Commanding Fourth Brigade, Second Division, District of West Tennessee, February.

Inyestment of Fort Donelson, February 11-16.

Capture of Fort Donelson, February 16.

Temporarily in command of Second Division Army of Tennessee, March.

Assigned to command of Third Brigade, Fourth Division Army of Tennessee, April 5.

Battle of Shiloh, April 6-7.

Assigned to command of First Brigade, Fourth Division Army of Tennessee.

Siege of Corinth, Miss., April 30-May 30.

Pursuit to Booneville, march to Memphis, duty along Memphis and Charleston R. R., with headquarters at Bolivar, Moscow, and Memphis, till October.

Commanding expeditions to Grand Junction and LaGrange, September 20-22.

Near Middleton, October 4.

Battle of the Hatchis or Metamora, October 5.

To Memphis and assigned to command of Sixth Division, right wing, Army of Tennessee. Grant's Central Mississippi Campaign operating on Mississippi Central R. R. from Bolivar to Coffeeville, Nov.-Dec.

Commanding Fourth Division, Sixteenth Corps from December 24, 1862.

In command of line Memphis and Charleston R. R. from Mexico to Colliersville, headquarters at Memphis, till March 9, 1863.

Duty at Memphis till May.

Ordered to join Grant's forces in rear of Vicksburg.

Seige of Vicksburg, May 25-July 4.

Bolton's Ferry, July 5-6 (Big Black River), Clinton, July 8.

Jackson, July 9-12.

Placed on waiting orders till November.

Ordered to Philadelphia for duty as Provost Marshal, November 23.

Relieved and ordered to report at Memphis to General Sherman, commanding Department of Tennessee, December 7.

Placed on waiting orders at Burlington, Iowa, January 13, 1864.

Mustered out August 24, 1865.

Died February 9, 1867.

GREAT ICE AGES IN IOWA.

From a scientific angle the enlargement and improvement of the Capitol grounds promises to give prominence to a

unique circumstance in the history of our State. Because of the fact that one of the now most famous soil-sections in the country will be completely destroyed, it is worthy of special record at this time to note the bearing which this soil-exposure has had on the establishment of one of the great geologic generalizations of the century, and the part which one of Iowa's most distinguished sons played in this singular scientific achievement.

This great geologic discovery, made within the borders of our State, with its world-wide interest, relates to the conclusive evidences obtained for the first time pointing to the complexity of the Glacial epoch, or to a succession of Great Ice Ages instead of only a single one as was generally held to be the case. Around this question centers one of the most bitter and prolix of controversies.

In former allusions to the subject the arguments for a dual Glacial period, and at the time of its proposal for a multiple Ice age, were based mainly upon the fact of the presence in some till-sections of thin black soil-streaks, replaced here and there by thick peat-beds. That there might be extensive interglacial sands or clay deposits was not thought of. Yet these very phenomena were actually recorded and fully described a full decade prior to the time when their true significance was pointed out. Such an inter-glacial deposit, sharply intercalated between two wide-spread till-sheets, is the one on Capitol Hill in the city of Des Moines, described in detail by the late W J McGee in 1882. It seems to be the first instance ever recorded the stratigraphic relations of which were unmistakable.

The spot where the depositional proofs of the complexity of the Glacial epoch were first obtained is for several reasons of unusual interest. The section, originally well displayed, is now fast disappearing. It is also this section which later gave the first intimation of the eolian origin of the American loess-loams. It is here that was found the first clue to the wonderful interlocking of the continuous southwestern loess deposit with the northeastern glacial tills. This locality

bids fair long to remain one of the classic geological localities of the continent.

At this time and at this distance there are few of us who have any adequate appreciation of the great difficulties which the problem once presented. Still fewer of us there are who understand from direct experience what it really means actively and determinedly to contend on the battle-line of the unknowable. By one in position best to know intimately the intricacies of attempting to decipher the glacial puzzles of that day the procedure, so far as it concerns Iowa, is thus graphically stated:

