II

THE ROAD BLOCK BROKEN

THE FIFTEENTH CENTURY

PRINTS began to pervade the life and thought of western Europe in the fifteenth century. It is therefore necessary to take a glance at what we have been told about that century.

Probably the worst way there is to discover the most important thing done in any historic period is to take the word of that period for it. What to the generation of its occurrence is merely a casual happening, an amusing toy, or an impractical intellectual or physical adventure, in time frequently becomes all-important for the world.

In spite of this we are still asked to think of the Renaissance in terms of what some literary people of that time thought were the most important things it did. Thus almost every book dealing with the Renaissance says that the principal events of the fifteenth century were the recoveries of Greek thought and of the classical forms of art. This statement is so customary and is made with such an air of finality that most of us have come to believe it. And, yet, on the very face of the record, it is impossible to believe it. We have forgotten that the literary and artistic men who evolved and

told us this fairy tale were much more ignorant of the Middle Ages, and even of the Renaissance itself, than the Middle Ages were ignorant of Greek thought.

In the first place, what is called Greek thought is not a homogeneous body of doctrine and knowledge reflecting a reasoned and unified attitude towards life and the world. What remains of it is a highly accidental heap of notions and odds and ends of the most violently contradictory kinds. If you care to look for it you can find a phrase in it that can be twisted to the purpose of almost anything you want to argue on any side of any problem. The Greeks never agreed about anything; they actually knew very little; it was quite customary for them to be intellectually dishonest; their arguments were designed, not to bring out the truth, but to down the other fellow in a forensic victory; and they had very loose and careless tongues. Although we are always told that Aristotle discovered logic, it should be obvious that no one man could possibly have been its discoverer. Much of Aristotle's teaching was very illogical, and on the whole it undoubtedly hampered subsequent thought much more than it helped it.

In the second place, it is easy to forget that many of the scholastic doctrines and modes of thought which had dominated much of mediaeval thinking were specifically Aristotelian, which is to say that they were Greek. The shift away from scholasticism was not so much the result of any discovery of Greek thought as a revulsion from it. That this shift took the initial form of a limited and superficial fashion for neo-Platonism and for the exterior nudity, though not for the interior content, of Roman art, can be regarded as little more than a passing phase of the basic revolt. However important it may have seemed to certain restricted and loquacious portions of Renaissance society, this fashion in itself made singularly little difference to the part of the world that was beginning to think new thoughts and to do new things.

Contrary to what we have long been taught, the effective thinking of the Renaissance was not merely a resurrection of classical ideas. As we can see it today, the really great event of

the Renaissance was the emergence of attitudes, and kinds and objects of thought that were neither Aristotelian nor Platonic, nor yet Greek at all, but in so far as they had never attracted the attention of the writers and literary men, quite new and different. To a great extent they were the results of materials and technological problems completely unknown to the ancient world. What actually happened in the fifteenth century was the effective beginning of that practical struggle for liberation from the trammels of Greek ideas which has been the outstanding characteristic of the last five hundred years.

Passing over what the inventors, the technicians, the explorers, and the statesmen did, several events happened in the first half of the fifteenth century that are not given their due prominence in the standard accounts of the period. One of these was the pervasion of ways of making printed pictures—in other words of making exactly repeatable pictorial statements. Another was Leon Battista Alberti's enunciation, in 1435, of a method of perspective drawing, which, whether or not he or his contemporaries knew it, provided a geometrical rationalization for pictorial statements of space relationships, that was eventually to develop into a basic geometry or mathematics of a qualitative as distinct from the quantitative Greek kind. Perspective rapidly became an essential part of the technique of making informative pictures, and before long was demanded of pictures that were not informative. Its introduction had much to do with that western European preoccupation with verisimilitude, which is probably the distinguishing mark of subsequent European picture making. The third of these events was Nicholas of Cusa's enunciation, in 1440, of the first thoroughgoing doctrines of the relativity of knowledge and of the continuity, through transitions and middle terms, between extremes. This was a fundamental challenge to definitions and ideas that had tangled thought since the time of the ancient Greeks.

These things, the exactly repeatable pictorial statement, a logical grammar for representation of space relationships in pictorial statements, and the concepts of relativity and continuity,

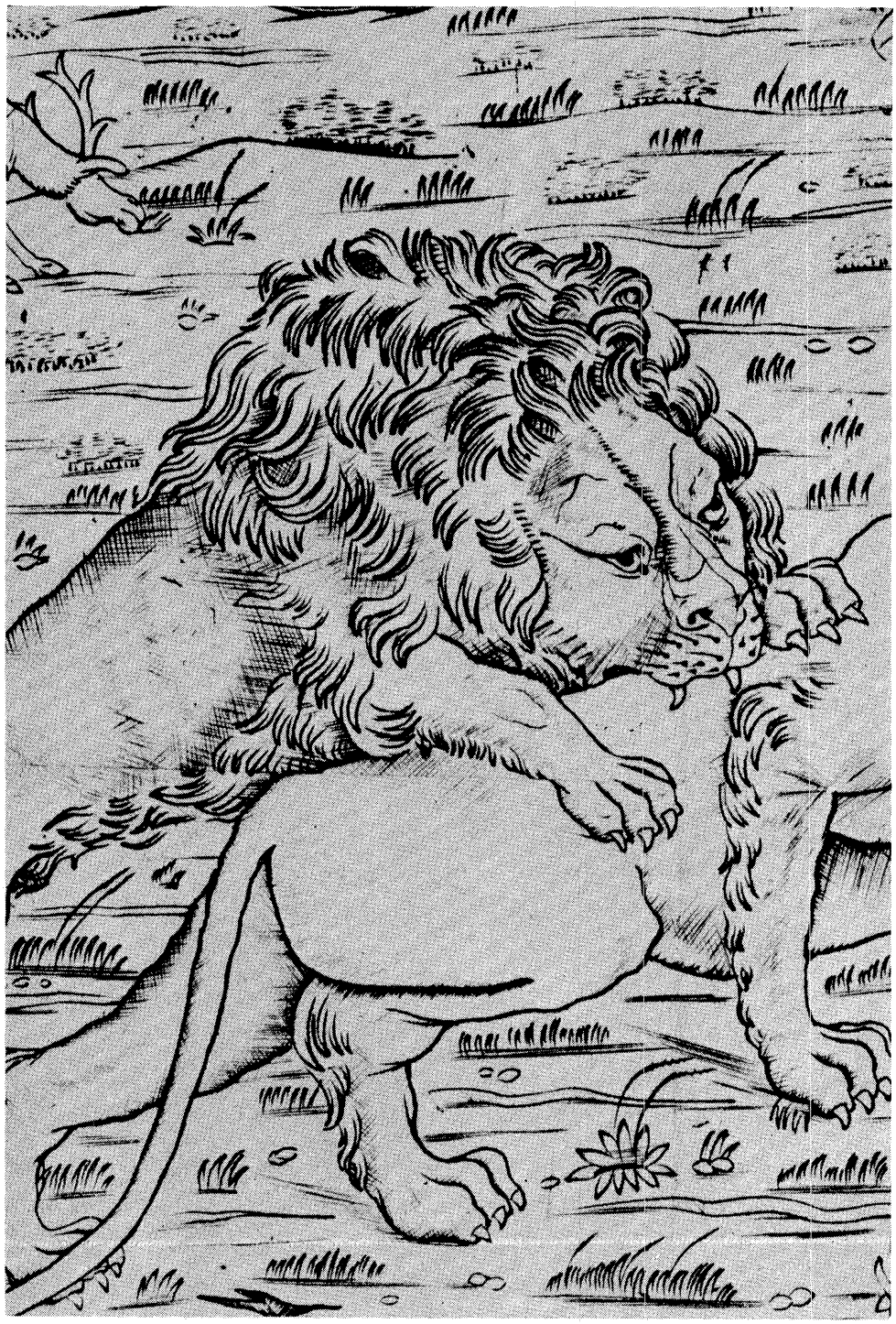
were and still are superficially so unrelated that they are rarely thought of seriously in conjunction with one another. But, between them, they have revolutionized both the descriptive sciences and the mathematics on which the science of physics rests, and in addition they are essential to a great deal of modern technology. Their effects on art have been very marked. They were absolutely new things in the world. There was no precedent for them in classical practice or thought of any kind or variety.

Now—I shall try to sketch the outlines of the development of the printed picture during the fifteenth and sixteenth centuries. In doing this I propose to regard artistic merit as a matter of subsidiary importance, and to look at the evidence from the point of view of that communication of visual information and ideas which, for the last four centuries, has been the primary function of the exactly repeatable pictorial statement.

