here. Besides this, the construction of the map is more simple than that of the polyconic map; the parallels being all concentric circles and the meridians straight lines, while in the polyconic projection each meridian must be constructed separately. But our projection has still another advantage: it is the best among all the authalic projections that are possible; that is to say, the maximum of distortion cannot be made smaller than it is in our map. A study of the map shows that the distortion reaches its maximum in the extreme southern part of the United States, in latitude 25° north, where it amounts to 1° 16′. Going north, it decreases rapidly, until in latitude 28° 58′ 49″ it vanishes. Then it increases again quickly, and in 37° 58′ 16″ again reaches its maximum of 1° 16′. Farther north it decreases, and on the parallel of 45° 58′ 55″ there is no distortion. While in this zone (from 28° 58′ 49″ to 45° 58′ 55″) the maximum of increase of length is in the direction of the meridians, while the maximum of decrease is along the parallels, it is the reverse north and south of it. From the northern line, on which no distortion exists, it increases, and reaches 1° 16′ on the 49th parallel, the northern boundary of the United States. We have indicated by various shading the regions of equal distortion on both projections. The regions situated east and west of the line of 1° 16′ distortion on the polyconic map are in every respect inferior to our map. But it will be seen that the distortion of angles in the central part of the polyconic map is slighter than in our map. The central parts of our projection, on the other hand, are inferior to the polyconic projection so far as alteration of angles is concerned, while it is superior for census purposes as being equivalent. We must not, however, consider the central parts alone, as the map is intended as one of the United States, not of parts of the States. For the central parts alone, it would be necessary to adopt another equivalent projection. In our map on the lines of maximum distortion the lines whose lengths are increased are 1.1 per cent too long, while those vertical to them are 1.1 per cent too short: therefore this is the maximum error that can be made in measuring lengths. In the polyconic projection this error is equal to the amount of deformation of surface, being 6 per cent in the Eastern and Western States.

The sketch-map on p. 62 shows the difference between the distortions of angles in these two maps. In the shaded portions the polyconic projection has a slighter deformation of angles than our projection; in the dotted portions the reverse is the case. This comparison shows that in 48 per cent of the area of the United States the polyconic projection is superior to ours regarding deformation, the maximum difference in its favor being 1° 16′, while in 52 per cent of the area ours is superior, the maximum difference in its favor being nearly 4°. A comparison between the amount of deformation in both maps gives the following results: —

Deformation.	Per Cent of the Area of the United States.	
	Conic Projection.	Polyconic Projection.
0°–1°	51	58
1°–1° 16′	49	12
1° 16′–2°	—	15
2°–3°	—	13
3°–4°	—	2

From these remarks it appears that the conic projection excels the polyconic in every respect.

It appears from our map, very clearly, that the polyconic projection has the valuable property of having very slight distortions on a wide belt situated on both sides of the central meridian. This property makes it valuable for maps showing narrow strips of land only, such as coasts of the ocean and of lakes: therefore it is serviceable for the purposes of the Coast Survey, particularly as the alteration of surface is of little or no importance to the mariner. The United States, however, have a wide extent in longitude, and a far smaller one in latitude, which makes the projection not well adapted for a map of the whole country. If the object were to construct a map of the whole territory of the United States on this projection, we ought to make use of this fact. Our country is far more extended in longitude than in latitude. But by assuming a system of parallels and meridians the pole of which is situated near latitude 12° north, longitude 175° west from Greenwich, and using this for a polyconic projection, the greatest distance from the new central meridian will be 13° instead of 30°, and the greatest distortion less than 1° instead of nearly 4°, while the increase of surface will be less than two per cent in the outlying portions. This projection may be considered quite a good one, as the central part of the country adjoining about the 40th parallel of latitude would have hardly any distortion. From this line it would increase very slowly northward and southward.

We said, however, above, that, for the purposes of a census, equivalence of surfaces must be the fundamental point of view for the construction of a map, and, as even the oblique projection just mentioned is not equivalent, it cannot be accepted. For the same reason it is necessary to take into account the spheroidal shape of the earth, which makes the computation of oblique projections difficult: therefore they will be only chosen if they offer great improvements upon others.

Assuming the central point of a circle circumscribed about the United States as a zenith, and computing a conical projection that is equivalent, and in which the alteration of angles is as slight as possible, we shall find that the maximum alteration of angle is not more than 58′, the map including the whole territory of the United States. We should recommend this map, if it were not for the fact that there would be an open sector of 10° aperture running from the centre near Omaha to the northern boundary. This is produced by the development of the cone upon which the map has been projected. The existence of this open sector is so serious an objection, that the decrease of 18′ in the deformation cannot be considered an equivalent.

