the German Chemical Society. Yet the author's industry has been noteworthy, and the omissions and inaccurate statements will probably be corrected in another edition.

The book is eminently readable. It is written in an agreeable, almost colloquial, style. The translation from the Russian is fairly good, so far at least as our own language is concerned, with an occasional quaintness which is not unpleasing. The work is in no sense a textbook, but, as the most original and suggestive treatise on inorganic chemistry which we possess, it is well worthy of the student's attention, and must be regarded as a very important addition to chemical literature.

54 (11 February 1892) 110

SCIENCE IN AMERICA

CSP, identification: the evidence here is internal, but quite convincing. The review of "The Comtist Calendar" was written by Peirce, as was the review of Lombroso's "Man of Genius," which is mentioned as forthcoming. See also: Fisch, *First Supplement*. The editorial reply is unassigned in Haskell's *Index to* The Nation, vol. I.

To the Editor of The Nation:

Sir: In the able review of 'The Comtist Calendar' in the *Nation* of January 21 occurs the following:

"There is no civilized country where a great work of reasoning is less feasible than in ours. We have the most superb observatories and laboratories, it is true, but what would a Kepler, with his bad sight and awkward hand, be doing in such an establishment? Perhaps among our sixty millions there may just now live one such mind; certainly nobody is on the lookout for him. If he does exist, what is he doing? Reading examination papers?"

No, indeed, it seems quite unlikely that this should be his occupation. If it were, we should soon hear of him. He would find time enough to work out some great thing that we should be able to admire, and soon he would rise to positions of high honor and comparatively high pay. He is much more likely, as a true son of his time and his country, to be wasting his time in making money. In this pursuit, no doubt, he is successful, his great talent having taken that direction. In Germany it is the army that absorbs the best talent of the country, and with us it is the chase after riches that causes many a brilliant talent to be lost to the world.

The trouble is that our colleges do not, in general, attract great talents. But it is not the universal craving for wealth alone that produces this result. Much of the blame no doubt falls to other causes, and these I prefer to state in the words of the Rev. James T. Bixby (*Unitarian Review*, August, 1888):

"On the other hand, the man among us who, outside the college circle, does original and able work, may hope in vain for a college appointment. He is not in the line of promotion, and the solid phalanxes are unwilling to admit a new-comer to interfere with the rules of seniority. And even if he has gained admission to the charmed circles, he must square his instruction with the demands of his superiors, or he is likely to be unceremoniously shown the door, as Prof. Felix Adler (by current rumor) was at Cornell University after his lectures on Buddhism, or as Prof. Alex. Winchell was at Vanderbilt University because of his belief in Pre-Adamites and Evolution."

To return to our Comtist Calendar review. Fermat and Jacob Steiner are mentioned among those who are barely assigned a place by Comte in his Calendar of great men, though Comte was himself a mathematician. Now, I would ask, how many are there, even among the readers of the *Nation*, who know anything about Jacob Steiner, or what he did? And this leads me to the subject I wish to urge namely, that it seems high time we should begin the study of modern geometry. So far as I am aware, not a single book upon the subject has been published in America, nor is the study of modern geometry pursued in any of our institutions by purely geometric methods. Yet modern geometry is by far more interesting, more systematic, more fruitful of results than the Euclidian geometry. Steiner, in the preface to his 'Systematische Entwickelung,' says: "There exists a small number of simple fundamental relations, from which the remaining great number of theorems can be derived, and without difficulty. Thus, by the acquisition of the few fundamental relations, one becomes master of the whole subject." And in the book itself, with wonderful ease, he derives almost everything from *one* fundamental relation, namely, the anharmonic ratio. The principle of duality there shows itself in its wonderful fecundity. Any one who will take the trouble of studying Chauvenet's "Introduction to Modern Geometry," appended to his 'Elements,' will understand the possibilities of the method, and, furthermore, will be prepared for the study of the larger works, say, Chasles's. It would be easy to compile a good text-book from easily accessible sources. Thus, the 'Traité de Géométrie,' by Rouché and De Comberousse, alone, in its various appendices, contains all or nearly all the material necessary, and collections of problems exist in goodly number.

