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Just how these are arranged is not yet perfectly certain, but it seems probable that the hydrogen atom consists of a central heavy, very small mass of positive electricity and an associated negative electron which is very much larger in size, but much less massive. The helium atom consists of such a central positive charge and two negative electrons. Then, when we come to heavier and heavier atoms we have more and more of these satellites. The motions of these satellites give us light and kindred radiations. Of course, when the atoms vibrate, the motion of vibration is shared by the electrons, so that the radiation from the atom is affected by the temperature. In other words, while the motion of the electron in a sense is independent of the motion of the centre of the atom, it is influenced by it. Hence, if we can cool bodies to approximately absolute zero, we may reduce the motion of the electrons to relatively simpler paths. No doubt, gravitation, chemical affinity and other types of force between bodies will turn out to be due to the properties of these electrons. So development of low temperature research holds great promise for the unravelling of some of Nature's secrets. It is not strange then that at Leiden the greater part of the time is spent on the study of materials at low temperature. It requires, however, expensive equipment and a high degree of technical skill and can be done at only a very limited number of laboratories. which are especially fitted for such work. Sir James Dewar in London, Linde of Berlin, Kamerlingh Onnes at Leiden, Olzewski and Wroblewski in Russia, and Pictet and Cailletet in France have had such laboratories. There are none on this continent.

Before turning our attention to actual accomplishments, we may examine how the temperature is measured when it is so low. The electrical resistance of metals increases as the temperature rises and the amount of this change may be used used as a measure of the temperature. [Experiment shown]. Also the pressure of a gas increases with the temperature since the motion of the particles becomes more energetic, as the temperature rises. Hence, this change in pressure may be utilized to measure the temperature. [Experiment shown]. The difficulties increase as the temperature becomes lower,

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