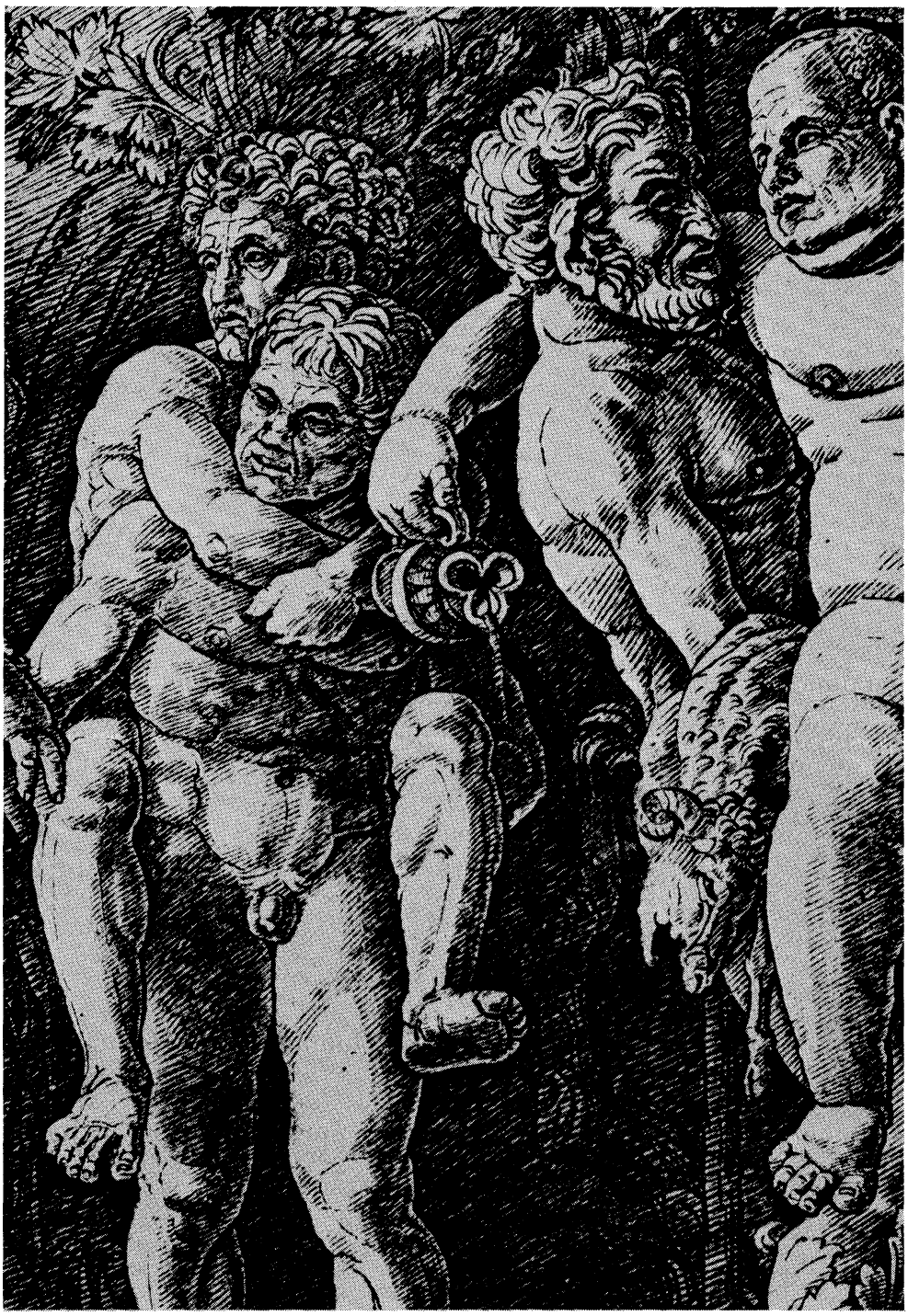
No one knows when or where in western Europe men first began to print designs and pictures from wood-blocks and metal plates. To save time and to avoid getting lost in a discussion of detail that, however fascinating, is of little importance, I may sum up the story by saying there is reason to believe that woodcuts were made before engravings were, and that both were made before etchings were. The extant evidence enables us to guess that in 1400 there were very few if any prints in Europe. The evidence also enables us to know that by the middle of the fifteenth century the making of woodcuts and engravings was widely practised in a number of European countries, and that before the end of the century etchings were being made in south Germany.

It is generally thought that, as the requisite tools, materials, and skills for the making of woodcuts were to be found in the shops of the painters and carvers, the making of woodcuts began in those shops. Similar reasoning indicates that engraving took its start in the shops of the gold and silver smiths, and etching in those of the armourers.

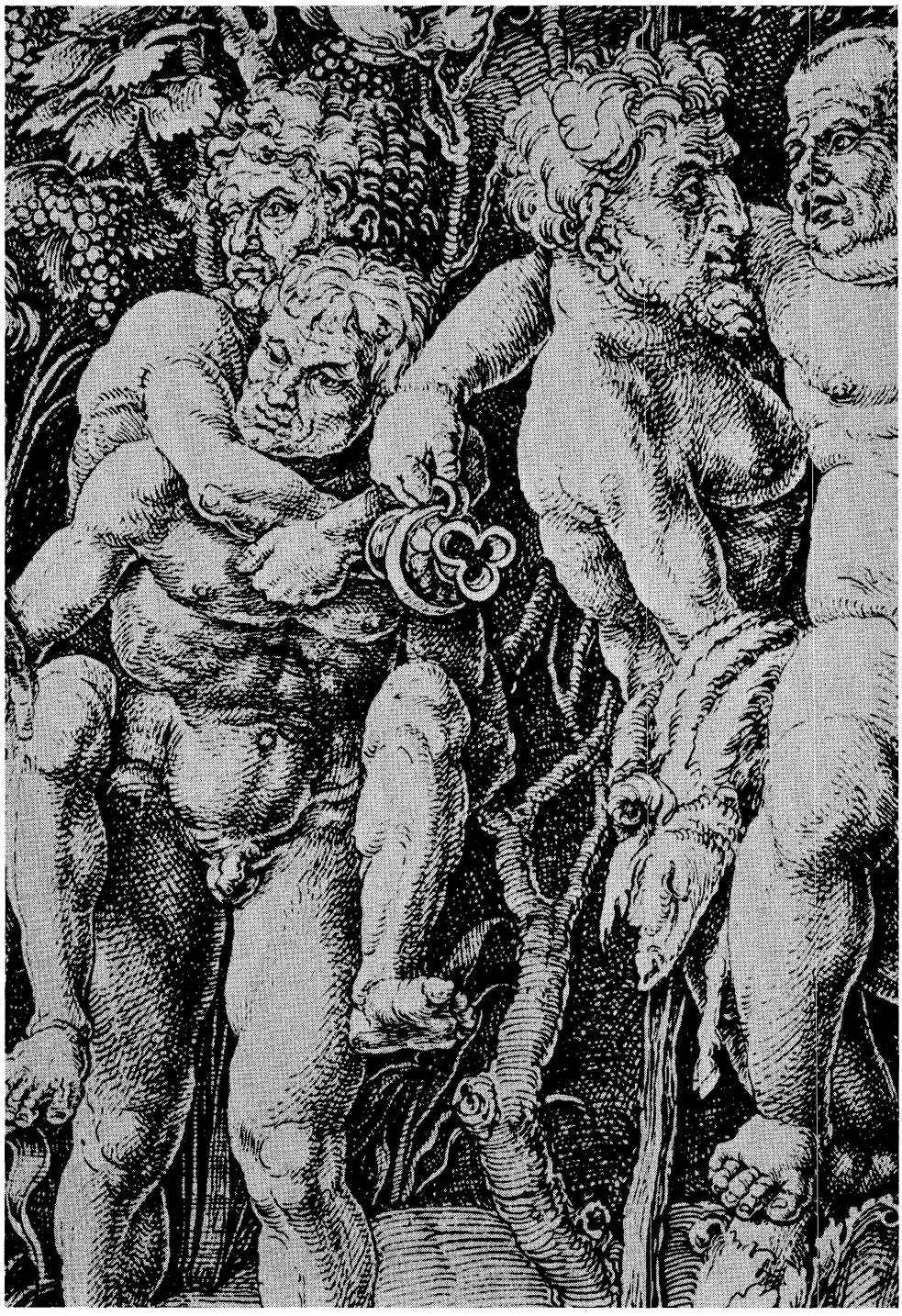
The most primitive woodcuts we have were rubbings from



