

regarded as a love of truth, yet it ought rather to be called a love of these propositions, irrespective of their truth. The lover of truth is ready to reject every previous opinion the moment he sees reason to doubt its exactness. This particular direction of the love of truth will lead its possessor to pursue truth in every direction, and especially to investigate those problems of society where the greatest additions to knowledge may be hoped for.

Scientific method we may define as simply generalized common sense. I believe it was described by Clifford as organized common sense. It differs from the method adopted by the man of business, to decide upon the best method of conducting his affairs, only in being founded on a more refined analysis of the conditions of the problem. Its necessity arises from the fact, that, when men apply their powers of reason and judgment to problems above those of every-day life, they are prone to loose that sobriety of judgment and that grasp upon the conditions of the case which they show in the conduct of their own private affairs. Business offers us an example of the most effectual elimination of the unfit and of 'the survival of the fittest.' The man who acts upon false theories loses his money, drops out of society, and is no longer a factor in the result. But there is no such method of elimination when the interests of society at large are considered. The ignorant theorizer and speculator can continue writing long after his theories have been proved groundless, and, in any case, the question whether he is right or wrong is only one of opinion.

I ask leave to introduce an illustration of the possibilities of scientific method in the direction alluded to. Looking at the present state of knowledge, of the laws of wealth and prosperity of communities, we see a great resemblance to the scientific ideas entertained by mankind at large many centuries ago. There is the same lack of precise ideas, the same countless differences of opinion, the same mass of meaningless speculation, and the same ignorance of how to analyze the problem before us in the two cases. Two or three centuries ago the modern method of investigating nature was illustrated by Galileo, generalized by Bacon, and perfected by Newton and his contemporaries. A few fundamental ideas gained, a vast load of useless rubbish thrown away, and a little knowledge how to go to work acquired, have put a new face upon society. Look at such questions as those of the tariff and currency. It is impossible not to feel the need of some revolution of the same kind

which shall lead to certain knowledge of the subject. The enormous difference of opinion which prevails shows that certain knowledge is not reached by the majority, if it is by any. We find no fundamental principles on which there is a general agreement. From what point must we view the problem in order to see our way to its solution?

I reply, from the scientific stand-point. All such political questions as those of the tariff and the currency are, in their nature, scientific questions. They are not matters of sentiment or feeling, which can be decided by popular vote, but questions of fact, as effected by the mutual action and interaction of a complicated series of causes. The only way to get at the truth is to analyze these causes into their component elements, and see in what manner each acts by itself, and how that action is modified by the presence of the others: in other words, we must do what Galileo and Newton did to arrive at the truths of nature. With this object in view, whatever our views of culture, we may let science, scientific method, and the scientific spirit, be the fundamental object in every scheme of a liberal education.

S. NEWCOMB.

ECCENTRIC FIGURES FROM SOUTHERN MOUNDS.

IN a recent publication,¹ I have described a number of relics from the mounds, that present many new and remarkable features. The most important of these were two engraved shell disks, the designs upon which presented very marked variations from the work usually attributed to the mound-builders. Tracings of these are given in figs. 1 and 2.

Both specimens were found associated with characteristic mound relics, and had undoubtedly been deposited with the dead by the builders of the mounds. The question of origin was left for settlement to the light of future discoveries; the only conclusion reached being, that, while the ornaments had a northern character, the designs engraved upon them were decidedly southern, that is to say, Mexican or Central-American. Recently some important additions have been made to this class of works, and a flood of light has been thrown upon the subject.

Explorations in Georgia, conducted by Dr. Thomas for the bureau of ethnology, have brought to light two more shell gorgets bearing engraved designs of human figures. Outlines of these are given in figs. 3 and 4.

¹ Proc. anthrop. soc. Washington, vol. ii.

In case there should be any question as to the place of these objects among true mound relics, I present the following facts furnished by Dr. Thomas from the observations of his assistant, Mr. Rogan. The mound from which

were obtained. These contain *repoussé* figures corresponding closely with those engraved on shell. They are made from thin, well-polished sheets of copper of uniform thickness, some of which are a foot in width and twen-



FIG. 1. — Shell gorget from a mound in Missouri.

they were obtained belongs to the celebrated Etowah group at Cartersville, Ga., and is the one marked 'C' in plate I. of Jones's 'Antiquities of the southern Indians.' The burials were in a layer of dark, rich loam, and all in well-constructed stone cysts of the usual shape. They were not all at the same depth, but were near the base of the mound, and in every case beneath undisturbed strata of loam, sand, and hard-beaten clay. One of the engraved shells and three copper plates, one of which is given in fig. 5, were found in one grave. They were deposited with a very large skeleton, which had been wrapped in cloth and matting.

