# Correspondence.

### The Gun Erosion Problem.

To the Editor of the SCIENTIFIC AMERICAN:

May an outsider ask a question about this gun erosion problem?

Assuming that it takes less heat to soften some one ingredient of the steel that it does the others, also that small particles of this softer substance are exposed to the intense heat of the burning powder, would this condition of things offer a weak spot for heat and friction (one or both) to break down the surface of the bore?

Or, is it possible that there is some chemical affinity between one or more of the ingredients of the steel and one or more of the ingredients of the powder, that in the presence of the intense heat decomposes the surface of the bore?

The laws of chemistry and physics have come to be so well understood, surely this problem would be solved if put into the hands of men who understood these sciences. WILLIAM R. LEE, M.D.

[It is believed that the erosion may be partly due to chemical action; although the greater part of the destruction is generally thought to be due to the fusion and carrying away of the metal surface by the great heat of the swiftly-moving gases, the irregularity of the erosion being due both to the composition of the steel and the successive local action of the gases.—EDITOR.]

### The Origin of the Word "Scientific."

To the Editor of the SCIENTIFIC AMERICAN:

Could you tell me the origin of the word "scientific," which shines in the name of your very excellent periodical? I have succeeded in tracing it back to the middle of the thirteenth century, when the famous Robert Grosseteste, Bishop of Lincoln, uses the word *scientificus* in a passage that might serve for your motto.

Robert of Lincoln used the term *scientificus* in or about 1246 in a letter to Henry III., King of England, The passage appears in the letters of Robert, well edited by H. R. Luard, 1861, in the Rolls series, page 350.

The King had asked why the rite of anointing was used at the public coronation of kings. The great bishop answered that he was no authority in secular state matters, but suggested that kings might be properly anointed at the coronation as members of the church are at the confirmation, when they receive episcopal benediction and the sevenfold spirit of wisdom, understanding, *counsel*, might, knowledge, etc., as stated in Isaiah xi, 2. The Latin text calls it the "spiritus domini, sapientiae, intellectus, *consilii*, fortitudinis, scientiae, pietatis."

The great bishop offers a brief interpretation, and says: "Ad praedicta autem praecellenter agenda dono consilii decoretur (sc. rex), quo artificialiter et scientifice ordo hujus mundi sensibilis edocetur;" or in English, "to do well what is required of him, the king needs the gift of counsel, which teaches the proper order of this world in the spirit of true art and science."

Assuming that Robert used a new word—for he answered a new question—he did not act without some precedent. In saying *artificialiter*, he meant "filled with the spirit of the seven arts, grammar, rhetoric, logic, arithmetic, music, geometry, astronomy. He adds that a true king should be taught *scientifice*, which means in the spirit of science, or filled with the genius of science. Robert might well use the term, as he was justly called the first man of science in his day by Roger Bacon, himself a great man of science. The immediate precedent for *scientifice* was the common use of similar terms in Scotus Erigena, whom Robert studied with care. Scotus Erigena, also a British author, has *sapientificus*, *potentificus*, *multificus*, etc., where the termination *ficus* means replete with. The earlier *pacificus* does not mean making peace, but filled with peace.

The early divines frequently call the Bible *deificus*, meaning filled with the divine spirit, not making God. In the classics *magnificus* means filled with greatness. *Scientificus*, in Robert of Lincoln, means filled with the spirit of science. He wishes his king to have the genius and spirit of the arts and sciences, not the technicalities of the school or the professor.

The medieval church often called for scientific men, meaning men amply trained in liberal learning.

You have honored the name "American," and your distinctive "Scientific" has a beautiful history and meaning. If Robert of Lincoln be the father of the term, no better could be desired; neither could a better age, for in 1246 England was happier, perhaps, than ever before or since; it was the age of cathedral building, of great learning inspired by Greek, the crusades, the rise of universities, the study of nature, and a galaxy of eminent men. The people were happy. Robert of Lincoln, Roger Bacon, Bracton, are studied to-day.

I congratulate you, and submit these notes as a starter for scholarship to enlarge and improve.

Swampscott, Mass. C. W. ERNST.

