SCIENCE:

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THE NEW GEOLOGICAL MAP OF PENNSYLVANIA.

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THE *chef d'œuvre* of a *geological survey* is the map. It is a graphic story of the results achieved by the corps engaged in its construction, and shows by a glance wherein progress has been made in defining the limits of the natural resources of a state, in interpreting the age of its rocks, and in establishing the relations of these rocks one to another. It is a bird's-eye view of the geological history of the area, and is an indispensable adjunct of the accompanying report.

The Second Geological Survey of Pennsylvania, under the direction of the venerable geologist, Prof. J. P. Lesley, has brought its results together in the form of a final report of which the first volumes and the map have appeared. The map, dated 1893, is in four sheets on the scale of six miles to the inch, and was made by A. D. W. Smith, assistant geologist, under the direction of Professor Lesley. It is drawn on a polyconic projection, and the data were the county maps published between 1874 and 1892, together with other special maps of particular areas. The original map, so it is stated in marginal notes, was drawn on a scale of two miles to an inch and reduced by photography by Julius Bien & Co. to six miles to an inch.

The legend contains twenty-two blocks of color, two of which have overprints to indicate trap and a limestone bed, respectively. The formation column is as follows:

POST-TERTIARY.
- Alluvium.
- Terminal moraine.

CRETACEOUS.
- Potter's and Fire Clay and Sands.

TRIASSIC (Mesozoic).
- Trap, Red Shales and Sandstones.

CARBONIFEROUS.
- XVII. Greene County Measures.
- XVI. Washington County Group.
- XV. Monongahela River Coal Measures.
- XIV. Pittsburgh Measures.
- XIII. Allegheny River Coal Measures.
- XII. Pottsville Conglomerate.
- XI. Mauch Chunk Red Shale.
- X. Pocono Sandstone.

DEVONIAN.
- IX. Catskill.
- VIII. Chemung. Portage. Genessee. Hamilton. Marcellus. Corniferous.
- VII. Candagalli Grit. Oriskany Sandstone.
- VI. Lower Helderburg Limestone.

SILURIAN.
- V. Salina. Niagara. Clinton.
- IV. Medina. Oneida.
- III. Hudson River. Utica.
- II. Trenton Limestone. Chazy Limestone. Calciferous Sandstone.

CAMBRIAN (including lower Calciferous).
- I. Quartzite.

Slate.
Phyllite.
Serpentine.
Gneiss.

LAURENTIAN.
Gneiss.

The coloration is very similar to that employed in the "Geological Hand Atlas, Report of Progress X.," which appeared in 1885, and, as in the case of that set of maps, the topographic base is omitted. While this omission leaves the colors without the variable shading of contour-lines, which is an obvious advantage where many shades of color have to be used, it detracts from the value of the map since the student cannot infer from the breadth of outcrop alone the relative thickness of a given formation. Where the outcrop is contoured, the inclination of the surface affords the trained map-reader more satisfaction.

The mother geological map of this state was published in 1858 by H. D. Rogers, from surveys made between 1836 and 1857. The eccentricity of the nomenclature applied to the rocks makes this map well-nigh unintelligible to geologists of the present day. From this first general map to the hand-atlas of 1885 was a great step, embodying the results of the first ten years of the second survey. It is interesting to note that in the present final map many minor changes in the limitation of formations have been introduced.

It is always fair to test a map by matching its boundaries with those of adjacent areas, surveyed under different auspices. The geological map of New York on the north is by no means a contemporary of the present high-grade map of Pennsylvania, and be it said, to the chagrin, not of the geologists and palæontologists of the Empire State, but of the legislators and the people, the state has no map comparable to that of the coal commonwealth. New Jersey has a geological map the matching of which with the state across the Delaware is attested by the map under discussion, on which the Palæozoic and Archæan rocks of northern New Jersey adjacent to Pennsylvania are shown in continuous bands. Of Delaware little can be said, but Maryland on the south has, through the enterprise of Professors G. H. Williams and W. B. Clark, a