Permit me to plead for one more neglected mathematical study, namely, the functions of complex variables (functions of $x + \sqrt{-1}\, y$). When we find that the realm of number is not of one dimension, so as to be representable upon a single infinite straight line, but that it has *two* dimensions, and requires a whole infinite plane to represent it, our horizon is at once infinitely widened. When next we find that by taking $z = f(x + iy)$ as the general form of the equation of a plane curve, and that we encounter no longer the puzzling difficulty of having the dependent variable become "imaginary" and meaningless, while undoubtedly it continues to vary, we see the usefulness of the method. And, finally, when we follow Rieman to his *mehrfach zusammenhängende Flächen*, we cannot help admiring the beauty of this modern analysis.

Shall we continue to plead that this is a new country, and that as yet we have no time for the sciences, except so far as they serve some technical purpose in the useful arts? The Australians seem to disdain such a plea, and we hear of vigorous scientific work done at Melbourne.—Respectfully, WERNER A. STILLE.

ST. LOUIS, JANUARY 25, 1892.

[These things are worth saying; albeit the first question, upon which our correspondent so lightly expresses himself, involves points of high debate among those who of late years have studied the problem of genius. We shall return to some of these in a notice of Lombroso's 'Man of Genius.' Meantime, we remark that Kepler, with all his advantages, did but one great work, and that that was by no means the sort of thing a college tutor "would find time enough" to toss off.

As to the teaching of the two important branches of mathematics to which Mr. Stille refers, we derive the following information, relating chiefly to the year 1888-9, from Prof. Cajori's document on the 'Teaching of Mathematics in the United States.' The Theory of Functions was the subject, at the Johns Hopkins University, of several courses: at Cornell of a two-years' elective course, with sessions thrice a week one year, twice a week another; at Harvard of an advanced course; at Princeton of a University course; at Madison of a "special advanced elective" (possibly not taken). Projective (modern synthetic) Geometry was the subject of a course at the Johns Hopkins; at Cornell was *required* for some students, elective for others; at Ann Arbor was studied (and *really* studied, as we happen to know) from Reye's admirable treatise; and at the Universities of Texas (where Cremona's charming book was used), Virginia, and South Carolina formed the subject of post-graduate lectures or examinations. This, though a poor showing, yet makes a beginning.—ED. NATION.]

54 (11 February 1892) 116

THE NON-EUCLIDEAN GEOMETRY

Geometrical Researches on the Theory of Parallels.

By Nicholaus Lobatchewsky. Translated from the original by George Bruce Halsted, A.M., Ph.D., ex-fellow of Princeton College and Johns Hopkins University, Professor of Mathematics in the University of Texas. Austin. 1891.

CSP, identification: MS 1365; Haskell, *Index to* The Nation. See also: Burks, *Bibliography; List of Articles.*

Nikolai Ivanovich Lobachevski (1793-1856) was a Russian mathematician. He demonstrated his genius in mathematics at the University of Kazan, where ultimately he became president. He published his geometry in 1829, after holding it back for several years. Philosophically, the development of non-Euclidean geometry shattered the notion of self-evident truth in its most secure stronghold, mathematics.

George Bruce Halsted (1853-1922) was a mathematician of considerable fame. He took his Ph.D. from Johns Hopkins in 1879 (where he was the first student of J. J. Sylvester), and in 1884 moved to the University of Texas, where he assumed the post of professor of mathematics. While at the University of Texas, he published 25 books on mathematics, and authored numerous articles for journals such as *The Monist*, *The Educational Review*, and *The Popular Science Monthly*.

Lobachevski's little book, 'Geometrische Untersuchungen,' marks an epoch in the history of thought, that of the overthrow of the axioms of geometry. The philosophical consequences of this are undoubtedly momentous, and there are thinkers who hold that it must lead to a new conception of nature, less mechani-