Since its very beginning mathematics was deeply related to logic and ontology. Greek mathematicians consciously applied the contradiction principle and had a clear idea of the soundness of *modus ponens* and of the implicational transitivity of deduction. When Pythagoras (or the Pythagoreans) demonstrated the irrationality of $\sqrt{2}$ by applying the method of *reductio ad absurdum*, Greek mathematics was already quite developed. It must be signalled that in this first clash between mathematics and logic, nobody thought that the culprit was logic. Greek mathematicians never thought that it was logic and not mathematics that had to be readjusted. This spontaneous attitude among the ancients, has prevailed up to the present times\(^1\). When a strange or paradoxical result was obtained through mathematical reasoning nobody thought that logic had to be readjusted or even radically changed. Without this conception of logic (naive but based on very strong intuitions), the creation and development of set theory would have been impossible and, consequently, the project of finding a trustable foundation for classical mathematics (or, perhaps, it would have taken place many years later).

The inexpressibility by means of rational numbers of $\sqrt{2}$, was the first known crisis of mathematical science. Some modern mathematicians and philosophers of mathematics think that the shock produced by the discovery of irrational numbers was so great that the old way of making mathematics, based only on intuition, and piling discoveries one after the other, was the deep motivation that led Euclid to create the axiomatic method (nobody knows if Euclid's systematization had antecedents)\(^2\). It must be signalled that the demonstration of this fundamental theorem could never have taken place without the application of the contradiction principle. On the other hand, the Pythagoreans believed that God was number, that numbers had geometrical forms (for instance, the holy tetractys was pyramidal). And they also thought that the underlying real-
ity was rational and that it consisted of numbers. The history of mathematics shows, indeed, that logic, mathematics and ontology were born tightly imbricated.

We will skip the Middle Ages and concentrate our analysis on European logic and mathematics. During the Renaissance mathematics and ontology reappear deeply related. For Leonardo da Vinci and Galileo nature is an open book whose language is mathematical. Although they didn’t make explicit reference to logic, they implicitly presupposed it. There is no doubt that both of them, but particularly Galileo, were fully conscious that logical deduction was a fundamental component of mathematics and physical science. In several texts Galileo explicitly refers to theorems and corollaries that are justified through "deduction".

After Galileo’s discoveries, mathematics and physics (theoretical and experimental) underwent a bewildering progress. It can be said, without exaggerating, that there was a kind of creative orgy. But contradiction lurked in the very foundations endangering, as a Damocles sword, the whole edifice. Infinitesimal calculus, the leading theory, considered as the fundamental discipline, freely employed the concept of "infinitesimal", created by Leibniz and, since the beginning of modern mathematical science, it was patent that this concept was contradictory. The same can be said of the Newtonian fluxions (although perhaps not as clearly, compared with the "infinitesimals")5. But, in spite of this disturbing fact, mathematics and physics burgeoned with new ideas. This flourishing can be compared with the situation of Greek mathematics when Pythagoras (or the Pythagoreans) discovered the mathematical existence of irrational numbers. But this awareness did not hinder the formidable theoretical impulse awaken by the creation (or discovery?) of the infinitesimal calculus.

However, around the end of the XVIII century the leading mathematicians were deeply worried about the fact that in its ultimate foundations mathematics was inconsistent. Why? It is difficult to find an answer. But I think the following hypothesis can function rather well. The power and fecundity of logical deduction, when the inference is followed long enough, frequently leads to unexpected conclusions. These conclusions