5. Portion of a late impression of an early North Italian engraving of St. Jerome. Enlarged.



6. Portion of the engraved Bacchanal with Silenus, by Mantegna (1431-1506). Reduced.

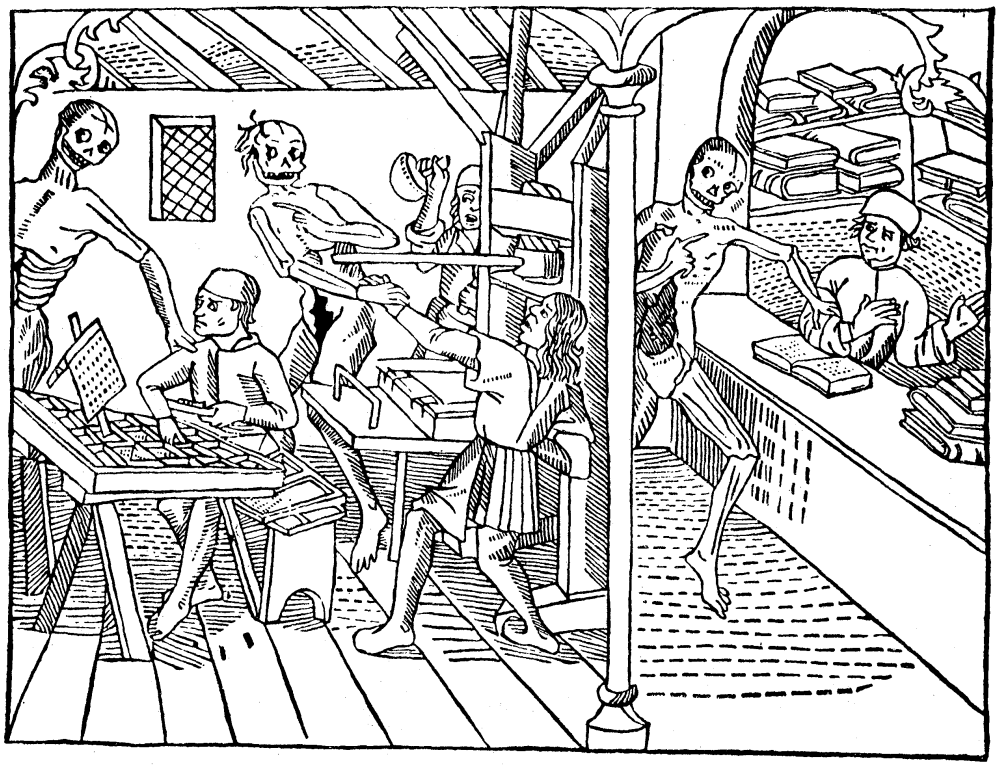


7. The same portion of a pen and ink copy by Dürer. Reduced.

8. Portion of an early Italian engraving after a drawing by Mantegna. Enlarged.

9. Portion of an early fifteenth-century woodcut of St. Christopher. About actual size.

wood-blocks and were not struck off in a press. The use of the printing press undoubtedly was known to the makers of woodcuts at least as early, if not earlier, than it was to the printers from movable types. The earliest known picture of a printing press for type or woodcuts is said to be that contained in the Lyonese *Dance of Death* of 1499. There is no technical description of one until



10. The earliest picture of a printing press. Woodcut from a *Dance of Death*, Lyons, 1499. Reduced.

almost two hundred years later. How the earliest engravings were printed is not known, but it was probably by some method of rubbing or burnishing—a method still used in goldsmiths' and gunsmiths' shops. When the roller press came into use is not known, but it was presumably some time in the middle years of the fifteenth century.

The dated prints prior to 1460 are so few in number and of such widely diverse characteristics that it is impossible to use them as evidence for the dating of the undated prints. They do not form

an integrated series. Prints of advanced and primitive technical types have always been made simultaneously, just as they are at the present time. Because of this the history of prints does not leave the realm of conjecture and hazardous connoisseurship until the first use of woodcuts as illustrations in books printed from movable types, a very large and useful number of which are either definitely dated or datable with some approximate degree of accuracy within a short period of years. After about 1460 the history of the woodcut is known to us by a long and closely integrated series of dated and closely datable documents. It is perhaps worth while to mention, in passing, that after that time the fifteenth-century woodcuts in books are in general much more interesting as works of art than are the single-sheet woodcuts.

The earliest book printed from type to contain woodcuts is said to be the *Edelstein* of Ulrich Boner, which was printed at Bamberg by Ulrich Pfister, a church dignitary and amateur printer who seems to have had no relations with Gutenberg and his circle. Pfister produced two different editions of the *Edelstein* with the same illustrations, one of them undated, the other dated 1461. It is interesting to notice that this is eleven years earlier than the date in the earliest known dated block-book.

The integrated series of engravings does not begin until somewhat later. The use of engravings for book illustrations was rare and sporadic until about the middle of the fifteen-hundreds. We have rough ideas about when many of the early engravers worked, but their prints are rarely dated and it is impossible to arrange their prints in time orders, let alone in chronological lists.

A small number of the earliest types of single-sheet woodcuts were merely patterned papers to be pasted on boxes and other objects as decoration. Some of the earliest types are to be found on playing-cards. But most of the early single-sheet woodcuts were of religious subjects. The same things are true in general of the earliest engravings, with the remarkable exception that quite a number of pattern designs for the use of gold- and silversmiths are to be found among them. These pattern designs seem to be the

first exactly repeatable pictorial statements that were intended to provide ideas or information that could be put to work.

The subject matter of a print, like its purpose and the social group at which it is directed, has always had a great deal to do with how it is made. We see this even today in the qualitative differences between the pictorial advertisements of the Fifth Avenue merchants and those of the mail order houses. The single-sheet woodcuts seem to have been made for very simple people. The figures in them are no more than class symbols, which stand for some particular saint or such an object of religious veneration as the Vernicle or the Sacred Heart. The identification of the personage represented is accomplished by the use of an attribute or sign that is specially connected with him. Well before the end of the century the cloven hoof of manufacture showed itself in these prints, for there are some that have changeable heads and attributes printed from little blocks dropped into slots left for the purpose in the bigger blocks. Thus different saints would have identical bodies, clothes, backgrounds, and accessories, all printed from one identical block. The people for whom these prints were made obviously looked to them not for information but for the awakening of pious emotions. Doubtless there was a good deal of superstition also, as is indicated by the fact that a great many of these prints represent saints who were prayed to for protection against particular dangers and sicknesses.

That these early prints were not looked to for information is shown in several ways in addition to those that I have mentioned. Thus, the first edition of Schreiber's great catalogue of the fifteenth-century single-sheet woodcuts described only eleven portraits and three views—and all of them were made at the end of the century. I think I am correct in saying that there is no single-sheet woodcut in the Schreiber catalogue that depicts a device or method of doing anything, except in a wholly accidental and incidental manner. Except for the engraved pattern designs, the same thing in general is true of the early engravings.

Another way in which we can see that the informational

capacity of the print was not realized for a long time, is by noting how many of the early woodcuts were daubed up with colour carelessly applied in such a way as to cover and obscure their lines. So far as their buyers were concerned prints were just pictures and not a special kind of pictorial statement that could be exactly repeated. Exact repeatability meant no more to the original purchasers than it does today to the buyers of greeting cards. So far as the maker was concerned a print was merely a picture made by a process which saved time and labour in quantity production. The printing surface from which they were struck off was no more and no less than a capital investment in specialized machinery.

The only material difference between the woodcut and the engraving, so far as concerns things of this kind, was that the engraved plate wore out much faster than the wood-block and was more expensive to make and to print. While the functions of the two were the same, the engraving was, in comparison with the woodcut, an article of luxury. It is to be doubted that either woodcuts or engravings became objects of interest to the great and the wealthy until towards the end of the fifteenth century. Such intellectual interests as they represented were thus distinctly of bourgeois kinds. It may be said that this has in general been true through most of the history of prints.

The early woodcut book illustrations, like the early single-sheet prints, were often daubed up with coarse and careless colour. This practice was far less frequent in Italy than it was in the north. It is not improbable that many of the more popular early picture books were sold 'penny plain, and tuppence coloured', as was the famous *Nuremberg Chronicle* of 1493. The *Schatzbehalter* of 1491 actually contains an instruction for the colouring of one of its pictures. The illustrations of the Pfister books in the 1460's were so painted up that they became merely crude and gaudy decorations of the printed pages.

One of the most curious survivals in thought about the design of picture books is the widely held and expressed notion that illustrations are mere decorations, and that as such no illustrations

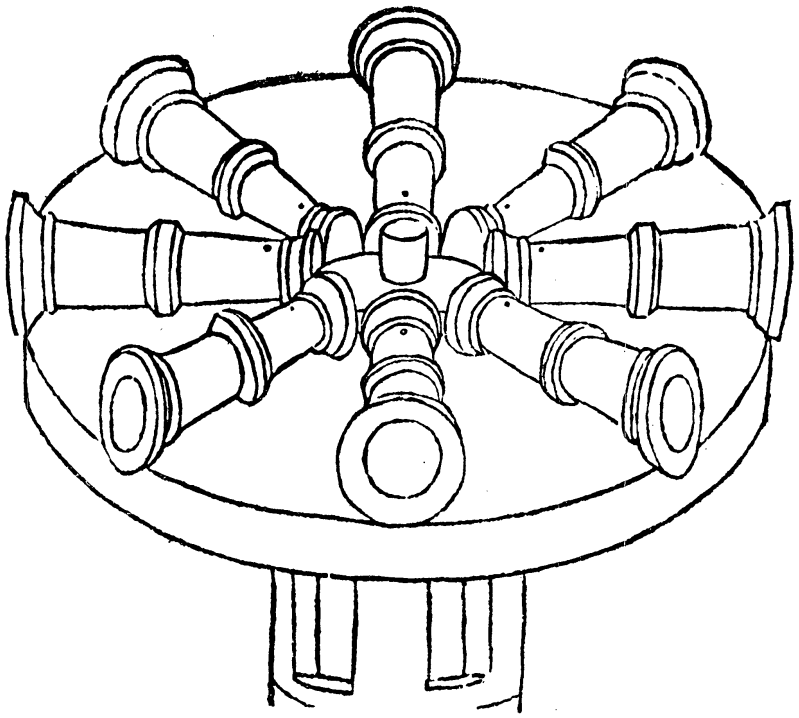
are 'good' unless, as people say, they 'harmonize' with the printed text pages and do not attract attention to themselves or interfere with the balance of the blocks of type. This procrustean notion flourishes among people who know books only as means for diversion and who think that the way to test the design of a book is to look at it two pages at a time—although no mere human being

11. Woodcut from Torquemada's *Meditationes*, Rome, 1473. Reduced.

can read more than one page or see more than one illustration at a time. This idea was loudly expressed by William Morris and some of the typographical ideologues who followed in his train. The irony of the doctrine can only be fully appreciated when we think that very few of the greatly illustrated books conform to the Morrisanian teaching, while many very poorly illustrated books do.

