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Early Research on the Biological Effects of Microwave Radiation: 1940-1960

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Received 8 November 1979

Summary

Two overriding considerations shaped the development of early research on the biological effects of microwave radiation—possible medical application (diathermy) and uncertainty about the hazards of exposure to radar. Reports in the late 1940s and early 1950s of hazards resulting from microwave exposure led to the near abandonment of medical research related to microwave diathermy at the same time that military and industrial concern over hazards grew, culminating in the massive research effort known as 'the Tri-Service program' (1957-1960). Both the early focus on medical application and the later search for hazards played important roles in dictating how this field of research developed as a science.

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1. Introduction

The history of research on the biological effects of microwave radiation¹ effectively begins with the development of radar early in World War II, and the concerns that arose thereafter within industrial and military circles over the possible deleterious effects this new source of environmental energy could have on personnel. Prior to this time, the energy levels at which microwaves had been produced were not sufficient to cause widespread concern about harmful effects. Before the invention of radar, artificially produced microwave energy was not a general environmental problem.

¹ Microwaves encompass electromagnetic wave radiation falling within the wavelength range of 10^2 - 10^{-1} cm (frequencies of 300 MHz-300,000 MHz). The microwave range is usually further subdivided into ultra-high (10^2 -10 cm), super-high (10-1 cm), and extra-high (1 - 10^{-1} cm) wavelengths. The standard abbreviations used in this paper are by and large concerned with milliwatts (mw), given in densities per square centimeter (cm^2). A milliwatt is one-thousandth of a watt, so a tenth of a watt per square centimeter (0.1 watt/cm^2) equals 100 mw/cm^2 .

