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MW 1/21/65

INTER-OFFICE MEMORANDUM

August 21, 1945

TO: All Division Leaders and All Group Leaders

FROM: H. A. Bethe

SUBJECT: LA HANDBOOK

The following is a tentative plan for the comprehensive LA Handbook. Each of the volumes here proposed should presumably have an editor and contain of the order of five to ten contributions describing various phases of the work. I should expect this list to be incomplete and to have too much emphasis on physics and particularly theoretical physics. I should therefore like to have suggestions of additional topics and also of suitable editors for the various volumes. In some cases, the names would be obvious.

In most instances, I believe it is appropriate to combine experiments and related theory in the same volume. There are some exceptions, such as Volumes 3 and 16.

To give an example, I have sketched the possible subdivisions of Volume 2. Various volumes will obviously be of very different length; some, like Volume 17, will be very short while others, like Volume 12, may possibly require splitting into several volumes. I am anxious to get your reaction and criticism on this proposal as soon as possible.

LIST OF VOLUMES

1. General Problems

   To discuss the connection between the various activities of the Laboratory.

2. Differential Nuclear Physics

   Cross-sections and other constants, relation with the theory of the compound nucleus.

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3. Diffusion Theory

   This might be split into two parts, the first containing generally applicable methods which could be published almost without restriction, the second, special methods such as the theory for many neutron velocities.

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4. Critical Assemblies

Mainly experimental, to describe the approach to critical, the behavior of the critical assembly itself, and its use (such as the power water boiler).

5. Efficiency

Theory of the nuclear explosion, including radiation.

6. Gun

To include also the fabrication of materials for the gun.

7. Engineering

Fuzes, detonators, outer case, ballistics, etc.

8. Chemistry of U and Pu.

9. Metallurgy of U and Pu.

10. Other Chemistry

Such as Po, preparation of foils, protective coatings, etc. (I am assuming that the metallurgical problems not connected with U and Pu can be treated in connection with the purpose for which they were solved such as the WC metallurgy in connection with the gun. It may, however, be preferable to have a separate volume on non-plutonium metallurgy.)

11. Explosives

Techniques and properties of explosives, castings.

12. Detonation and Shock Waves, Equations of State

Theory of the equation of state of explosives and of solids; relevant experiments. Theory and experiments on detonation and shock waves especially the interaction of several waves.

13. Implosion

Experimental methods to observe implosion, i.e., work of Division G and Section X-1. Theory of implosion.

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14. Blast Wave

Theory of the blast wave from the gadget as compared to TNT explosion. Measurements at Trinity and on combat drops.

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15. Trinity Test

16. Experimental Physics methods

17. Numerical Methods

Proposed subdivisions of Volume 2 are as follows:

2. Differential Nuclear Physics

Cross-sections at High Energy
Cross-sections velocity selector
ν α
Spontaneous Fission
Scattering
Evaluation of Scattering
Relation of results with General Nuclear Theory

H. A. BETHE

HAB:jsh

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