An intellectual paradigm shift similar to the Italian Renaissance also took place in northern Europe. The Northern Renaissance loosely corresponds to the period 1380–1580 (1, 2). Its early phase, before 1500, is also known as the Late Gothic. In Italy, the Renaissance was essentially a cultural rebellion against Byzantine influence, a return to the Roman past, and the rise of humanism. In the North, the humanist element gained prominence, and the initial period was less focused on connecting with ancient Roman culture.

Art in Northern Europe started to transform at the end of 14th century. The highly decorative style known as the International Gothic started to evolve toward realism. Even biblical scenes were painted in contemporary-looking spaces. Portraiture emerged: realistic modeling of the human body led to paintings that had previously unheard of resemblances to their models. The intense palette of the International Gothic became muted and more lifelike.

The pioneers of this new paradigm were the Flemish painters Robert Campin (also known as the Master of Flémalle, active from 1406–1444) and the brothers van Eyck, Hubert (died 1426) and Jan (died 1441). Their pupil Rogier van der Weyden (1399 or 1400 to 1464) painted images with a strong expressive element. In the 1430s, realism spread to France and Germany.

Europe in the 15th century was a surprisingly international place. Borders in today’s sense did not exist: the more important divider was the Alps, which separated the Italian city-states from the North. The northern merchant union known as the Hanseatic League, which existed between 1160 and 1669, included at its peak 180 towns, from the Atlantic shore to Poland and Finland and around the Baltic Sea. Bruges, Augsburg, Brussels, and Antwerp became prominent merchant cities. They maintained multiple trade links with Italian city-states, particularly Florence and Venice (3, 4).

Columbus traveled to America in 1492, and Magellan circumnavigated the globe in 1519–1522. The discoveries of new routes to the East were responsible for the steady rise of the merchant North and the relative decline of Italian cities, particularly Venice, which was now in a less advantageous position for the Eastern trade.

There was a demand for artworks in these new merchant communities. Northern artists traveled to Italy, and there was an exchange of ideas, commissions, and paintings. Toward the end of the 15th century, Albrecht Dürer (1471–1528) became one of the leading painters in Europe (5–7). Dürer was born in Nuremberg. At the age of 15, he was apprenticed to the painter and illustrator Michael Wolgemut, who was one of the pioneers of printing and woodcut design. This early contact with printing became important for Dürer’s future artistic development. During the period 1492–1494, he visited Colmar, Basle, and Strasbourg, also centers of printing.

Dürer went to Venice twice, first in 1494–1495. At that time, apart from the rich local art, Venetians were aware of all the Florentine artistic inventions, including linear perspective (3). Dürer saw Andrea Mantegna’s works in Venice and during his second visit (1505–1507) met Venice’s premier painter, Giovanni Bellini. He was greatly impressed by the social status of Venetian artists. He famously wrote home, “Here I am a gentleman, at home I am a parasite” (6).

The visit to Venice changed his attitude to work and his concept of an artist. He now defined art as a craft plus knowledge: he coined the German word for art (Kunst, derived from the verb können, to know) (8). On his return to Nuremberg he began to study languages and mathematics. He read Vitruvius on architecture (6).

Eventually Dürer wrote books on mathematics, on geometry, and on his particular interest, the theory of human proportions. The Art of Measurement appeared in 1525, whereas the Four Books on Human Proportions were published only after his death in 1528. After 1512, Dürer enjoyed the patronage of emperor Maximilian I and subsequently Charles V.

His ability to draw and paint realistic images became unsurpassed. He was able to render minute detail with extreme clarity, such as the famous Young Hare (now in the Albertina, Vienna) (9) and his iconic Self-Portrait from 1500, now in the Alte Pinakothek in
Munich (10). His crowning achievement was The Four Apostles (1523–1526), also in the Alte Pinakothek (11).

It is interesting to glimpse into Dürer’s learning processes. The so-called Dresden Sketchbook gives an insight into the laborious studies that underpinned his work. The sketchbook contains preparatory drawings for the Four Books. There are countless stereometric constructions, mannequin drawings, and detailed studies of physiognomy. He also produced anatomic drawings and studies of drapery, ornaments, and architecture (12).

Fig. 1. Albrecht Dürer.
Importanty, Dürer became engaged with a then new medium, the print, through woodcuts and engravings (13). Printing was then a true revolution: Johannes Gutenberg, working in Mainz, had invented the movable type in 1453. The woodcut had emerged earlier, at the end of 14th century. With this technique, one could produce more than 1000 replicas of an image. A more sophisticated form of print, engraving, emerged in Germany in the early 15th century, and Dürer soon became the greatest printmaker in Europe (13). His woodcuts and engravings brought him fame and traveled as far as India and America (14). His first important print work was the dynamic and violent series of woodcuts entitled *Apocalypse*, published in 1498. *Saint Jerome in His Study* (Fig. 1) was created much later, in 1514 (13, 14). St. Jerome, one of four Latin Church Fathers, translated the Bible from Greek and Hebrew into Latin (the Vulgate). The lion in the foreground is his symbol. The print shows Dürer’s mastery of this medium. Note the complex shading used to render textures and patterns. Note also how he renders the wood grain in the ceiling and the gradations of light, with the brightly lit table surface, the play of the shadows on the walls, and the volumes constituting the body of the lion.

Importantly, prints created by leading artists were often copied and replicated by others. In fact, the degree to which a print was replicated became a measure of the status of the original author. Such circulating images in effect formed an “iconographic database” shared by different artists. Portraying a saintly scholar in his study was one such template. St. Jerome was also painted by, among others, van Eyck (or his follower) in 1442 and by an Italian painter, Antonello da Messina, in 1475. It is possible that the inspiration for Dürer was shared by different artists. Portraying a saintly scholar images in effect formed an “iconographic database” to which a print was replicated became a measure. In fact, the degree to which a print was replicated became a measure of the status of the original author. Such circulating images in effect formed an “iconographic database” shared by different artists. Portraying a saintly scholar in his study was one such template. St. Jerome was also painted by, among others, van Eyck (or his follower) in 1442 and by an Italian painter, Antonello da Messina, in 1475. It is possible that the inspiration for Dürer was shared by different artists. Portraying a saintly scholar images in effect formed an “iconographic database” to which a print was replicated became a measure.

Without doubt, Dürer, similarly to Leonardo da Vinci (18), made a major contribution to the increase of the artist’s status in the culture. Throughout his career, he maintained that broad knowledge is needed, along with the perfecting of skills and grounding them in theory, for a craftsman to progress to an artist. Such a concept of a professional who is also an intellectual is less important, if at all, in contemporary art, but it may well remain important in science. In fact, it might apply to clinical chemistry of the 21st century. Clearly, the danger of succumbing to applicative routine (“craft”) without sufficient engagement in research (“knowledge”) exists in any field of science. Extending this analogy further, one might consider that the status of people working in a field that limits itself to being only craft might diminish within the biomedical culture. Some issues are truly timeless, are they not?

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