A comparison of this pair with the examples from Missouri and Tennessee develops many important points of resemblance. The designs are clearly the work of, or at least have their origin with, the same people, and that people in all probability a Mexican people. This result is, however, not satisfactory, and other evidence is demanded. This is fortunately at hand. From the same mound with the articles of shell a number of copper objects



FIG. 2. — Shell gorget from a mound in Tennessee.

ty inches in length. The figures have been stamped in high relief, and the outlines and perforate areas cut with mechanical precision. One of these curious images is shown in outline in fig. 5.

These objects are much corroded, and bear evidence of age corresponding to that of the other relics with which they were buried.

Another is almost a duplicate of this, while two others represent eagles. Very similar to the latter is a copper eagle, made also of sheet-copper, obtained by Major Powell from a mound in Illinois. A tracing of this is given in fig. 6.



FIG. 3. — Shell gorget from a mound in Georgia.

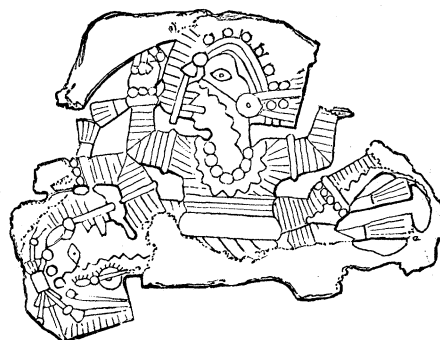


FIG. 4. — Shell gorget from a mound in Georgia.

With these links added to our chain, we are able, not only to say that all of these objects are identical in time and origin, but to say, with a fair degree of confidence, what is the

time and what the origin. The use of sheet-copper, manufactured and manipulated with mechanical precision, will to most minds be sufficient evidence of European agency and post-Columbian time.

This view is enforced by the presence of articles of brass and iron in the mound with one of the shell objects.

Besides this, a study of the designs themselves develops some interesting facts. Four of the designs presented, two on copper and two on shell, represent compound creatures, part bird and part man. This is a characteristic American conception, but in the execution of details there are features very suggestive of an oriental origin. The wings are, for instance, attached to the shoulder-blades behind, the arms being also present, and expand symmetrically to the right and left, resembling mediæval angels more closely than Mexican deities. We notice, also, in the delineation of the eagle, a decidedly heraldic character, a symmetrical extension of the wings, legs, and talons highly suggestive of some imperial coat of arms.

In all their leading features the designs themselves are suggestive of Mexican or Central-American work; and, if actually derived from some of the highly cultured nations of



FIG. 5. — Copper image from a mound in Georgia.

the south, it is not impossible that this derivation was through aboriginal agencies: but some of the examples in shell and copper

shown in the accompanying figures bear the ear-marks of transatlantic workmen; and I believe it quite probable that they are southern works copied in favorite American mate-

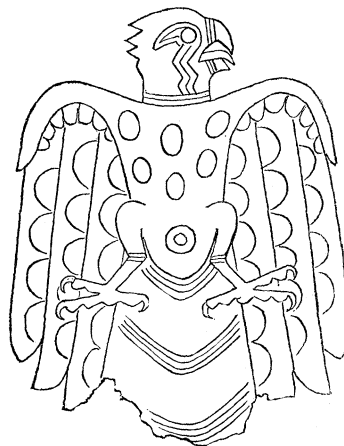


FIG. 6. — Copper eagle from a mound in Illinois.

rials by the avaricious Spanish conquerors, and subsequently used in trade with all the tribes of the Gulf states. This is well known to have been a usual practice with our early traders.

If in the end it should turn out that these remarkable objects are the unaided work of the mound-builders, we shall be compelled to recognize their standing in the manipulation of metal, and in the art of design generally, as unsurpassed by any other native American people.

W. H. HOLMES.

ADAPTABILITY OF THE PRAIRIES FOR ARTIFICIAL FORESTRY.

VARIOUS views have been entertained in relation to the treeless condition of the prairies of the interior region of the United States, some of which are rational, some partially so, and others positively erroneous. The opinion has been popularly held, that the prairies were originally covered with forests, as the region to the eastward of them was when it was first known to white men, and that from some unexplained cause these forests were destroyed. Those who entertain this view are disposed to discuss speculatively the origin of the prairies, and practically the means of reforesting them. These are views of men who lay no claim to scientific knowledge; but certain persons, even of scientific pretensions, have claimed that the character of the soil of the prairies is such,