

**NOTES ON CERTAIN
EXPLOSIVE
AGENTS; PP. 3-69**

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Notes on Certain Explosive Agents; pp. 3-69 by Walter N. Hill

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WALTER N. HILL

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NOTES

ON

CERTAIN EXPLOSIVE AGENTS.

BY

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PREFACE.

IN March, 1875, the writer prepared a paper which was published in pamphlet form by the Bureau of Ordnance, Navy Department, under the title of "Notes on Explosives and their Applications in Torpedo Warfare." This paper was intended for the use of the naval service, and especially for instruction at the Torpedo Station, and was mainly derived from the notes of a course of lectures on Explosives, delivered at the Torpedo Station in 1874.

Since the publication of this pamphlet, much interest has been expressed in it by persons outside the service, and numerous inquiries have been made concerning it. Commodore Jeffers, Chief of the Bureau of Ordnance, having kindly consented to its reprinting, it is offered in its present shape to those interested in the subject.

In preparing it for the press at this time, there has been omitted a discussion of the applications of explosives to torpedoes, which was included in the earlier pamphlet; and in its place will be found some observations of a general character upon the use of some explosives for blasting purposes. Some other alterations and additions have been made.

No attempt is made in these pages at an extended treatment of the subject of Explosives. It is intended only to briefly examine a few of the most important topics included under it, from a practical point of view.

At the present time, the detonating explosives (nitro-glycerine and gun-cotton) have become prominent, and are largely used, while they are yet unfamiliar to many persons. Especial attention will, consequently, be paid to them, after a short discussion of the general principles governing all explosive action.

Considerable space is devoted to details of some operations in use at the Torpedo Station. They have not been described before, and may possess some points of interest.

Those who may wish to study the subject of explosive agents minutely can consult books on chemical technology and a few special works; but to a large extent its literature is to be found in scientific and technical periodicals, and in occasional publications of various kinds.

W. N. H.

UNITED STATES TORPEDO STATION,
Newport, R. I., June 1, 1875.

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NOTES ON CERTAIN EXPLOSIVE AGENTS.

CHAPTER I.

EXPLOSIONS AND EXPLOSIVE BODIES.

EXPLOSIVE REACTIONS.

ALL chemical changes, whether of combination or decomposition, are called reactions.

Reactions take place in or between molecules. The same atoms are found after a reaction as were present before, but differently arranged or united, forming molecules different from those which entered into the reaction. The reaction, then, is a change in the manner in which the attractions or affinities of the atoms are exerted. The operations of these attractions are governed by the circumstances under which they are exercised. Then, in order to produce any desired result, certain necessary conditions must be fulfilled.

These conditions vary between extreme limits. Thus, in one compound, the attractions which bind together its parts may be so feebly exercised that the slightest change in its surrounding circumstances will bring about its decomposition, while to reverse those of another compound may require that the most powerful agencies should be exerted for a long time. Again, compounds which are stable at the ordinary temperature may be broken up when moderately heated, or reactions which occur at the ordinary pressure may be entirely altered if the same materials are brought together at a different pressure.

Reactions may go on rapidly or slowly, and be accompa-