

the shadows cast on the screen, soon determined the relative transparency of many substances to the "rays," he concluded that they were not the Kathode rays themselves, but emanated from those parts of the glass that were caused to fluoresce; that they were probably incapable of refraction, or of *regular* reflection, though he found evidence that metals and glass could produce a scattered reflection, as a white wall does with ordinary light. The paper, which is a model of scientific caution, condensation and accuracy, details researches on many other points, such as the susceptibility of the rays to magnetic and statical electric influences, to polarization and to interference, and ends with the very interesting but guarded suggestion that we may here be at last in presence of those longitudinal vibrations of the æther which many physicists have held must accompany the transversal vibrations (*i.e.*, those at right angles to the ray) which constitute ordinary and polarized light, though hitherto they have not been detected.

Near the end of this admirable paper about twelve lines are devoted to some curious photographs or "silhouettes," obtained by making use of the fact that certain substances are much more transparent than others to the Roentgen rays.

It happens that metals and bones are much more opaque than ebonite, wood, paper, flesh and liquids. Hence, Dr. Roentgen says, he has obtained pictures of wires upon a bobbin, weights inside a box, and the bones inside his hand; and he modestly suggests that there will be useful applications in surgery. Lead being the metal usually fired into human bodies, is fortunately one of the most opaque substances and casts a very black shadow. Hence the possibility of locating bullets, or observing malformations or fractures in the bones.

It is this startling aspect of the discovery which has seized on the popular imagination, and led to all kinds of wild speculations on the part of those who failed to understand the first brief reports of Dr. Roentgen's results. When further research shall have increased the sensitiveness of this process as much as the modern dry plate exceeds in speed and brilliance the slow and misty daguerrotypes of the early photographers, there is no reason to despair of obtaining pictures, at least in outline, of those organs of the living body (and their contents) which are not hidden behind too great a thickness of bone. For the present we must be content to obtain, by a long exposure, a shadow of the bone or foreign substances divested of the surrounding flesh. The process simply consists in placing the object to be pictured between a Crookes tube and a sensitive plate enclosed in an ordinary plate holder, or, better, in black and orange paper. The operation is