By assuming an oblique conic projection the alteration of angle might be reduced to 1° 9′, but the difficulty of computing this projection for the spheroid induces us to discard it. A thorough investigation into the properties of all known projections leads us to the conclusion that the projection we propose here is the best that is possible for census purposes, and the only one that ought to be used for it. The easiness of computation of the elements adds to the properties that qualify it for an extensive use. DR. F. BOAS.

JAMES STEVENSON.

IN the death of James Stevenson on Wednesday, July 25, the public lost the services of one of the most active and indefatigable ethnologists of the time. Certainly, so far as knowledge of the aboriginal American race habits and customs is concerned, he contributed more than any predecessor, and by his keen appreciation of the subject and tireless investigation he saved from irreparable loss much of the evidence upon which must stand all we know of many of the ancient peoples of this continent and their polity.

From an article in a recent issue of the *National Tribune* of Washington we get the following facts relating to the life and labors of Mr. Stevenson. He was born at Maysville, Ky., in 1840, and his life was devoted to the one passion of geographical and ethnological research, except when interrupted by the war.

He went West first when quite a boy, several years prior to the Rebellion, with Professor Hayden, to the Missouri River country, making unofficial observations of Indian customs, and learning their dialects. Upon the breaking-out of the war, Professor Hayden entered the service as a surgeon, and young Stevenson enlisted as a private, and became a second-lieutenant of the Thirteenth New York Volunteers. He was at the second Bull Run, and was an important witness in the famous Fitz-John Porter case.

In 1866 he resumed his explorations, going to the Bad Lands of Dakota with Professor Hayden, as his assistant in the Geological Survey. Being a warm personal friend of the late Gen. John A. Logan, young Stevenson aroused in him a deep interest in the subject of developing a better knowledge of our Western lands. Logan, at Stevenson's suggestion, conceived the idea of establishing such a survey as a distinct and responsible branch of the general government, and from his place on the floor of the House, in the winter of 1866–67, he offered an amendment to the Sundry Civil Bill appropriating the sum of five thousand dollars for such an investigation, to be made by D. F. V. Hayden. This was adopted after a warm debate, and from this small beginning the present extensive and efficient organization known as the United States Geological Survey took its origin, and its growth upwards was due almost wholly during 1868 to 1872 to Stevenson's careful management. In 1867 and 1868 he again went with the annual expeditions, the work during these two summers being chiefly in Nebraska. In 1869 he took a trip along the eastern slope of the Rocky Mountains in Colorado and New Mexico. In 1870 the party went out on the Platte and into the Green River basin.

In 1871 Professor Hayden's party made the first geological surveying trip into the Yellowstone Park; and Stevenson, as usual, went along, acting as executive officer and general manager as well as collector in his own field. They took a pack train at Bozeman and an escort of cavalry from Fort Ellis. In 1872 the Hayden survey again went into the park, in two parties this time. They rendezvoused at Ogden and divided; the main party, under Professor Hayden, going in from the north by Bozeman, as before.

Stevenson went to Fort Hall and organized the Snake River expedition, which entered the park from the south by way of the Teton Mountains. On this expedition he ascended the great Teton, and nearly lost his life through slipping and falling several hundred feet on the snow, but miraculously escaped, and persisted in an effort to reach the summit, which he accomplished. It is not known that any other white man ever set foot upon the peak. He verified an Indian tradition by finding on the mountain-top an ancient stone altar.

He joined Professor Hayden's party at Yellowstone Lake, after which they again separated, each going out in the direction by which he had entered.

The season of 1873 again found Stevenson in the field, collecting and acting as executive officer for Hayden's surveying party in Colorado; and for the three following years his work was a repetition of this experience, and in the same field. In 1877 they went to Idaho, Wyoming, and Utah, and in 1878 to Yellowstone Park once more. On this trip Mr. Stevenson made a most complete collection of those specimens of the phenomena of the Geysers, which may be seen at the Smithsonian and National Museum in Washington.

In this connection it is worthy of mention that the first hydrographic survey of the Yellowstone Lake, which was made in 1871 and published by Henry W. Elliott, assisted by Campbell Carrington, United States Geological Survey, names the largest island in that remarkable body of water 'Stevenson Island,' and the loftiest peak that overlooks it 'Mount Stevenson.' This was done by Elliott in spite of Stevenson's strong disinclination to have it so recorded. He was always modest and retiring in so far as his own individuality was concerned. Thus his name is perpetuated by the largest island in that beautiful lake and one of the highest peaks on the east side of that famous park.