In the following survey, I regret that I shall be able to mention only a very few of the more notable books. Other persons familiar with the material might easily select quite different examples for comment without in the least changing the general argument.

It was not until 1467, at Rome, that the earliest set of datable prints was issued that purported to be pictures of precisely identifiable and locatable objects. These were the woodcuts in the Cardinal Torquemada's *Meditations on the Passion of Our Lord.* According to the first and the last sentences in the book, they represent pictures with which the Cardinal had decorated his



12. A machine gun. Portion of a woodcut in Valturius's *De re militari,* Verona, 1472. Reduced.

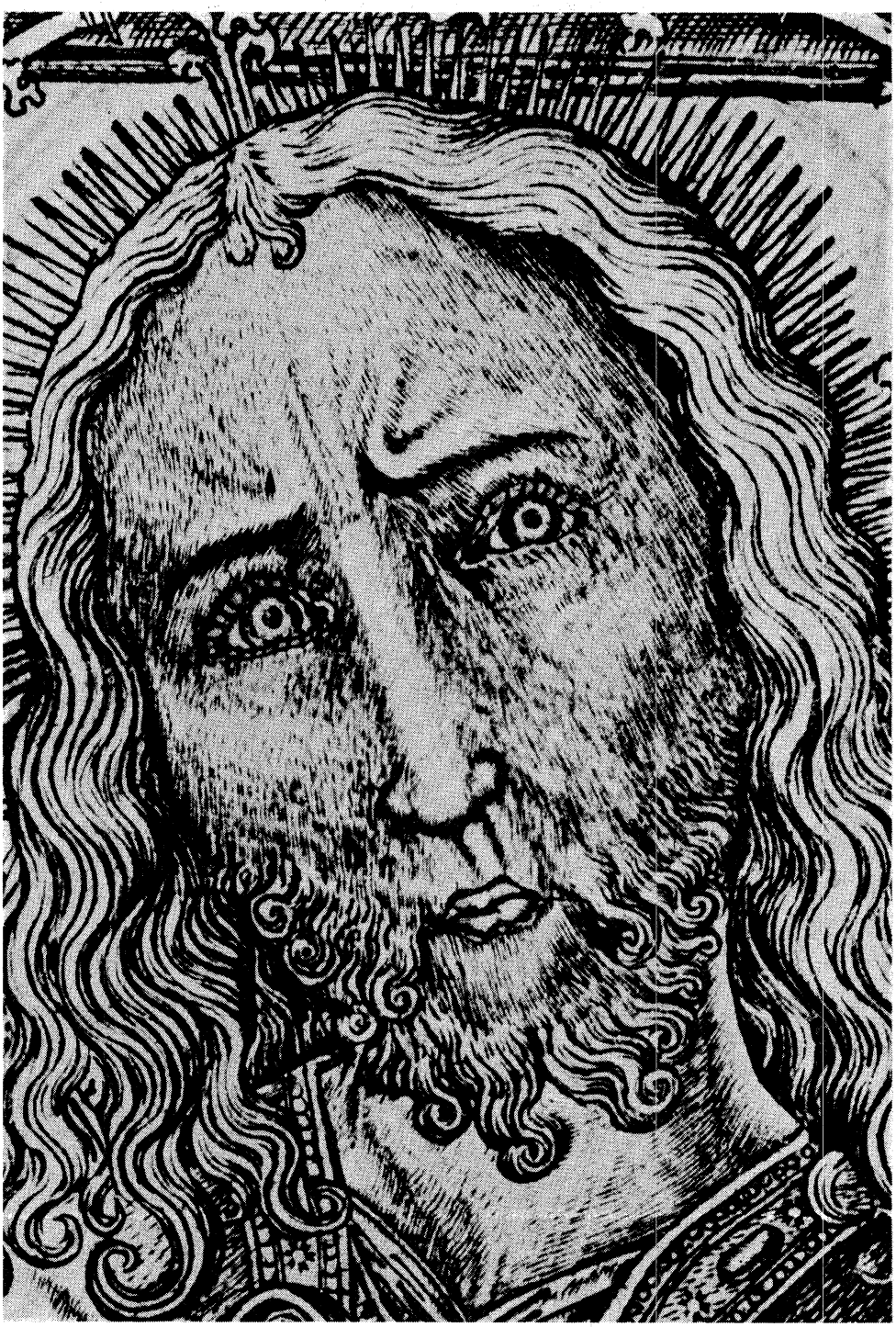
titular church of Santa Maria sopra Minerva. As the book was one of edification and not of information, this fact was probably a matter of complete indifference to its readers, but doubtless the Cardinal took great pride in it.

Five years after the appearance of the Torquemada, there appeared at Verona, in 1472, an edition of Valturius's *Art of War,* which was illustrated with many large and small woodcuts specifically representing machinery and its uses. This was not edification at all, and neither was it mere decoration. It was the deliberate communication of information and ideas. The historians have

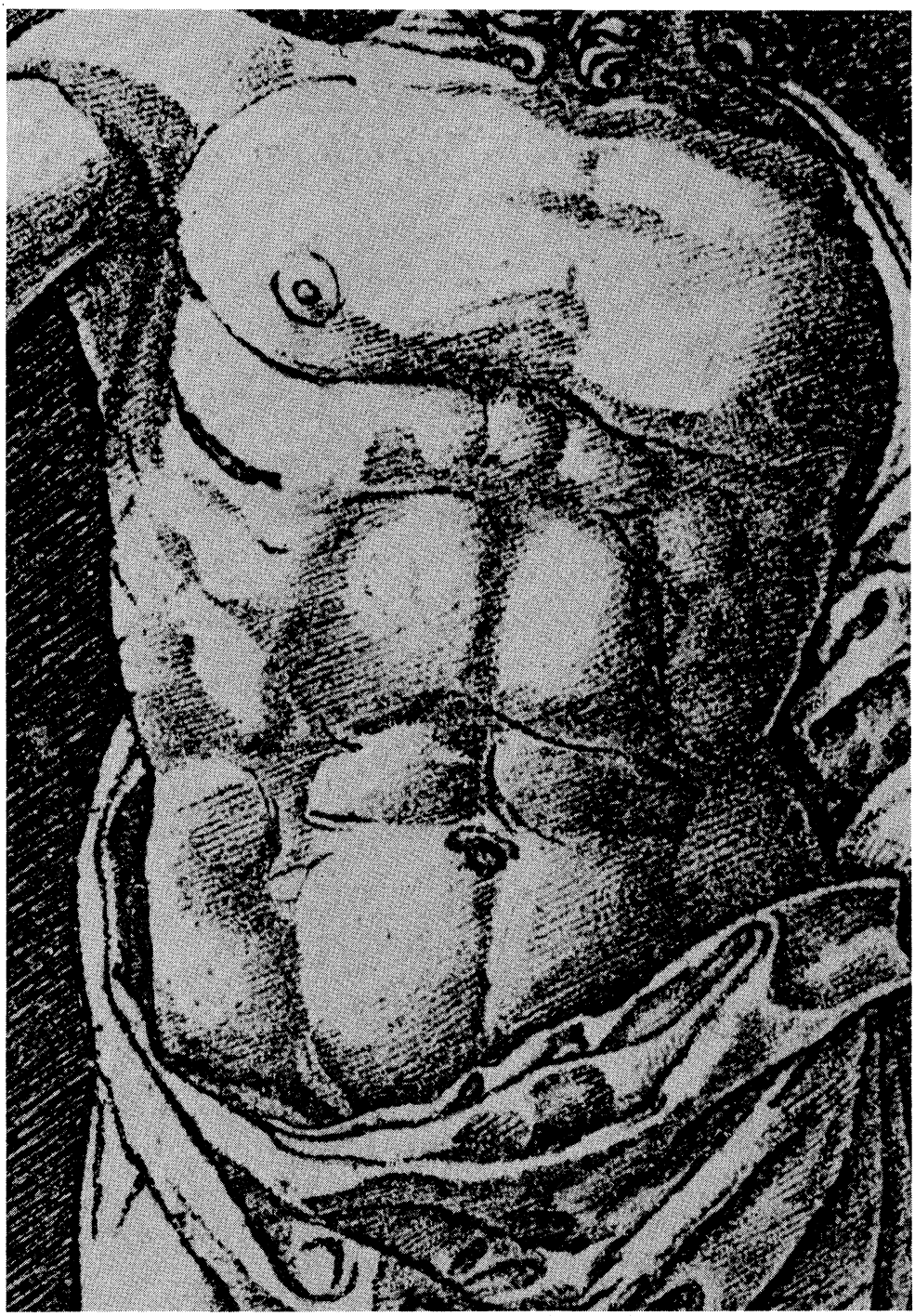
concentrated their interest on some technicalities in the printing of the book and on the identity of the designer of the woodcuts, but they have unanimously overlooked the importance of these

13. 'Asparagus agrestis', woodcut from the herbal of the *Pseudo-Apuleius*, Rome, *c.* 1483. About actual size.

