i. Juridical and scientific laws

In the previous chapter I used the term ‘law’ exclusively in the sense of a scientific law. That is, roughly speaking, as a descriptive statement of coherence in the behaviour of real-world entities that has been derived by inductive reasoning from observations. But it is convenient at this stage to interrupt the discussion of Comte’s thesis to note that ‘law’ also has a juridical sense. This, again roughly speaking, is the sense of an authoritative prescription governing or authorizing conduct. In every language that I know there is a single term reasonably equivalent to ‘law’ that similarly encompasses both the scientific and juridical senses. Moreover, in all these languages the juridical sense was conceptually and linguistically prior to the scientific, by many centuries.

The term ‘law’ in English originated with the sense of placing or setting down. It soon derived the sense of a commandment that is set down by authority, human or divine.\(^1\) Thus, the first sense was essentially juridical law. However, in so far as divine authority had not only prescribed human conduct but also ordered the material universe, it was easy to extend the notion of divine law to encompass the material universe. ‘The “laws of nature”, by those who first used the term [“laws”] in this sense, were viewed as commands imposed by the Deity upon matter.’\(^2\) This was typically the medieval view of the universe, as based on the Aristotelian scheme supported by the Roman Catholic Church. It rested squarely on the structural premise of a perfect deity as the creator of the universe, and permitted the deduction of laws of nature.

This premise was particularly fruitful in astronomy. An immediate deduction was that a perfect deity would create perfect celestial bodies and ordain that they move in perfect figures. Since the circle was the
most perfect figure, the orbit of any planet must be a circle. (The scheme was later modified to improve the fit with observational data, but the modified scheme retained the perfection of circles.) Moreover, since the earth was central in the divine scheme and the planets were perfect as celestial bodies, the earth must lie at the centre of every circular planetary orbit. These then were laws of nature derived from the basic structural premise. They provided a coherent worldview resting firmly on fundamental postulates about the inherent nature of things.

But it took some time before ‘law’ came to be used for the results derived from scientific investigations. To understand why, consider some crucial results of the early seventeenth century derived from astronomical observations: Kepler’s three famous discoveries regarding planetary motion. It is enough here to consider the first of these, that the planets travel not in circles about the earth as centre but in ellipses about the sun as focus. Nowadays we call this Kepler’s first law of planetary motion, but it is not surprising that at the time it did not in itself suggest extrapolating ‘law’ from the juridical to the scientific context. While its close fit with observational data rapidly won it widespread acceptance, it did not provide a structural sense of the universe. Kepler offered no profound explanation for elliptical orbits, which therefore appeared as an inexplicable isolated fact that contradicted the Aristotelian scheme without offering a viable alternative to it.

Scientific astronomy could compete with the Aristotelian scheme only when it began to produce deeper results that revealed structural coherence in the universe. The most important of these was the conclusion, largely due to Isaac Newton, that the gravitational attraction between two bodies is inversely proportional to the square of the distance between them. This offered a coherent fundamental principle that could readily be seen as the manifestation of a divine prescription, and thus in terms of the action of a law. Via this route the sense of ‘law’ was extrapolated from the juridical to the scientific context, beginning in the latter part of the seventeenth century and becoming established in the eighteenth. Newton’s conclusion itself quickly became known as the inverse-square law of gravitational attraction. Newton later succeeded in deriving Kepler’s conclusions from the inverse-square law, whereupon they took their place within a comprehensive schema and were also regarded as laws.

In the seventeenth century the fledgling scientific approach surely gained social and political credibility by this association with the established prestige of law. It must also have gained intellectual credibility, as this association would have suggested that a scientific law applied