

ANNUAL REPORT

UPON THE

GEOLOGICAL EXPLORATION OF THE FORTIETH PARALLEL
FROM THE SIERRA NEVADA TO THE EASTERN
SLOPE OF THE ROCKY MOUNTAINS,

BY

Mr. CLARENCE KING,

UNITED STATES CIVIL ENGINEER;

BEING

APPENDIX K K

OF THE

ANNUAL REPORT OF THE CHIEF OF ENGINEERS FOR 1875.

WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1875.

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[EXTRACT FROM THE ANNUAL REPORT OF THE CHIEF OF ENGINEERS TO
THE SECRETARY OF WAR.]

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., October 18, 1875.

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GEOLOGICAL EXPLORATION OF THE FORTIETH PARALLEL.

Mr. Clarence King, United States civil engineer, in charge.

Mr. King and his assistants have been engaged during the year, at the office in New York, in the preparation of his report and accompanying atlas. Delayed by the impossibility of getting the necessary paleontological studies sooner completed, the geological portion of the atlas was not put in the hands of the engraver until the end of June, 1875. The topographical portion, however, has gone steadily on, and is now more than half done; the remainder to be finished by December 1, 1875. The main labor of the year, beside the necessary supervision of engraving, has been in the department of geology, where the chemical and microscopical branches have been most satisfactorily advanced. It is stated by Mr. King that they will form in the forthcoming reports a more prominent part than in any previous geological survey in America. There remains only the consolidation of the report, which it is expected, unless interrupted by some unforeseen cause, may all be in the printer's hands by the end of the coming winter.

(See Appendix KK.)

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REPORT.

APPENDIX KK.

ANNUAL REPORT OF MR. CLARENCE KING, GEOLOGIST,
FOR THE FISCAL YEAR ENDING JUNE 30, 1875.

GEOLOGICAL EXPLORATION OF THE FORTIETH PARALLEL, FROM SIERRA
NEVADA TO THE EASTERN SLOPE OF THE ROCKY MOUNTAINS.

U. S. GEOLOGICAL EXPLORATION OF THE 40TH PARALLEL,
New York, August 22, 1875.

GENERAL: I have the honor herewith to present a brief annual report of the operations of the geological exploration of the fortieth parallel, under my charge, for the year ending June 30, 1875, and to state in explanation of its delay that, since the date when it should properly have been rendered, I have been severely ill, and confined to my bed more than half of the time.

REPORT.

The entire year has been spent in office here in New York, and devoted to the preparation of reports and their accompanying illustrations. I had hoped ere this to have been able to go to press with a completed work, and could easily have done so but for the impossibility of getting from the various paleontological authorities (to whom we were obliged to commit our collections of fossils) any final lists. It is the misfortune of geology to be more or less dependent on this branch of specialists. Without their specific determinations, the geological maps, even, cannot receive their ultimate color-designations, nor can reports, which, like ours, involve a wide range of stratigraphy, be safely written. So it has happened, in spite of every effort on my part, that these scientific auto-crats, although abundantly promising, have again and again disappointed me, and caused a wearying delay in the publication of our report.

Vexatious as this has been, it has not, however, failed to add a compensating value to the work at large, in that it has yielded us the time to elaborate certain important branches, as I shall presently show.

The following statement of what has been done in each special branch will give a clear idea of the present status of our work.

ATLAS.

The ten crayon-shaded sheets, which constitute our series of topographical maps, have all been pushed with the utmost vigor. Five are already completed, and the remaining five now in an advanced state of preparation, will be done by the first of December.

Each of these maps will receive impressions from three separate stones: one, upon which are engraved lines, including projections, boundaries, borders, lettering, rivers, &c.; a second, upon which are shaded, in lithographic crayon, all the hill-work; and a third, which will carry a fleet tint over plateaus and level low-lands, besides emphasizing certain features in the mountain topography. All the minutiae of the production of this series, even to the "pulling" and seasoning of paper, has been attended to; and the printing, necessarily slow from the need of great evenness of press-work, will be begun as soon as the present damp weather is over, and carried steadily on to completion.

The grade-curve sheets, designed to be the basis for the geological maps, were completed last year, save the adding of such names of localities as have been rendered necessary to call attention to certain points of geological interest.

As above explained, the geological maps have suffered delay at the hands of the paleontologists; but we have made elaborate preparations for their printing, devising, among other things, an intricate color-scale, covering forty-two distinct designations; that being the number of geological subdivisions we find it necessary to express.

In June last, we finally received the paleontological material necessary for our work, and immediately added the last corrections to the geological series, and put them in the hands of Julius Bien. Maps 9 and 10 (the Nevada basin) are now being proved, and specimens will be forwarded for your inspection before many days.

Map No. I of the general atlas, being a sketch of the whole western mountain-system, with indications of the blocks of country covered by our series of detailed maps, has been finished on stone, and lies ready for the printer.

In conclusion, then, I may state that the whole of the general atlas is out of our hands, and requires from us only the supervision incident to publication.

So, also, all the pictorial-volume illustrations are done on stone, and require only an oversight during printing. A few remaining plates of fossils, to come to us from Prof. James Hall, of Albany, and the volume-sections of geological localities, are yet to be done, but they represent an insignificant amount of time and labor.

GEOLOGY.

Aside from the superintendence of the above-mentioned maps and illustrations, our whole year has been devoted to geological research, based upon our notes and collections, and chiefly directed to the departments of microscopical and chemical study. Here satisfactory progress has been made, and I feel warranted in promising most interesting results. The study of the micro-structure of the eruptive rocks, including full and careful comparison with European types, is done; also a profitable microscopic examination of the clastic rocks.

The result of this work, important as it is as a direct contribution to American geology, will be most advantageously felt in the general report, where, as each formation is treated, its minute inner structure will be given. Among the clastic materials, the microscope has proved most valuable as affording clues to the derivation of many constituents whose origin could not otherwise have been traced. In the same way, the chemical study has been carried to as high a point as our means permitted, and yields excellent results.

Both microscope and laboratory will only be used by us hereafter for the solution of such minor questions as will mentally come up during the writing of the report.

There remains hereafter in the department of geology only the consolidation of our reports from the accumulations of manuscripts already in our hands.

Unless prevented by ill health, it is expected that our completed work can be put in the hands of the Congressional Printer in the latter part of the winter.

Very respectfully, your obedient servant,

CLARENCE KING,
Geologist in Charge.

Brig. Gen. A. A. HUMPHREYS,
Chief of Engineers, U. S. A.