> . . . in the solution of the problem it is necessary to do more than assume the existence and action of a great sheet of ice hundreds or thousands of feet in thickness and hundreds or thousands of miles in extent. In order to explain the sum of the phenomena it is necessary to picture the great ice sheet not only in its general form and extent, but in its local features, its thickness, its direction and rate of movement over each square league, the inclination of its surface both at top and bottom, and the relation of these slopes to the subjacent surface of earth and rock; and all this without a single glacial stria or an inch of ice polish, save in one small spot, in the whole tract of 16,500 square miles. It is necessary to conceive not only the mode of melting of the ice at each league of its retreat, but also every considerable brook, every river and every lake or pond formed by the melting, both at its under surface and on its upper surface; it is necessary to restore not only the margin of the mer de glace under each minute of latitude it occupied, but, as well, the canons by which it was cleft, the floe-bearing lakes and mud-charged marshes with which it was fringed, each island of ice, and each ice-bound lake formed within its limits. And it is not only necessary to reconstruct the geography of a dozen episodes, as does the anatomist the skeleton from a few bones, but to develop a geography such as civilized eye has never seen, and which could exist only under conditions such as utterly transcend the experience of civilized men. All this has been done. The trail of the ice monster has been traced, his magnitude measured, his form and even his features figured forth, and all from the slime of his body alone, where even his characteristic tracks fail.[7]

The now famous geologic section under consideration is situated on the crest of Capitol hill, at the south end of the State Capitol grounds. As originally described in the *Ameri-*

[7] 11th Annual Report, U. S. G. Survey, p. 200.

can Journal of Science[8] the exposure of deposits presents the following relations:

	Feet
5. Till, light reddish bluff clay, with pebbles	7
4. Till, contorted and interstratified with loess	5
3. Loess, with numerous fossils	15
2. Till, dark red clay, with abundant pebbles	6
1. Shale (Carbonic) exposed	10

The important features especially to be noted are that: (1) The lower till (No. 2) represents what is now called the Kansas drift, which was formed when the great continental glacier reaching southward to St. Louis and Kansas City, attained its greatest extent and thickness; (2) the loess members (Nos. 3 and 4), composed of fine loams, constitute the soil formations during a long interglacial epoch when the climate was not very different from what it is at the present day; and, (3) the upper till (No. 5) represents what is now known as the great Wisconsin drift-sheet.

At the time when these observations were made (1882), as already indicated, the possible complexity of the Glacial period was not yet even surmised. Possibilities of a second Glacial epoch were only vaguely being considered. The prolix and bitter controversy on the duality versus the unity of the Glacial period was just beginning. Under these circumstances it is not at all surprising that some of the facts were partially misinterpreted, and that their true significance was for a considerable time overlooked. Then, too, the prevailing theory of the origin of the loess tended to obscure the proper understanding of the accurately recorded data.

Notwithstanding the fact that McGee was inclined at the time to attach rather slight importance to his observations, and to regard the phenomena as indicating mere local advance of the ice-sheet, it soon became manifest that the two till-sheets separated by a thick loess formation was unimpeachable testimony in support of two distinct and great ice movements within what was previously regarded as a single one. So far as is known this appears to be the first and most im-

[8]American Journal of Science, v. 24, pp. 202-23.

portant recorded evidence showing conclusively the complex character of the Ice age.

Of similar import was the somewhat later description of a great drift section several miles farther south on the Des Moines river. In a paper read before the Iowa Academy of Science in 1890, it was shown that there was still another thick member to be reckoned with below the loess. In later years the officers of the State Geological Survey have been inclined to regard it as representing the pre-Kansan Aftonian beds.

The Capitol Hill section is now one of the notable drift localities in America. During the past quarter of a century the place and vicinity have been visited by many of the most eminent scientists of the world.—C. K.

LETTERS CONCERNING GEN. J. G. LAUMAN.

The collections of the Historical Department of Iowa of war mementoes, writings and books, promise richest returns to descendants of the soldiers and to the students of their times. Much of the meaning of one life is gleaned from materials contemporary with that life, recently received from different sources.

Elsewhere is presented a list of the materials illustrative of the life and services as a soldier, of Brevet Major General Jacob G. Lauman. Almost simultaneously there arrived from Mrs. Ann Gowey, Pleasant Plain, Iowa, a fine collection of family letters, very rich in genealogical and Civil war materials. One of these, in cramped hand and heavy pencilled lines reads:

Benton Barax, Jan. the 2.

Dear Brother:

I sit down to write to you to let you know how we are getting along. . . . . Colonel Lauman returned the other day. You better believe the boys gave three rousing cheers, after which the Colonel stepped forward and told them that they behaved themselves nobly at the battle of Belmont and he expected before long that they would have a chance to see what the balance of the regiment was made of. You see that he thinks a good deal of his men. He is lame and has to have help to get around.

THOMAS B. ATWOOD.