### Some More "Man in the Drift."

To the Editor of the SCIENTIFIC AMERICAN:

I ask to be indulged in submitting the following statements, as evidence of man in the drift; and hope they will prove of sufficient note to call forth expressions of judgment from those who are authority on such subjects, and especially on this class of evidence. Were the writer, after speculating many years, able to see one single weak point in the argument contained in these data, they would not have been here presented. The relics in evidence, a physical description of three of which I here present, consist of ovate spheroids (egg-shaped), slightly flattened, as shown in transverse diameters, of syenitic or hornblendic granite, so far as observed. The following table of dimensions is its own argument, as to the origin of the relics under consideration, as to whether they are the products of accident or design.

| | Lines. No. 1. | Lines. No. 2. | Lines. No. 3. |
|---|---|---|---|
| Major axial circumference..... | 483 | 320 | 309 |
| Minor axial circumference..... | 460 | 306 | 297 |
| Major transverse circumference... | 362 | 249 | 230 |
| Axial diameter (major axis)..... | 177 | 117 | 114 |
| Transverse diameter (superior)... | 126 | 84 | 78 |
| Transverse diameter (inferior)... | 108 | 72 | 66 |

No. 1 was taken from a drift moraine gravel bank two miles north of Massillon, Ohio, by an employe of the Cleveland, Lorain & Wheeling Railway.

Nos. 2 and 3 the writer obtained from a deep excavation for a street, on Deuber Heights, in the city of Canton, Ohio. Am positive they were taken from a depth of 10 feet or more, as they were found on top of dump after cut was 18 or 20 feet deep, and as further evidenced, the surface of No. 3 was, and still is, covered with a calcareous incrustation, which could not have occurred had it lain near the surface.

The figures showing the relative dimensions of these specimens, to me, display a marvelous and yet unwavering set of facts. I have examined gravel, and boulder deposits by the acre, by the thousands of tons, and by the week, in the glacial gravel deposits of Stark, Tuscarawas, Columbiana, and other Ohio counties; lacustrine gravels on Lake Erie and other beaches; fluvatile gravels on the beds of many rivers; and yet have never discovered a single one among the inestimable millions that the accidents of natural forces had formed in such perfect symmetry, and that, too, a type of a once vital organism. Bowlders of any form, the sizes of the subjects of this paper, are very rare in the drift. If practically all drift moraine bowlders of such sizes and materials are of the form and proportions of these types presented, why, if the work of accident, are not the smaller bowlders and gravels, which have been subject to the same mechanical manipulations, and other environmental processes, reduced to the same forms, and in the same generous proportions? There were two other specimens of like form and dimensions in the shanty of a tender of a gravel bank, at South Massillon (which were not measured), thus making an aggregate of five, strictly of one type in all essentials, found within a distance of nine miles. On the other hand, the small bowlders and gravels never present you with a single type of perfect outlines, or duplicates of any vital organism, though they are millions to the others' one. Why not? E. V. MORSE.

Burton, O., October 28, 1906.

### How the Ocean Got Its Saltness.

To the Editor of the SCIENTIFIC AMERICAN:

In Notes and Queries No. 10186, October 27, 1906, J. C. B. asks: "From what source does the ocean derive its intense saltiness, and how retain the same in uniform strength?" Your answer: "The salt now in the ocean has been in the past ages washed out of the land or dissolved from beds of salt in the earth to which the water gained access. The original water was fresh. It became salt by dissolving salt from the earth."

It seems to me your answer is not in accord with the teachings of geology. You do not explain how beds of salt were formed in the earth. Salt is not one of the elements, but a compound of chlorine and sodium, and these elements had to be in solution in water to enable them to get together. Prof. Alex. Winchell in his "Sketches of Creation," pages 294 to 306, explains how salt was formed in the earth and in the ocean, claiming that all salt beds are dried up remnants of the ocean. The great stratum of rock salt that lies more than 1,000 feet below the surface under southern Michigan and Canada, but is mined in Cayuga and Onondaga counties, New York, is a remnant of a dried-up gulf of the ocean that existed in the Silurian period, and extended from Milwaukee eastward beyond Syracuse, and from Mackinac on the north to Sandusky on the south. All other beds of salt were similar dried-up portions of the ocean. On page 296 he says: "How the waters of the sea came into possession of their saltiness is a question of primeval chemistry to which allusion has heretofore been made (pages 49 to 63). It was the resultant of the chemical actions which took place between the fire-born rocks and the chemical acids washed down by the primeval rains, and gathered with the 'gathering together of the waters.'"

