sible instances in which the order of T is 8.   Hence we observe that the required group is the well known simple group of order 168.

It is known that there are abelian groups which cannot be groups of cogredient isomorphisms.* Suppose that the group of cogredient isomorphisms H of a given group G is Hamiltonian.   Each of the operators of G which corresponds to identity of H is self-conjugate in G.   Since the non-identity commutator of H is some power of each one of a set of generators of H, all the operators of G which correspond to it must also be self-conjugate in G.   As this is clearly impossible, it follows that *a Hamiltonian group cannot be a group of cogredient isomorphisms*.   In fact, the preceding arguments apply to all groups which contain an operator different from identity, which is some power of each one of a set of generating operators.   Hence such a group cannot be the group of cogredient isomorphisms of any group whatsoever.

CORNELL UNIVERSITY,
    February, 1900.

LOBACHEVSKY'S GEOMETRY.

Nikolaj Iwanowitsch Lobatschefskij.   Zwei Geometrische Abhandlungen aus dem Russischen übersetzt, mit Anmerkungen und mit einer Biographie des Verfassers von FRIEDRICH ENGEL.   Leipzig, B. G. Teubner, 1899.   8vo. xvi + 476 pp.

This volume is the first in the series of the "Urkunden zur Geschichte der Nichteuklidischen Geometrie" planned by Friedrich Engel and Paul Stäckel in continuation of their "Theorie der Parallellinien von Euklid bis auf Gauss." The present work on Lobachevsky has been undertaken by Engel, while a volume on the two Bolyais by Stäckel is soon to appear.   All geometricians will welcome the opportunity thus afforded of becoming fully acquainted with the writings of these men, who share with Gauss the honor of being the first to break loose from the authority of Euclid and to show that the latter's axiom concerning parallel lines is not only incapable of proof but entirely unnecessary in a logical geometry which fully explains all facts of experience.   The earlier works of Lobachevsky have been until now locked up in the original Russian and their contents

Comptes rendus, vol. 130, 1900, p. 316.