The preceding chapter examined how the AO network enabled a special type of communication among surgeons. But even more remarkable, as this chapter shows, was the interactive exchange it created between science and industry. This unique form of cooperation, which has aptly been called a symbiosis by those involved, was centred on the production and marketing of the AO equipment. I have therefore thought it appropriate to begin with a historical outline of the general problems concerning the materials used in osteosynthesis, in reaction to which the AO set about developing its own instruments and implants. I will then explain how the specific type of symbiosis between the AO’s manufacturers, surgeons and scientists came about and what it consisted of, placing special emphasis on the balance of interests and power inherent in that special arrangement. At the end of the chapter I will describe the basically sceptical reaction of the surgical world to the AO upon its first public appearance, which set the terms for the AO’s ensuing attempts at self-defence.

The issue of osteosynthesis material

Even a virtuoso, the AO surgeons wrote in their 1963 textbook, cannot hope for perfect results in surgery unless he has the appropriate instruments. As much as the early AO emphasised the individual surgeon’s skill and knowledge as a prerequisite for successful osteosynthesis operations, it also recognised the significance of having the right equipment.

In the early stages of osteosynthesis, surgeons tended to use whatever material they had at hand. They employed biological materials such as bone, ivory and horn in the hope that these would eventually be assimilated by the body. But they also tried iron, gold, silver and platinum, often in combination. Many surgeons bought nails, screws, pins and plates in general
hardware stores, but these materials often corroded and broke or caused tissue reaction.

Such attempts increased awareness of the need for appropriate materials. In the later nineteenth and early twentieth centuries numerous articles and books described the influence of metals on bone healing and on body tissues in general. Scientists performed laboratory studies that showed the adverse effects of electrolytic phenomena resulting from the combination of different metals within live tissue. From the 1920s on, the search for suitable materials focused on iron compounds, such as the vanadium steel alloy introduced by the surgeon William O'Neill Sherman in 1912. New varieties of stainless steel, which the industry was in the process of developing at that time, would prove to be essential for the introduction of Gerhard Küntscher’s intramedullary nailing procedure.

Despite the improvements in science and metallurgy, osteosynthesis equipment remained poor in quality. The lack of standardised material was still considered the primary reason for the technique’s bad reputation. One of the main complaints was directed at the instruments’ makers for their failure to provide a system of compatible instruments and implants. Besides compatibility, another longstanding cause of trouble was the lack of quality control of instruments and implants used in bone surgery.

William Arbuthnot Lane, for instance, was made responsible for failures caused by the poor quality of some of the ‘Lane plates’ on the market, though he could not control the quality of the plates sold under his name, as he regretted in 1912. Whenever osteosynthesis implants went into mass production, their quality seemed to become less reliable. William Sherman demanded a ‘guarantee from the sales agent, so as to make sure that the plate is made of proper material and thoroughly tested’. His plates had fallen into disrepute when imitation Sherman vanadium steel plates made of inferior alloys had led to disasters caused by corrosion and breakage. In 1931 the US Bureau of Standards introduced a commercial standard covering the manufacture and sale of steel bone plates and screws to be used for the operative treatment of fractures. Plates and screws conforming to the specifications of these standards were packaged in sealed envelopes that bore a recognisable label.

Buying instruments and implants was a matter of trust, and surgeons had good reason to be suspicious of their instrument suppliers. When Böhler introduced femoral neck nailing in the 1930s, using nails obtained from various suppliers, he soon noticed corrosion damage in the X-ray pictures. Analysis of specimens revealed considerable variance in the metal used as well as in the quality of workmanship. In their 1947 osteosynthesis textbook the Americans Venable and Stuck stressed that, being unable to perform chemical tests to determine the composition of the material himself, the individual surgeon ‘was at the mercy of the salesman’ concerning the composition of the implants he bought. They demanded supervision and