was wide and the disparity was unexplained. One might hazard the guess that those hospitals having the higher rates also had a high rate of patients signing out against medical advice.

Only four of the fifteen institutions reported drug sensitivity tests of positive sputums on entry. No reliable data as to drug resistance could be found for patients who had a positive sputum at the time of discharge. Drug sensitivity studies are important in workmen's compensation cases and from a public health and treatment standpoint. More tuberculosis institutions should be encouraged to carry out drug sensitivity studies on sputum. The importance of drug sensitivity studies on the bacilli of patients being considered for operation cannot be too strongly emphasized.

The significance of present drug resistance studies is not entirely clear as there are differences of opinion regarding the pathogenicity of some drug-resistant bacilli. The probability is that as more drugs are used in treating tuberculosis, more resistant strains will be developed. Among patients admitted to the hospital for the first time whose sputum was positive for tubercle bacilli, 11.7% had organisms resistant to one or more antituberculosis drugs. More research is necessary to ascertain the nature of resistant organisms and to prevent resistance from occurring. Perhaps a way can be found to cause the bacilli to revert to a sensitive state.

The proportion of readmittances to tuberculosis hospitals is sizeable. Perhaps it should not be called a relapse rate inasmuch as not enough is known about the facts behind previous admissions. In any case, an average readmittance rate of 19.2% seems much higher than it should be. (Gompertz, J. L., Porter, D. E., Tuberculosis Organisms Resistant to Drugs: California Med., December 1956; abstracted in Tuberculosis Abstracts, Nat. Tuberc., A., XXX: 7, July 1957)

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Biological Hazards of Microwave Radiation

The potential health hazards due to electromagnetic radiations is rapidly becoming one of most serious concern. The following information has been abstracted from a paper, A Summary of SAMUSAF Program for Research on the Biomedical Aspects of Microwave Radiation by Major D. B. Williams USAF (MC) and Colonel R. S. Fixott USAF (MC), which was presented at the Proceedings of the Tri-Service Conference on Biological Hazards of Microwave Radiation held 15 - 16 July 1957 at the Rome Air Development Center.

About 3 years ago, a review of existing information established the following conclusions: (1) Microwave injury had been qualitatively demonstrated in animals, but had not been observed clinically in radar personnel; (2) animal eyes, and particularly the testes, were especially vulnerable

to the shorter wave lengths; (3) experimental injury appeared thermal in nature; i.e., temperatures induced in the affected regions were sufficiently high to account for injury on a thermal basis; and (4) no reliable information existed on the power densities of the modern radar beam and the parameters of injurious exposure were unknown.

Research work during the past 3 years showed that experimental cataracts could be produced in rabbits by several minutes of exposure to power densities in the range of 500 to 600 milliwatts/cm^2. The threshold of experimental ocular injury for a single sustained exposure of 270 minutes was bracketed between 120 and 220 mw/cm^2. Temperatures significant in cataract production were bracketed between 49° and 53° C. (Measured in the vitreous at the posterior lens capsule; these limits recently have been rather conclusively refined to 49° to 50° C. in the same region.) Of considerable interest was the observation that detectable testicular changes could be produced in the rat by 15 to 20 minutes of sustained exposure to 30 to 40 mw/cm^2. (These limits subsequently were pursued to lower levels and it is believed that 5 to 10 mw/cm^2 is the steady state dose rate limit for testicular exposure at "S"-band frequencies). The minimum testicular temperature associated with injury was between 38° and 40° C. It was concluded that the experimental ocular and testicular injury thresholds should be regarded as hazardous for man, but that the risk of injury was minimal under current standard operational conditions. No substantial evidence of human injury having resulted from accidental exposure to radio frequency (rf) radiation, under either field or laboratory conditions, was available up to November 1956.

Considerable contract research has been in progress during the past 2-1/2 years. The tentative conclusions reached as a result of this research may be summarized as follows: (1) It has been demonstrated that 3 cm and 12.3 cm radiation could injure the hollow viscera of small animals. This work in the "S"-band frequency was extended to a study of functional effects in larger animals, namely, the dog. Both single exposure of 2-1/2 to 3 hours duration and repeated exposures, each of the same duration, were studied. The power density employed was on the order of 300 to 400 mw/cm^2 of 12.3 cm radiation, sufficient to maintain skin temperature between 43° and 45° C. which is close to, but below, the level required to produce burns. These exposures in the dog eventually produced temperatures typically of 41.3° C. in the liver, 41.5° C. in the stomach, 41.5° C. in the gall bladder, 42.4° C. in the intestines, and 43.6° C. in the skin. To date, the studies have failed to reveal any functional liver damage. It has been noted that these exposures have not produced the dramatic results observed in smaller animals, rats, guinea pigs, hamsters, and rabbits. The tentative explanation of this difference is based on a comparison of the ratio of exposed body area to total profile body surface. It is tentatively concluded that an even lesser effect would be experienced by man in a similar exposure situation. (2) Studies on rabbits exposed to

2450 megacylces/second ("S"-band) have led to the determination of empirical threshold for opacity or a cataract production resulting from a single acute exposure. A temperature of 49° to 50° C. at the posterior lens capsule has definitely been shown to be significant in lens injury in rabbits so that it seems reasonably certain that a thermal effect is involved. It has been previously demonstrated in cutaneous studies that cellular death from hyperthermia and probably coagulation is encountered at 5 to 10 minutes of exposure to temperatures of 49° to 50° C.

Summary. The progress of the Air Force-Navy program to date best seems summarized by recalling that only 3 years ago the sole data available on microwave tolerance was that an estimated 3000 mw/cm^2 should be regarded as hazardous for personnel exposure. In the interim, the limits of today have been scientifically refined to a level of 10 mw/cm^2 for a significant portion of the microwave-rf spectrum. Current work will provide limits for other frequencies.

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Industrial Medicine - A New Specialty

Recognition of industrial medicine as a specialty by organized medicine in the United States will ultimately benefit both industry and medicine. It does not preclude the part-time nonspecialist from serving smaller industries in which his services are urgently needed. The qualifications needed by the part-time industrial physician are not difficult to attain provided he has a genuine interest in the field. Industrial health services are distinct and separate from comprehensive medical care with obvious but often intangible values. A core of basic preventive medical services is needed by every industry regardless of size. Responsibilities of the industrial health team are to:

Protect employee and employer alike from hazards arising out of, and in the course of, employment.

Establish every known principle and procedure of preventive and curative medicine to safeguard and improve personnel health.

Attune the health program to the objectives of the industry with regard to economy and efficiency on one side and health needs on the other.

Advise all personnel on policies having a health aspect. These range from job placement to medical care included in fringe benefits.

Act as a bridge between the industry and community health, safety, and welfare agencies so that employees and their families may take full advantage of community facilities. (Shepard, W. P., Industrial Medicine - A New Specialty: Canad. Med. Assn. J., 77: 206-211, August 1, 1957)

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