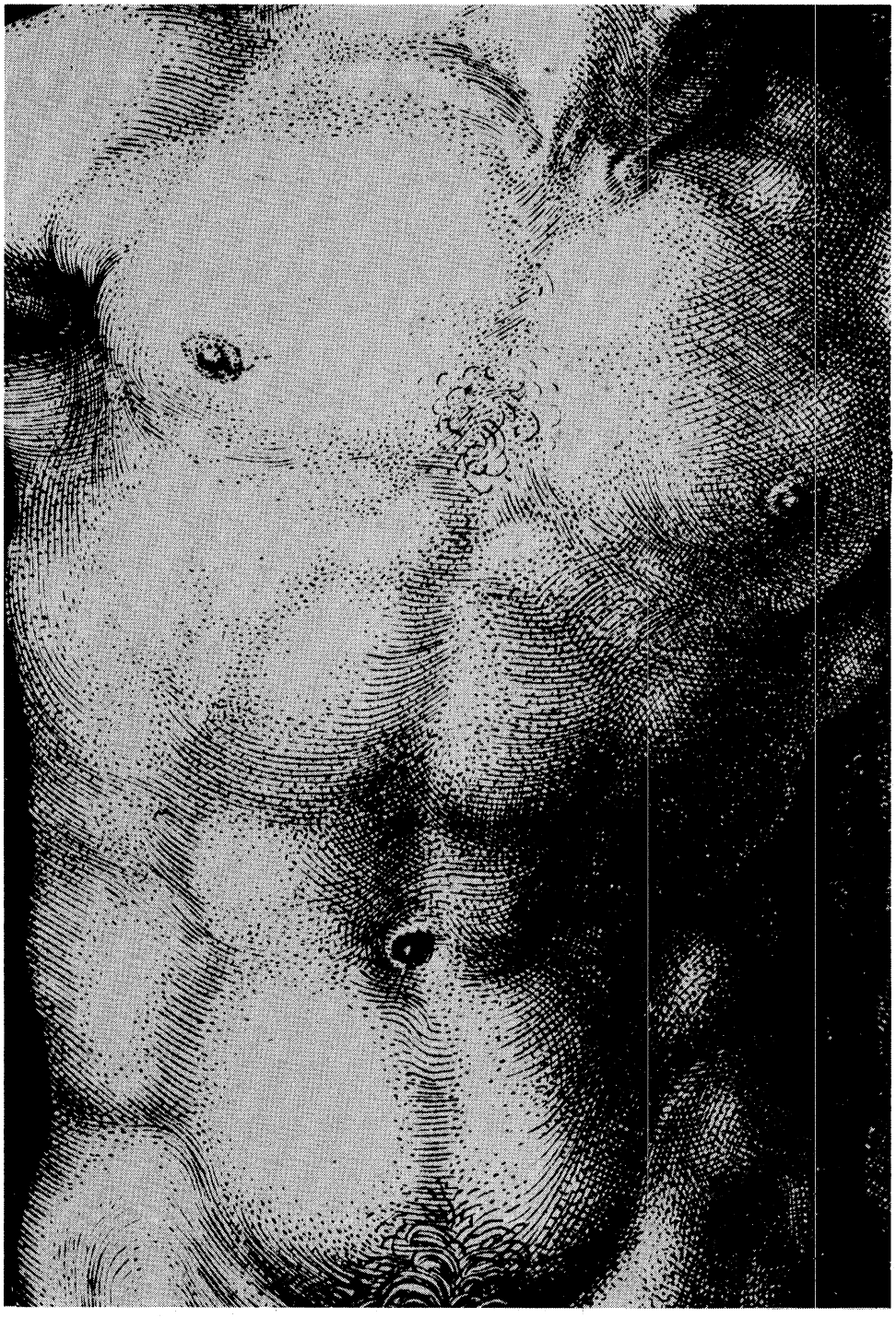
illustrations as the first dated set of illustrations made definitely for informational purposes. Whatever we may think about Valturius's machines from our present-day mechanical point of view, it seems certain that on the whole they represent a very notable



