

penetrate, they undo one another as far as possible at every point of the wave.

Thus the larger waves tend to collapse and the smaller waves run through air; and this collapse or contraction gives rise to pulling. Such a contraction of the ether between the bodies is what we call attraction. The action when the ether contracts is like that of a stretched piece of India rubber—it pulls the bodies together, by forces depending on the two magnets, their size and power, or degree of perfection of magnetization.

It is shown in the Wave-Theory (A. N. S. p. 55) that the light travels 904,000 times faster than sound, from which it follows that the aether is 689,321,000 times more elastic than air in proportion to its density. This number is enormous, and as the waves travel in free space with the velocity of light, and accumulate over by mere superposition, in proportion to the mass, or the number of atoms from which the waves proceed, we perceive that the action will depend directly on the mass, as in Newton's law of gravitation. Moreover, the intensity of the force will vary inversely as the square of the distance. This gives, therefore, a perfect explanation of the attraction of magnets which present opposite poles.

Let us now consider the cause of repulsion, when like poles are presented, which is exhibited in the second case on the right, in the same diagram. In this second case the waves from (B) rotate in the same sense as those from the larger magnet (A). When such waves interpenetrate, with the superposed rotations at every point in the same direction, the set of waves adds to the amplitudes of the other set; and the result is increased agitation of the ether, which thus tends to expand this medium between the two bodies. This expansive tendency of the ether thus gives rise to repulsion, and the magnets tend to push one another apart. Thus we have a simple explanation of repulsion when like poles are presented.

Accordingly, we have a simple explanation of both attraction and repulsion, which no one has been able to devise before. An explanation based on waves which is simple and direct has so much to commend it that we may pronounce it the true cause of the phenom-

enon. It thus appears as if we have at last discovered the cause of magnetism, and finally of electrodynamic action and universal gravitation.

An experiment by Dolbear (*Matter, Ether and Motion*, Boston, 1894, p. 95) throws great light on the tendency of Faraday's lines of force to shorten themselves.

"If a dozen disks five or six inches in diameter are set loosely an inch apart upon a spindle a foot long, so that they may be rotated fast, yet left free to move longitudinally upon the spindle, they will all crowd up close together as the pressure is less between them than outside. If one can imagine the spindle to be flex-

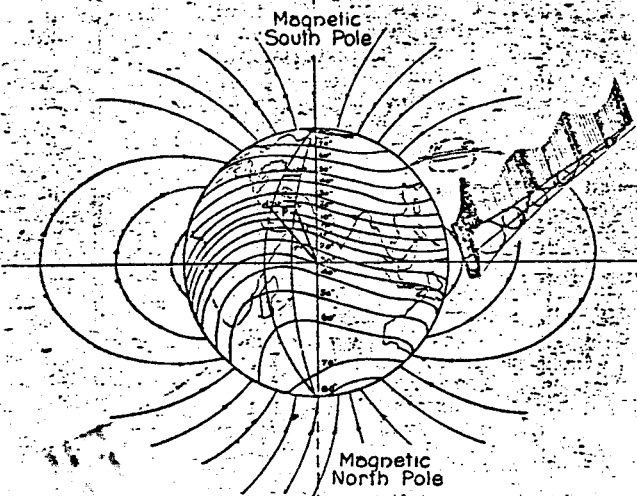
air exhibits the phenomenon in question."

Now, according to the wave-theory, every line of force about a magnet is an axis of a rotating filament or ether vortex, and thus the lines of force tend to shorten themselves, as in Dolbear's experiment. The lines of force in the form of circles surround a wire bearing a current, which means that the wave rotations are flat in the planes passing through the axis of the wire. This arrangement is shown in figure 2. And as the magnet also sends out waves flat in the equatorial plane, at right angles to the magnetic axis, we see why a magnetic needle sets itself at right angles to the axis of the wire bearing the current, as first noticed by Oersted in 1819.

If we examine figure 2 we notice that the rotations in the waves above are opposite to the ones below. Hence, when two currents flow in the same direction the collapse of the ether waves between the wires causes the wires to attract, which conforms to observation. When the currents flow in opposite direction the rotations of the waves between the wires are in the same direction, and by the increase of amplitude thus arising, the ether expands itself, so that the wires repel, in accordance with observation.

Accordingly, waves are the cause of electrodynamic action. It only remains to add figure 3, to illustrate the wave field of the earth's magnetism. It should be noted, as shown by Gauss, 1838, that the waves receding from the earth depend on 1/1380th part of the atoms

of our globe. These atoms are lined up in parallel planes—the other 1379/1380ths being arranged with their planes lying haphazard, and producing the central action of gravitation. With the rotations of their waves directed so as to harmonize mutually, the compass needle lies in the hollow of the receding earth waves, and thus pointing steadily to the Pole, guides the mariner safely over the trackless sea. This gives a very direct and simple explanation of the earth's magnetic field. The wave field about the globe is so very beautiful to behold that we cannot but regret it was not made known to us long ago. But who will show it to us?



3. Magnetic field of the earth, showing how exactly it compares with the ether waves already illustrated and described

able and the ends brought opposite each other while rotating, it will be seen that the ends would exhibit an apparent attraction for each other, and, if free to approach, would close up, thus making a vortex ring, with the sections of the disks. If the axis of the disks were shrinkable, the whole thing would contract to a minimum size that would be determined by the rapidity of the rotary movement, in which case not only would it be plain why the ring form was maintained, but why the diameter of the ring as a whole should shrink. So long as it is rotated it would keep up a stress in the air about it. So far as the experimental evidence goes, it appears that a vortex ring in the