Table for Comparing the Physical Properties of the Aether with well known Terrestrial Gases.

Gas	Mean velocity of molecule $\bar{v}$	Molecular wt. ($H = 1$)	Coefficient of viscosity $\varkappa$ at 0° C.	Mean free path $l = 3\varkappa/\rho\bar{v}$	Collisions per second $c = \bar{v}/l$ — 8 percent, for collision rebound	Radii of molecules calculated by four independent processes, except in the case of the aether
Aether	47 123 900 000 cms	15.56×10^{-12}	1800	57 295 900 000 cms = 572959 kms	0.82	2.537×10^{-12} (= 1/4005 of H)
Air	49800 »	14.43	0.0001724	0.0000059 cms	7765×10^{6}	1.86×10^{-8}
Hydrogen	185900 »	1	0.0000867	0.0000116 »	14743×10^{6}	1.34×10^{-8}
Helium	132113 »	1.98	0.0001889	0.0000171 »	7108×10^{6}	1.11×10^{-8}
Oxygen	46100 »	16	0.0001896	0.0000063 »	6732×10^{6}	1.81×10^{-8}
Nitrogen	49200 »	14	0.0001660	0.0000057 »	7941×10^{6}	1.90×10^{-8}
Argon	41527 »	19.96	0.000210	0.0000063 »	6064×10^{6}	1.81×10^{-8}
CO	49700 »	14	0.0001626	0.0000058 »	7901×10^{6}	1.88×10^{-8}
CO_2	39600 »	22	0.0001410	0.0000040 »	9108×10^{6}	2.28×10^{-8}
Chlorine	31262 »	35.36	0.0001287	0.0000029 »	9874×10^{6}	2.68×10^{-8}
Steam H_2O	62000 »	9	0.0000912	0.0000040 »	14260×10^{6}	2.27×10^{-8}

As was first clearly shown by *Maxwell*, viscosity is due to the molecular resistance developed when one layer of gas slides over another. In the case of such a superfine gas as the aether the viscosity passes into rigidity; the processes for establishing this transition of viscosity into rigidity is explained in *Daniell*'s Principles of Physics, 3rd ed., 1895, p. 227, and the theoretical basis of *Maxwell*'s theory of viscosity is notably improved by *Jeans*, Dynamical Theory of Gases, 2nd ed., 1916.

As the aether is a gas made up of corpuscles 4000 times smaller in diameter than a hydrogen molecule, and having only 15.56 millionths of a millionth of the mass of the hydrogen molecule, we readily see why this superfine medium pervades all gross bodies. But as the aether is the ultimate medium of the universe, and is not underlaid by anything finer, we also perceive that energy carried in such a medium cannot be dissipated, because there is no finer medium to which wave energy might be given up. Thus it follows that *Larmor*'s argument (in the article Aether, Encyc. Brit. 11th ed., 1911), to the effect that aether is not molecular, is not well founded. There is no valid objection to a corpuscular aether, such as was conceived by *Newton*, 1721, and approved by *Preston* and *Maxwell*, 1877. The kinetic theory of this superfine gas is here worked out in somewhat greater detail, and we see that quite unexpectedly it affords the most substantial physical ground ever developed for the most fundamental of all physical doctrines, namely, the conservation of energy.

Somewhat more detailed explanation of the processes of calculation used to derive the high molecular velocity of the aetheron are given in section 6 below. At present we need only point out the obvious advantages of having before our minds definite numerical results which show what manner of gas the aether is.

6. The excessively high molecular velocity of the aetheron, its long free path, and small mass, with radius only one four-thousandth of that of a Hydrogen molecule, ensures both great elasticity and great power of penetration to the aether.

The extraordinary elastic properties of the aether are due mainly to the excessively high velocity of the aetheron, its long free path, and small mass, with a radius of only one four-thousandth of that of a Hydrogen molecule. As far back as 1845, *Stokes* recognized (Trans. Camb. Phil. Soc., 8.287), that the aether is similar to well known solids, but has their physical properties in an accentuated degree. Thus ice, treacle, pitch, beeswax, molasses pulled for candy, and other substances are fluid for slowly acting forces, allowing hard bodies pressed into them to pass through without any fracture, by a gentle yielding or flow of the substance; but yet when struck violent blows these bodies vibrate like elastic solids, and may be fractured like glass or other brittle substances.

It thus appears that a solid is one which does not yield readily to the forces applied to it, and the resistance to change of shape with time measures the rigidity. All bodies, however, yield to forces in some degree. Now in the case of the aether the corpuscles have the enormous velocity of 471239 kilometres per second, as already pointed out: and in comparison with such tremendous speed, all earthly velocities are trivial. Even the velocities of our swiftest planets, like Mercury and Venus, are exceeded 10000-fold by the extreme swiftness of the aetherons. In addition to their rapid motion, they have the immensely long free path of 573000 kms, nearly one and a half times the moon's distance.

The enormous velocity of the aetheron and the great length of the mean free path makes the aether unique among all physical bodies. For rapidly acting forces it vibrates and transmits waves with a velocity of 300000 kms per second, and is capable of exerting the most tremendous stresses, such as are required for holding the planets in their orbits; but for slowly acting forces yields without resistance, because its own molecular motions are so rapid. The particles, travelling with such extreme velocity, get out of the way of all moving bodies -- absolutely without hindrance, when the bodies move uniformly; and offer but slight resistance for changing velocity of movement due to acceleration or retardation.

It is recognized that the viscosity of gases, as determined by the diffusion experiments of *Loschmidt*, *O. E. Meyer*, *Maxwell* and others, depends on the molecular friction of the moving molecules projected from one layer of gas into another adjacent layer, when two layers are slid relatively