In 1879 the Hayden Survey was disbanded, and the Bureau of Ethnology was organized. Major Powell, the director, at once appointed Stevenson as a specialist in ethnological work, and he began an investigation, which has made him noteworthy, among the Pueblos of the Rio Grande and at Zuñi. During this year and the next, and again in 1881, he made an exhaustive collection of pottery, costumes, and ceremonial objects. Among the rest, he secured from the Zuñis a complete collection of their animal fetiches held sacred by them, and never before allowed to go out of their possession. During 1881 he also visited the Moqui Pueblo, making vast collections of objects illustrating both the ancient and modern life of the race.

The annual report of the bureau for 1881 contains an exhaustive descriptive catalogue of his collections among these Pueblos.

In 1882 he was off again, this time to explore the remains of the cliff and cave dwellers in New Mexico and Arizona at Cañon de Chelly and Cochiti, bringing back, among other things, two perfect ancient skeletons found in the largest of the cave-dwellings of the prehistoric inhabitants. From 1883 to 1885 he continued in this work, and in 1886 he paid a visit to the Mission Indians of California. By his familiarity with the inner life of these races he was enabled to discover, that, although these Indians had been ostensibly Catholics for two centuries, still at heart they were yet Pagans, and worshipped and sacrificed to the gods of their forefathers in secret.

During the trip of 1885 he contracted the worst type of that peculiar 'mountain fever' which is so well known and dreaded in the high mesas of Arizona and New Mexico. He fought it off, however, after a severe siege of illness. It was the first real sickness that he ever had in his life, for he possessed a fine physique, and was remarkably temperate and regular in his diet and living.

Last year he returned to the New Mexico region, exploring and collecting, and renewed that wretched fever which finally destroyed the tissues of his heart, so that when he returned last December he was literally prostrated. He made, however, an heroic struggle for his life, and, growing worse as time passed on, he was advised to go to Gloucester, Mass., to spend the summer, and was on his way back from there, accompanied by his wife, when overtaken by death in New York.

His remains were taken to Washington, and after appropriate ceremonies were interred at Rock Creek Cemetery, just outside of the Soldiers' Home.

It is to be regretted that he did not write more; but the fact is, he had little time for that purpose. But as an original investigator, whose results some other hand must record, he was and is justly famous.

He left some manuscripts, however, which will have a lasting interest, one of which is upon 'The Mythologic Painting of the Navajos,' which, with the rest, will no doubt appear in due time in the publications of the bureau.

Mr. Stevenson was a man of singular firmness and rare amiability. He had an intuitive appreciation of men and what they really amounted to. This faculty made him one of the most efficient and prompt managers of the varied men of the survey, as they were despatched into the field with their outfits every spring, and recalled from it every fall.

SCIENTIFIC NEWS IN WASHINGTON.

A New Way of using Oil to calm the Troubled Sea. — How a Mound was made: Interesting Discoveries in Ohio by Mr. Gerard Fowke of the National Bureau of Ethnology. — How the Monthly Pilot Chart is made, and What it shows.

Oil-Exploding Rockets.

THE pamphlet describing and explaining the exhibit sent to Cincinnati by the Hydrographic Office of the Navy Department, which is now ready for the printer, contains a description of an oil-exploding rocket invented by Mr. W. Missel of the German steamer 'Werra,' and forwarded by Lieutenant Cottman, U.S.N., in charge of the branch hydrographic office, New York. The following extracts are made: —

"It is stated that experiments have been made with this rocket at sea and on shore which have proved very successful, particularly those by the German life-saving stations. Trials were made during a fresh wind and moderate sea off the mouth of the Elbe, and the rockets were exploded outside the breakers, in the breakers, and inside of the same. Outside the breakers, oiled areas of about three hundred feet long and nearly one hundred feet wide formed and calmed the sea very much, and remained a long time on the surface of the water. Those which exploded among the breakers exercised a remarkable quieting effect, and gave evidence of their value in facilitating the handling of lifeboats in case of shipwreck, as the resulting oil areas will enable the boat to get through the breakers without shipping water.

"A trial was made at sea on board the 'Werra' by firing a rocket from the bridge directly against the wind. It flew directly ahead against a wind whose force was 9, and the oil cylinder exploded in the water. The oil at once smoothed the sea, the heavy waves facilitating its rapid spread, and no seas were seen to break within the oiled area.

"Above the rocket composition the shell is prolonged 1½ inches to receive the oil cylinder, which contains within it an exploding chamber filled with powder. Some loose powder is poured on top of the fuze composition, and the cylinder then shipped on the rocket. The stick is weighted with lead to balance exactly, so as to prevent trembling. All being ready, the rocket is set off from a tube, and