14. Head from an early German engraving by the Master E.S. Enlarged.

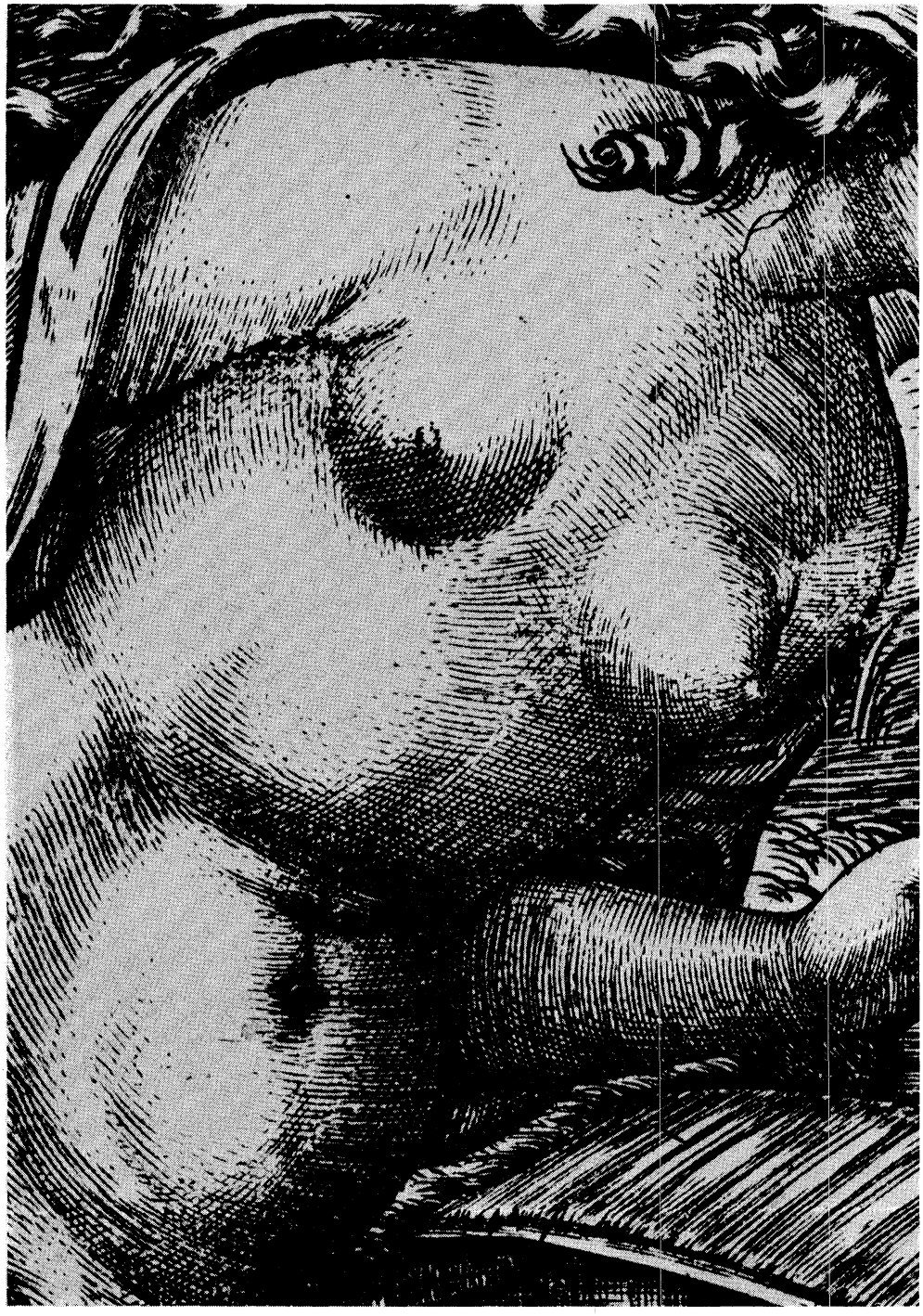


15. Torso from the engraving of The Risen Christ between Saints Andrew and Longinus, by Mantegna. Enlarged.

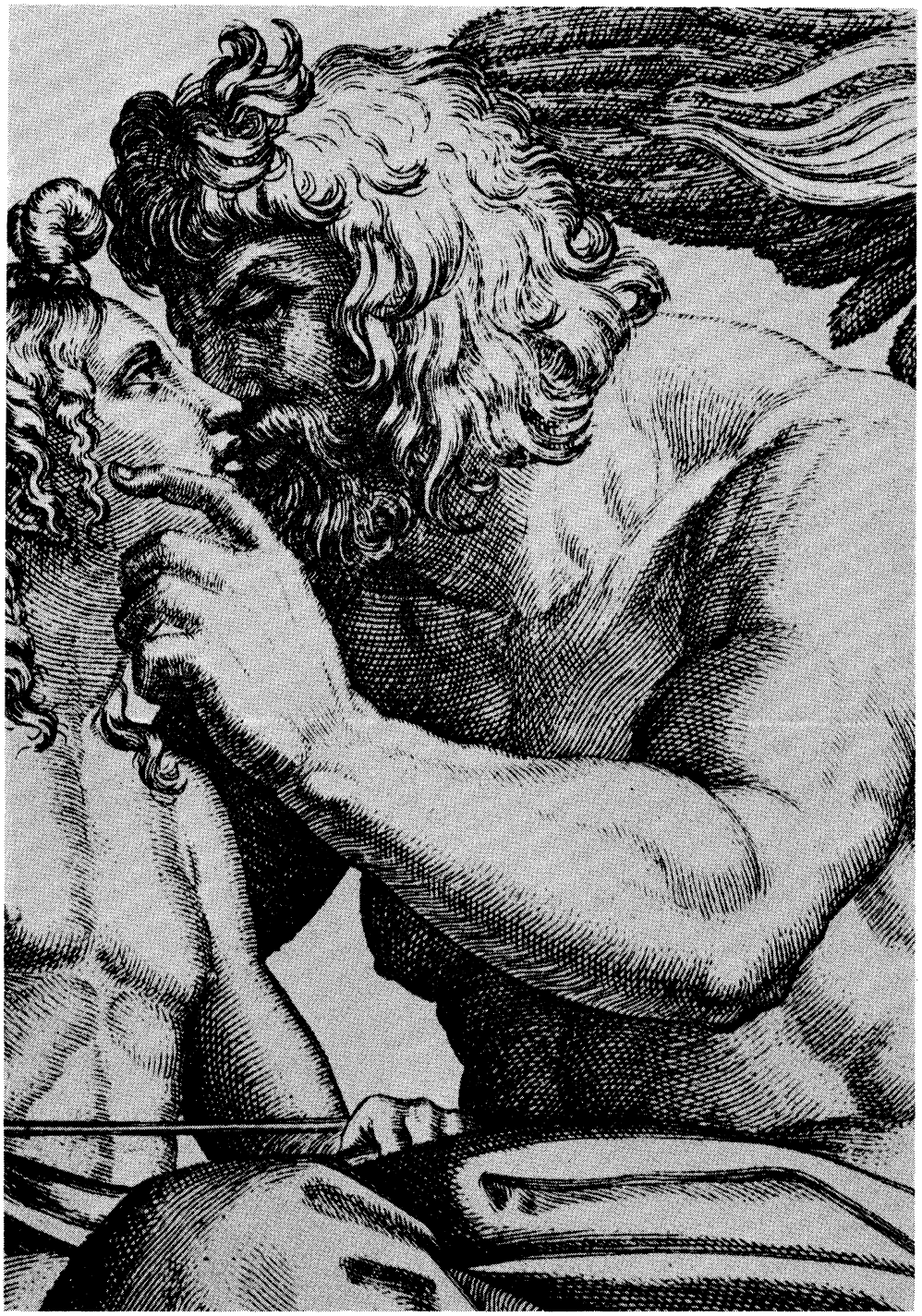


16. Torso from Dürer's engraving of Adam and Eve (1504). Enlarged.

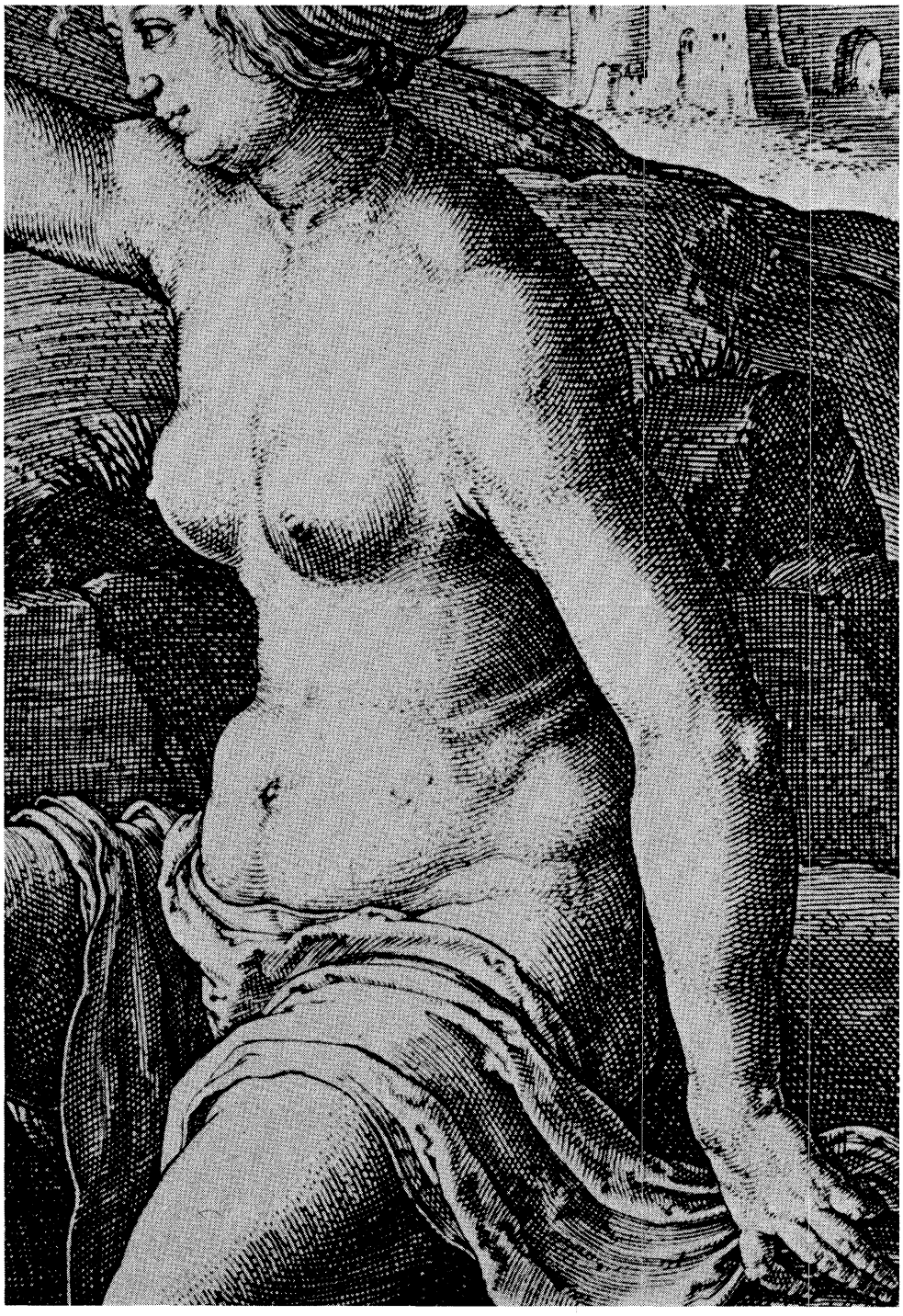
17. Torso from Dürer's woodcut of The Trinity (1511). Enlarged.



