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GEOLOGIC PAST

Highlighting Past Articles from *GSA Bulletin*

“Geology in the World War and After”

Whitman Cross, *GSA Bulletin*, March 1919

In his presidential address delivered to the Society on 31 Dec. 1918 and published in *GSA Bulletin* in March 1919 (v. 30, p. 165–188), Whitman Cross lauds the termination of “the great World War,” and labels it “the war of the Age of the Natural Sciences” (p. 165)—one “in which all the resources of science have been called into play” (p. 166). His *GSA Bulletin* article covers six main points:

1. The Role of Geology in Earlier Wars

Cross cites examples from the Crimean and Boer wars as well as “the contest between the Japanese and the Russians in Manchuria,” which convinced many that “extended earthwork defenses or trenches ... might prove to be the dominant kind of warfare in the future” (p. 167). Cross explains that “the routes of approach and the positions for defense have been and must always be determined primarily by topographic and geographic positions” (p. 166), but the study of topographic geology was not always incorporated into the plan of battle (as recognized in studies of the Civil War; e.g., Whisonant and Ehlen, 2008).

Though not employed in earlier wars to study the lay of the land, geologists were “utilized in practically all armies in the last few decades ... in the limited field of the engineering problems” of fortification and water supply (p. 167).

2. Conditions at the Beginning of the War

“The greatly increased application of geological knowledge in the present war has been due, first of all, to the development of position warfare” (p. 167), an important facet of which is trench warfare, writes Cross. “It would seem,” he notes, “that the Germans may have prepared in some measure for trench warfare ... for they dug in with amazing rapidity after the first battle” (p. 168). Yet, according to Cross, the German army “had planned a different kind of campaign” and “their study of position warfare was far from thorough” (p. 168). What the Germans did have was a particularly ingenious retired captain, Walter Kranz, who, a year before the outbreak of the “Great War,” had published an article calling for the elevation of geology from the status of scientific “stepchild” to an essential facet

of modern warfare. Kranz' article had such great impact that once the United States entered the war, U.S. censors declared that "publications which permit to be recognized the effectiveness of geology or kindred sciences in the service of the army are not permissible in the technical as well as in the daily press" (p. 169, quoting the 25 May 1917 *New York Times*; see also Goldstein, 2001).

3. Organization of Geological Work in the Allied and German Armies

"When the war broke out no one of the armies engaged possessed any organized geological service" (p. 169). Once the Germans realized that they had been forced into position warfare, however, they immediately put together a geological service of "perhaps 75 to 200 men" (p. 170). The British army established a "small advisory corps of geologists," but the Italian, Belgian, and French armies "apparently had no particularly organized geological force" (p. 170). "The American Expeditionary Corps," Cross writes, "had the advantage of possessing in its Engineer Corps ... one of the most broadly trained American geologists, Alfred H. Brooks" (p. 170), who soon developed a staff of geologist-officers under him.

4. Geological Service on the Western Front

Several geoscience specialties were of particular value at the front: (1) **engineering geology**; (2) **stratigraphic geology and lithology**—providing information on "the variety of geological formations" (p. 172) across the expansive battleground, "ranging from the dune sands and marshes of Flanders to the crystalline rocks of the Vosges Mountains," and crossing "sections of Tertiary, Cretaceous, Jurassic, and Triassic sediments, including chalk, limestone, sandstone, shale, marl, clay, and various transition rocks, as well as valley and slope deposits of recent age" (p. 172); (3) **hydrographic geology** to ascertain the presence of ground- and surface waters for the troops; and (4) **medical geology** (though not labeled as such) as seen when, during tunneling efforts, troops "were greatly afflicted by sores of special character. Three thousand to four thousand were incapacitated. The medical corps could not understand the prevalence of this trouble ... [until] ... the clay material of the tunnel walls was closely examined and found to act like fullers' earth in removing the natural greases from the skin, which thus dried and cracked, permitting ready infection" (p. 175).

5. The Work of the Division of Geology and Geography in the National Research Council

Cross' knowledge "of the use made of geology in several of the principal armies engaged in this war" (p. 171) was a result of his association with the National Research Council (NRC). The NRC formed in 1916 and was reorganized in 1918 in light of the "emergency conditions of the war" (p. 176). Under the NRC, specific roles for geologists during wartime were outlined, including fuel and "war minerals" location and mining; map making and interpretation; road and fortification construction; water supply location; and instruction of military officers in the "vital significance of natural features of the battle terrain" (p. 178). NRC scientists put together three earth-science textbooks for educating military officers, but their publication was delayed "by strikes and ravages of the influenza epidemic" (p. 181).

6. Geology after the War

Here, Cross examines "how much of good and how much of evil" came from "thousands of scientific men [leaving] their laboratories and class-rooms to plunge with intense earnestness into war problems" (p. 185). He concludes that "the greatest benefit to science ... lies in the fact that there has never before been a period in the history of the world when the truth of the proverb, 'Knowledge is power,' was so clearly demonstrated" (p. 185). On the other hand, according to Cross, one of the "evils" coming out of the war was "the idea that devotion to research for its own sake is perhaps a form of selfishness, as contrasted with the utilization of knowledge, which is laudable public service" (p. 186). To the contrary, Cross argues, "Such a conception fails to recognize the more fundamental truth that scientific research is itself a public service of the highest type" (p. 186).

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- Whisonant, R.C., and Ehlen, J., 2008, No Place to run, No place to hide: Geology, terrain, and casualties at Gettysburg, Chancellorsville, and Antietam: *Geological Society of America Abstracts with Programs*, v. 40, no. 6, p. 118, <http://a-c-s.confex.com/crops/2008am/webprogram/Paper48099.html> (last accessed 20 Jan. 2009).

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