a general meeting of the two professions in the near future with the object of discussing ways and means of “improving relations.” As a result a combined meeting was held on March 3 with the State Registered Nurses engaged in industry on Merseyside. Eighty-four nurses attended the meeting and there was an interesting discussion on the ways in which the two professions could be of assistance to each other on Merseyside.

SOUTH WALES AND WEST OF ENGLAND GROUP

Chairman: Dr. J. S. Spickett,
Messrs. Richard Thomas, and Baldwins, Ltd., Monmouthshire.

Hon. Secretary: Dr. G. Stenlake Mundy,
The British Aeroplane Co. Ltd., Bristol.

The February, 1949, Meeting of the South Wales and West of England Branch took the form of a visit to a coal mine and miners rehabilitation centre. The excellent arrangements were made by the Regional Medical Officer of the National Coal Board, Dr. Jenkins.

From Cardiff the party proceeded to Bridgend and thence to Nantymoel colliery in the Ogmore valley. The Manager, Mr. Hackford, took considerable trouble so that no practical details of importance associated with underground working in this colliery should be missed. The party was impressed by a demonstration of a Welsh invention which consisted of drilling the coal face to a depth of about 6 feet and then inserting a piece of apparatus on the end of which was a sealing device to block the hole. When the hole had been sealed at a depth of several feet, water was passed through the apparatus under pressure. As its egress through the drilled hole was blocked, it had to force its way along the seams and might come out several feet away from the point of entrance. In addition to reducing the dust hazard, miners had found that the amount of coal hewn per day was also much increased. On their return to the surface the party had a practical demonstration of the efficacy of pit-head baths. After leaving the colliery, members proceeded via Bridgend to the Miners Rehabilitation Centre at Talygarn, where the Matron acted as guide.

YORKSHIRE GROUP

Chairman: Dr. S. A. Underwood,
Rowntree and Co. Ltd., The Cocoa Works, York.

Hon. Secretary: Dr. C. Cresdee,
I.C.I. (Dyestuffs Division), Dalton Works, Huddersfield.

A meeting of the Yorkshire Group was held in Hull on March 12, 1949. Mr. Arthur Cargill gave an interesting address about the Hull fishing industry. It was about 1844 that a prime catch of sole was first landed in Hull. In the early days, fishing was done from smacks, but about fifty-five years ago these gave way to the more modern trawlers, that steamed to more distant seas and eventually as far as Iceland. At present there were in service about 148 ships. The cod liver oil industry was begun comparatively recently, and the ships were provided with rendering plants for the fresh liver from which the oil was extracted and brought direct to the cod liver oil factory in Hull. The fishermen of Hull were full of adventure and commonsense, and no fishing ground was too far away for them.

The medical service to the industry started in a small way in 1930, and Dr. Burns had built up from such small beginnings a service of which the industry was proud.

Mr. Cooper took members round the Hull Ice Company, whose refrigeration units made 1,000 tons of ice a day by the ammonia process, the ice being used almost entirely for the trawlers themselves. The next visit was to a trawler built in 1948, where the members were particularly interested in the modern berths, messrooms, engine rooms, and Radar equipment. Dr. Burns then took members to the surgery on the dock side, to show its modern layout, spaciousness, and equipment, which included an X-ray unit. A visit was also made to the cod liver oil processing and refining factory, where modern methods of manufacture of cod liver oil were demonstrated. Films were shown relating to the industry, including “Arctic Harvest.”