

On the evening of the first day of the session the members present dined together at the Avenue House and a very enjoyable hour was spent.

The next meeting of the Section will take place during the spring of the current year, of which due notice will be given.

THOMAS F. HOLGATE,
Secretary of the Section.

THE PHILOSOPHY OF HYPERSPACE.

*PRESIDENTIAL ADDRESS DELIVERED BEFORE THE AMERICAN
MATHEMATICAL SOCIETY AT ITS FOURTH ANNUAL
MEETING, DECEMBER 29, 1897.*

BY PROFESSOR SIMON NEWCOMB.

THERE is a region of mathematical thought which might be called the fairyland of geometry. The geometer here disports himself in a way which, to the non-mathematical thinker, suggests the wild flight of an unbridled imagination rather than the sober sequence of mathematical demonstration. Imaginative he certainly does become, if we apply this term to every conception which lies outside of our human experience. Yet the results of the hypotheses introduced into this imaginary universe are traced out with all the rigor of geometric demonstration. It is quite fitting that one who finds the infinity of space in which our universe is situated too narrow for his use should, in his imaginative power, outdo the ordinary writer of fairy tales, when he evokes a universe sufficiently extended for his purposes.

The introduction of what is now very generally called hyperspace, especially space of more than three dimensions, into mathematics has proved a stumbling block to more than one able philosopher. The question whether a fourth dimension may possibly exist, and whether it can be legitimately employed for any mathematical purpose, is one on which clear ideas are not universal. I do not, however, confine the term "hyperspace" to space of more than three dimensions. A hypothesis which is simpler in its fundamental basis, and yet seems absurd enough in itself, is that of what is sometimes, improperly I think, called curved space. This also we may call hyperspace, defining the latter in general as space in which the axioms of the Euclidean geometry are not true and complete. Curved space and space of four or more dimensions are completely dis-