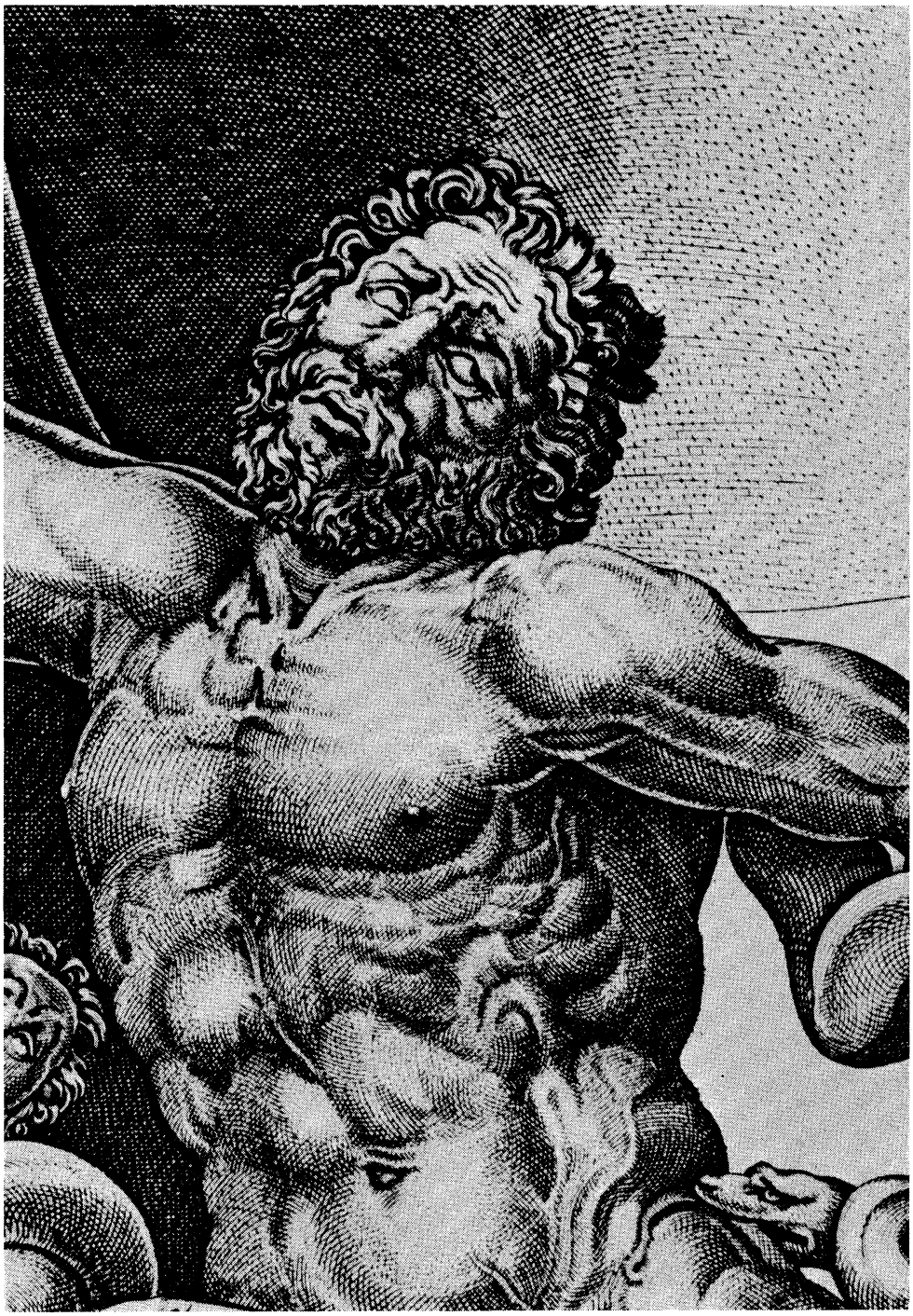
18. Torso from Marc Antonio's early engraving of Pyramus and Thisbe (1505). Enlarged.



19. Portion of Marc Antonio's late engraving of Jupiter and Cupid (c. 1518). Enlarged.



20. Portion of Lucas of Leyden's engraving of Lot and his daughters (1530). Enlarged.



21. Portion of an engraving of the Laocoon, published by Lafreri (mid XVI century). Enlarged.

technological advance over the practice of the classical Greeks and Romans. The figures in the cuts are represented in costumer's 'classical' armour, but the things they are doing and the tools they are using are frequently quite unclassical. They provide a very pretty example of the necessity to keep in mind the difference between fancy costume and actuality. We are merely amused by deliberate modern anachronisms of this kind, as when *Hamlet* or *Julius Caesar* is performed in modern clothes, but when Renaissance figures are represented in armour showing 'classical' forms humourless people are only too apt to say that they show the deep influence of classical thought, and to forget that the picture as a whole is a direct denial of that thought and as unclassical as it can possibly be.

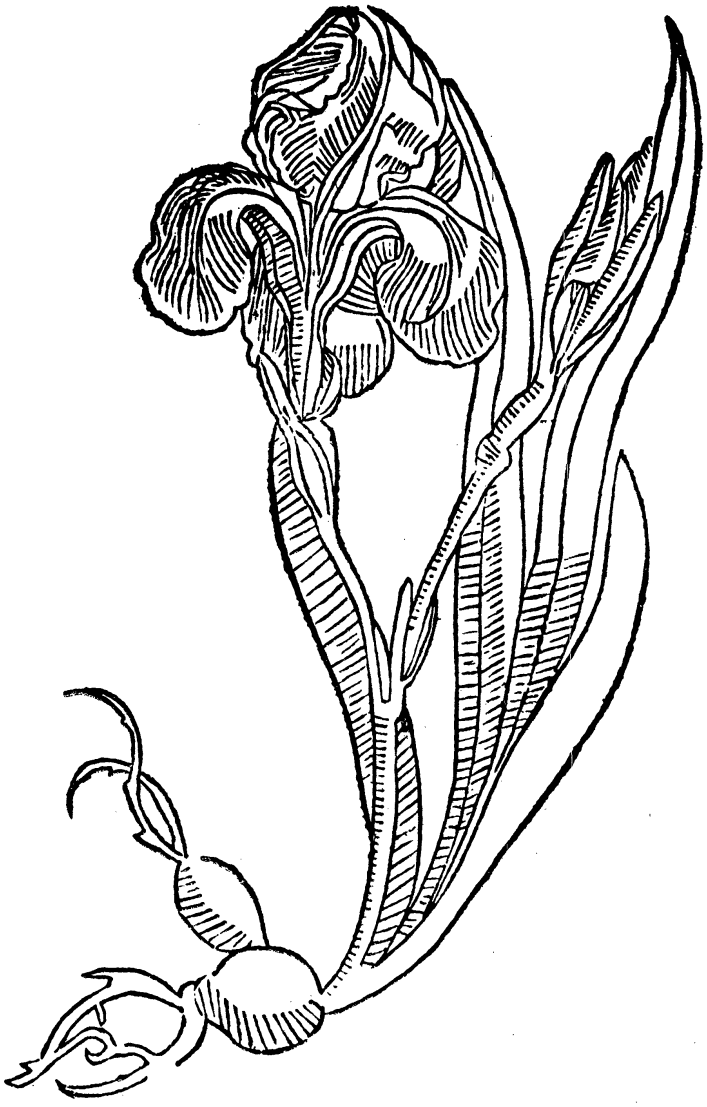
In 1475 Konrad von Megenburg's *Book of Nature* was published at Augsburg. It was the first illustrated printed encyclopaedia, but its few illustrations were also encyclopaedic and unlabelled. They can have been of no use to anyone in search of information of a precise kind. A Milanese book of 1479 contains what is said to be the first portrait to appear in a printed book.

Then, some time just after 1480, there was published at Rome the so-called *Pseudo-Apuleius*, a book that contains much for thought. Its text is that of a ninth-century botanical manuscript which for centuries prior to the last war was in the monastery at Subiaco. Its woodcuts are careless copies of the illustrations in that manuscript, but they are actually closer to their originals than we should expect in view of the then prevalent attitude towards such things. They were the final step in a long series of copies of copies of copies that went back to original drawings made not impossibly by some of the Greek botanists of whom Pliny talked. They point the moral of his account of why the Greek botanists gave up trying to illustrate their books. In any case, this was the first illustrated botany book to be printed, and it was also the first printed reproduction of both the text and the illustrations in a very ancient volume. It was the Adam from which sprang that line of facsimiles of old manuscripts and drawings that

every museum and university library prides itself in having on its shelves.

In 1484 the herbal known as the *Latin Herbarius* was printed at Mainz. It is a large and fully illustrated volume containing many woodcuts of plants, that seem to have been copied from various older sources. It suffers, though not so badly, from the same trouble as the *Pseudo-Apuleius*. The next year, 1485, however, the same printer issued another and completely different herbal in German, which is known as the *Gart der Gesundheit*. Its handsome and well-drawn illustrations were epoch making in the history of prints as a medium for the conveyance of information in invariant form. It is pleasant to let the author tell the story in his own words. In his brief introduction he says:

'. . . as man has no greater or nobler treasure on this earth than bodily health, I came to believe that I could undertake no more honourable or useful or holier work or labour, than to bring together a book in which the virtue and nature of many herbs and other creations of God, with their true colours and form, were made comprehensible for the consolation and use of all the world. Therefore, I caused this praiseworthy book to be begun by a master learned in medicine, who at my request brought together in a book the virtue and nature of many herbs out of the esteemed masters of medicine, Galen, Avicenna . . . and others. And when I was in the middle of the work of drawing and painting the herbs I noticed that many noble herbs did not grow in this German land, so that, except by hearsay, I could not draw them in their true colours and form. Therefore, I left the work I had begun unfinished and hanging in the pen until I had received grace and dispensation to go to the Holy Sepulchre. . . . And so, lest this noble work, begun but not ended, be left undone, and also that my journey should serve not only the salvation of my soul but all the world, I took with me a painter of understanding and with a subtle and practised hand. And so I travelled. . . . In journeying through these kingdoms and lands I diligently learned the herbs that were



Gladiolus Rotten krut oder geel ſwerteln
Capitulū·cxcv· 195.

