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DETAILED DUTIES OF 712450

Dr. William F. Bale

RHIG # 82,556  
BOX # 1

Dr. Bale is in charge of one of the most important divisions in our Project. He has recruited a number of excellent scientists and under his able guidance his Division has been responsible for three main lines of development, namely: (1) health monitoring; (2) instrument development; and (3) fundamental research, particularly on metabolic behavior and toxicology of radio-active elements. All three of these branches of his activities have necessitated extensive pioneering work in the construction of new and better instruments and in new analytical methods for the purification, separation and detection of radio-active elements.

As the problems of prevention and monitoring of health hazards, it has been his responsibility to develop and interpret film badges for the simultaneous detection of gamma and beta rays and neutrons, and for the detection of dangerous amounts of radon in plant air with subsequent recommendations for eliminating these hazards. Protection against polonium hazards in laboratories and factories was also one of his responsibilities.

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In carrying out this extremely important piece of work he has been called upon extensively for consultations both in the United States and Canada regarding these hazards and in numerous instances he has helped in both plant design and operation to forestall health hazards, particularly from radio-active dusts and gamma radiation. In some instances, techniques and equipment which were designed by his Division primarily for

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Name (ADD) - Organization  
7/27/94  
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health monitoring eventually turned out to be useful analytical methods in actual plant production, and upon being adapted, were of material aid in speeding and facilitating production of the atomic bomb.

Many new instruments had to be developed and produced which were of the utmost importance in health monitoring in the plants as well as in the direct application to research. The following instruments might be specially cited:

- (1) Portable Geiger-Mueller counters for prospecting for uranium ore
- (2) A unique pocket radiation instrument which was developed and constructed to investigate radiation intensities at the scene of atomic bomb explosions. This instrument was of pocket size, occupying the space of approximately two packages of cigarettes
- (3) Counters, designed and constructed for individual Alpha Particles, were another outstanding achievement. These counters, insensitive to noise, capable of being operated in non-soundproof and non-airconditioned rooms, incorporate decade counting systems for the first time, making them much more convenient and less subject to reading errors.

Other instruments which should be mentioned are:

- (4) Radon counters for breath samples, dependable recording neutron integrators, counters for fission fragments induced by a beam of neutrons
- (5) 25 Rochester Ion Meters
- (6) 12 Alpha Surface Monitors
- (7) 6 Alpha Hand Monitors
- (8) Portable Type Dust Sampler
- (9) Vane-type Vacuum Tube Electrometer, which was extensively used in the analysis of radon in plant air and in radium determinations on solutions
- (10) Sensitive Electrometer for measurements of plutonium

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Dr. Bale's research on the metabolic behavior and toxicology of radio-active elements included polonium, plutonium and radium. This work has been outstanding and has been of practical importance in special-products plants where polonium was an extreme health hazard. Research with this substance necessitated the development of methods for routine quantitative determinations in blood, urine and feces; the determination of the relation between polonium excreted and polonium content of the blood; the determination of safe polonium levels in the body; and the retention of this material when inhaled by the lungs. Under his direction, studies have been conducted leading to increased excretion of polonium from the body.

In all of Dr. Bale's varied activities, he has given of his time and energy without stint. Regardless of the pressure of work here on the Project, he has always been willing to go anywhere at a moment's notice at the request of the Manhattan District or the Director of the local Project at Rochester. As one of the Associate Directors, his cooperation in regard to the coordination of the various intricate and important research problems of the several divisions of the local Project has been fully and cheerfully given. His services both to the Rochester Project and to the many industrial phases of the Manhattan District Project will long be remembered and appreciated by all with whom Dr. Bale came in contact.