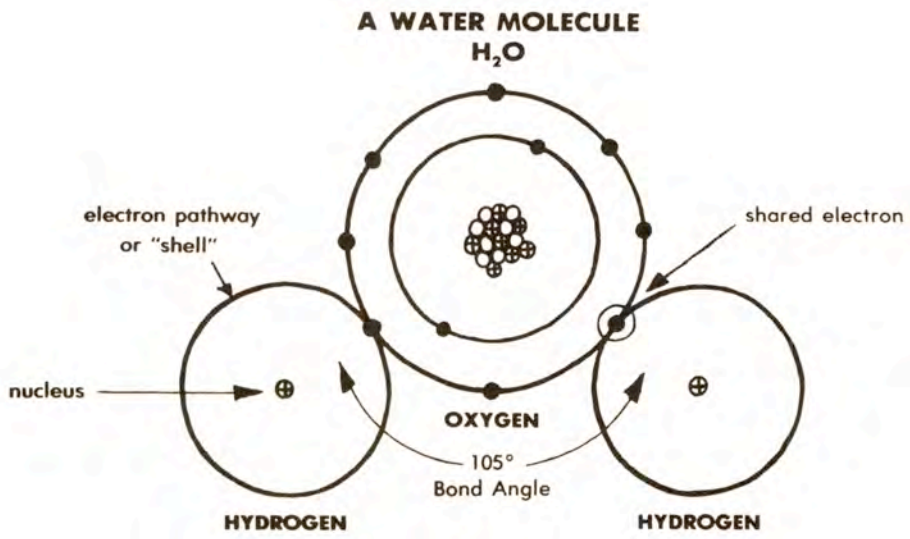

FIGURE 2.3.

A molecule of water (H20). Chemical combinations of elements are made possible either by the exchanging or sharing of electrons. If the *force of attraction* between the electron and proton were much stronger than it is in our Universe, the electrons would be pulled inside the nucleus of each atom. Chemical bonding of atoms into molecules such as water would consequently be impossible. Even the bond angle of 105° is very specific so that water remains a liquid within a relatively narrow temperature range.

universal properties -- that makes life possible here on Earth. We are talking not just about unique conditions on the planet Earth, but about the fundamental laws and properties which science believes govern the entire Universe.

Consider just a few of these so-called "natural laws" or "natural properties" or values which we take for granted. Let us first consider the world of the atom.

Atoms are composed of protons, neutrons, and electrons (see figure 2.2). Protons carry a positive charge (+) and electrons a negative charge (-). Neutrons are electrically neutral. Positive and negative charges are attracted to each other. Like charges repel each other.

One of the early mysteries of atomic physics was the nature of the force that kept two or more protons packed together in the nucleus. Their positive charges repel each other. It was like putting two male lions together in a single cage. Add more male lions and the action really heats up. In this same manner, the protons should be fighting to get away from each other. The cage keeps the male lions together. What keeps the protons together in the atomic nucleus?

The Nuclear Force. Nuclear physicists call the force that binds the protons and neutrons into the atomic nucleus the nuclear force (also known as the "strong" force). Without the existence of this mysterious force, the nucleus of an atom would simply explode like an atomic bomb.

The strength of this nuclear force is one of the basic values that is