On pages 49 to 63 he relates that at some stage of development all the heavier elements, as silicon, aluminium, iron, calcium, potassium, sodium, etc., constituted a molten globe, which was surrounded by the lighter elements, hydrogen, oxygen, carbon, sulphur, chlorine, etc., in a gaseous state. When the conditions became sufficiently cool oxygen and hydrogen united and formed water, which fell as rain on the central globe, bringing down with it the carbon, sulphur, chlorine, etc., in the form of acids, which united with the various mineral elements, producing gypsum, Glauber and Epsom salts, etc. Carbonic acid united with calcium and produced lime. And now to quote, page 60: "Carbonate of lime refusing, for the greater part, to be dissolved in the sea water, would settle to the bottom and become limestone; while chloride of sodium—chlorine and sodium united, which is only the chemist's name for common salt—remained in solution, and this gave its characteristic salinity to the sea."

So this is when and how the ocean got its saltness, as defined by Prof. Alex. Winchell, who is quoted by other geologists as authority on this subject. Its water was salty as soon as it became the ocean and chemical unions took place; it was never fresh water only while falling as primeval rain. C. W. BENNETT.

Coldwater, Mich.

### Prevention of Railroad Accidents.

To the Editor of the SCIENTIFIC AMERICAN:

In view of the recent terrible calamities on the railroads, I am led to inquire if there is not some possible preventive not yet utilized; and in this line I wish to suggest one for your consideration.

Suppose every important switch were guarded by two responsible men instead of one—each one of these to be held responsible, as if he were the only one in charge—would it not reduce the chances of mistakes to a minimum? The banks employ two separate and independent clocks on their time locks, on the ground that they are not likely to both fail at the same time; and why should the lives of two whole trainloads of passengers be dependent upon the faithfulness or competency or vigilance of a single individual, when experience shows that the best men do sometimes make mistakes? And in like manner the occupants of other important positions might be duplicated, so that any single oversight by one might be detected by his associate in time to avoid disaster. Under such conditions no mistakes would be likely to occur without a most culpable neglect of duty, in which case a much more severe penalty might reasonably be affixed, which would tend to secure the safety of passengers in a marked degree. EBEN BROWN.

Boston, Mass., January 4, 1907.

### The Current Supplement.

The current SUPPLEMENT, No. 1621, contains a most unusual variety of instructive scientific matter. The first of all is the opening article by the English correspondent of the SCIENTIFIC AMERICAN upon the combined ice-breaking, salvage, and survey steamer recently completed for the Canadian government. Next follows an illuminating exposition by F. W. McNair of some problems connected with deep mining in the Lake Superior copper district. Readers of the SCIENTIFIC AMERICAN will doubtless recall the gyrostatic device invented by Otto Schlick, the well-known German marine engineer, and described some time ago in these columns. Mr. Schlick's device was intended to prevent the rolling and pitching of ships at sea. Since the publication of that article the gyrostat has been practically tested on a German vessel, and in the current SUPPLEMENT Mr. Schlick himself gives the results of that experiment. The first installment of an important treatise on the new electric lamps appears. In this series of articles the new metallic filament lamps will be thoroughly discussed. L. Ramakers writes on the great wireless telegraph station at Nauen, Germany, of which we have been hearing much of late. Mr. A. E. Potter contributes a well-considered article on variations in horse-power developed by automobile gas engines. The excavations which have recently been made on the site of the ancient Chaldean city of Sirpourla throw much light upon ancient art. The Paris correspondent of the SCIENTIFIC AMERICAN contributes an illustrated article on these excavations. Miss Rose O'Halloran, whose solar research work is known to every astronomer, writes on the decline of the sun-spot maximum. To the layman it would not appear to be difficult to prove the existence or non-existence of the relation between intelligence and brain weight, but the difficulty of the problem is told in an instructive article published in the current SUPPLEMENT.