Gladiolus latine·grece dexeris·Die meiſter ſprechen daz diß krut habe keynen ſtengel vnd hait bletter die wachſen vßz der würtzeln die glichen eynes ſwertes lamek·vñ iſt zweyer hande·Eyns wechſet an drucke ſteten vnd hait eyn rote blomen die iſt weych vñ wöl

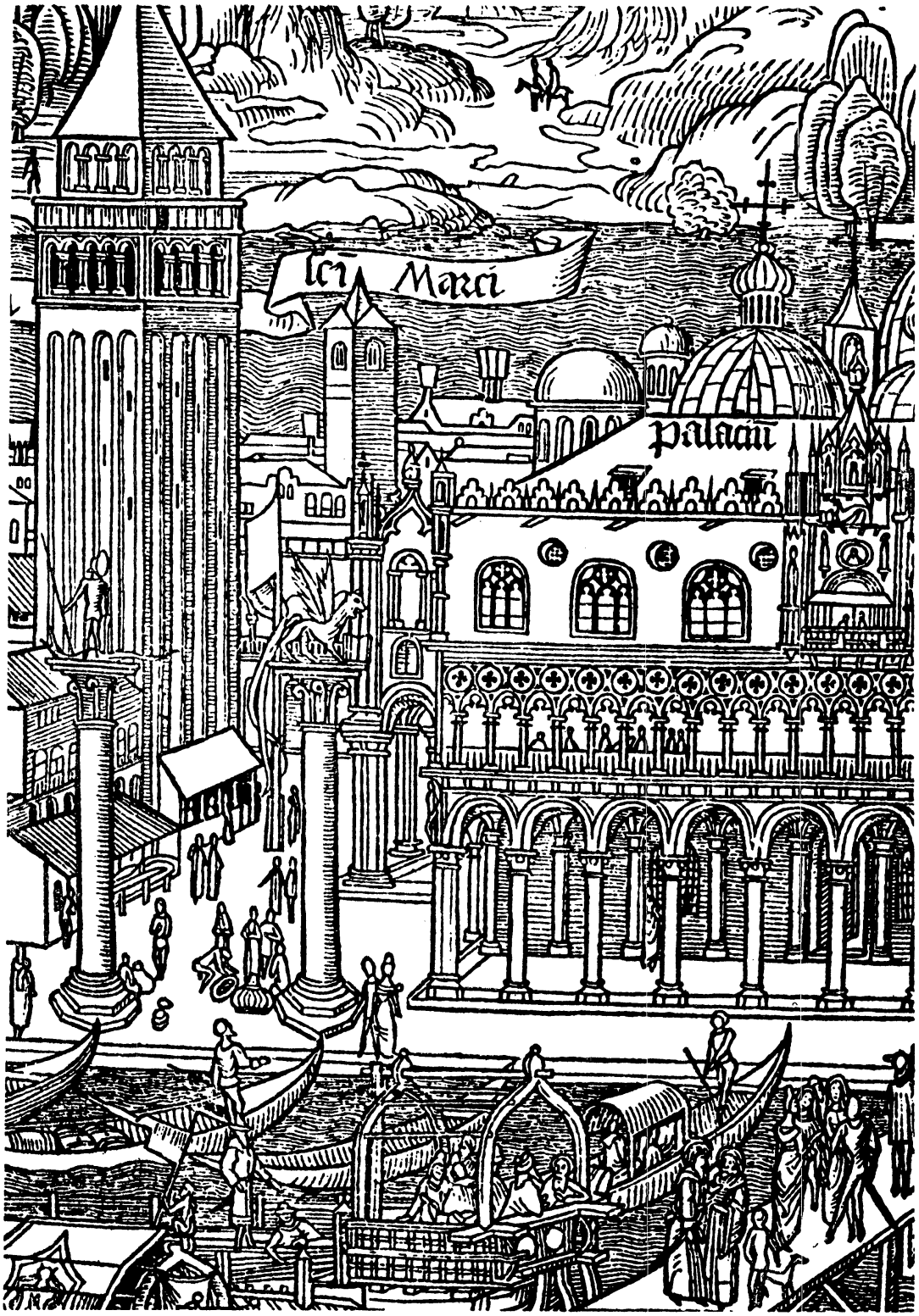
22. 'Gladiolus', woodcut from the *Gart der Gesundheit*, Mainz, 1485 Reduced.

there, and had them painted and drawn in their true colours and form. And afterwards, when, with God's help, I was come again in German land and home, the great love which I had for this work has moved me to finish it. . . . And in order that it may be of use to the learned and the lay I have had it turned into German.'

The *Gart der Gesundheit* is thus the first printed illustrated account of the results of a journey undertaken with scientific purposes in mind. I know of no earlier statement that a writer on a scientific subject refused to have his book illustrated from hearsay and took care that it be done directly from the original objects represented. Because of this it is one of the greatest monuments in the history of the descriptive sciences. It is to be regretted that we know the names neither of the man who undertook the task, of the learned man who assembled the literary material, nor of the subtle artist who made the drawings.

In that same year, 1485, there came out at Venice an illustrated edition of Sacrobosco's *Sphaera Mundi,* a book on astronomy. Its diagrams included one of an eclipse, which is printed, not painted or stencilled, in black, red, and yellow, and is reputed to be the first instance in which three colours were used in a wholly printed picture or diagram. It is thus one of the monuments in the history of the exactly repeatable pictorial statement.

The next year, in 1486, at Mainz, there appeared the first edition of Breydenbach's *Travels.* This was the first illustrated book of travel to come from the press. Its pictures were made by Erhard Rewich of Utrecht, who made the trip with the author. Among them are views of cities, pictures of costumes, and a number of Eastern alphabets. Some of these aphabets had not previously been seen in print. Some of the views are valuable documents about still extant buildings that are represented in them. A number of the large views are printed on folding sheets, that of Venice being about six feet long. It was apparently the first time that such things made their appearance in a printed



23. Portion of a woodcut view of Venice in Breydenbach's *Peregrinationes*, Mainz, 1486. Enlarged.

book. The general attitude of the time towards the difference between first- and second-hand visual information is shown by the fact that Carpaccio, the great Venetian painter, was content, for one of his pictures, to copy from Rewich's view of Venice rather than to draw the buildings directly for himself.

In 1493, a Nuremberg printer, named Hans Mayr, issued illustrated catalogues of the precious objects in the possession of several of the German cathedrals. So far as I know these are the first illustrated printed catalogues of any specific collections of any sort of material.

In the same year, 1493, there was published the famous *Nuremberg Chronicle*, which is still noteworthy for the brute number of woodcut illustrations it contained. There are said to be no less than 1809 of them, but they were printed from a much smaller number of blocks. In addition to pictures of notable events, such as the six days of the creation, and objects like Noah's Ark, there are many portraits and views of cities. Some of these are copied from earlier prints. The portrait of the Sultan, ironically, is a version of Pisanello's medal of the Emperor John Palaeologus. The same heads and views appear with quite different captions in different parts of the book. One view does duty for no less than eleven separate towns. Many of the pictures, however, of German towns and of a few foreign ones, such as those of Venice and Rome, show that some endeavour was made towards at least a slight degree of verisimilitude. The book may perhaps be regarded as the culminating example of the ancient and mediaeval careless attitude towards verisimilitude, though it must be confessed that it has had serious competitors down to the present day. We find these competitors even in our most learned books and best museums, where they parade themselves as restorations of sculpture and models of ancient buildings. They also occur in many of the most advertised re-creations of old buildings, such as those at Williamsburg in Virginia. The classical archaeologists of a generation or so ago were very fond of these flights of imagination, the net result of which was that some observing people came to think it odd that

so many of the Greek sculptors and architects spoke such fluent German. But this is a subject that, while it would richly repay investigation, is not popular among the learned.

Looking back at these illustrated informational books of the late fifteenth century we may be inclined to laugh at most of them, but the fact remains that they were quite serious and that the information they conveyed was the best that could be provided by the poor fellows who gave it. If we do laugh at them, and if we also want to be consistent, we must also laugh at the pictures in many of the solemn books I studied when I was a lad, and even at many of those that have appeared during very recent years. The pictures in almost all books on art and archaeology that were printed prior to the time I was born were little more than travesties of the objects they purported to represent. The fifteenth-century illustrations are actually no funnier distortions of fact than those in the edition of Dr. R. C. Lodge's standard translation of Winckelmann's *History of Ancient Art* that was published at Boston in 1880, or for that matter those in the books by Perrot and Chipiez, or by Luebke, or Murray, and ever so many others that I pored over in my childhood and youth.

In passing it is interesting to notice that many of the little pamphlets that came from the Florentine presses during the last decade of the fifteenth century not only were illustrated but were distinctly political in nature. These were not only the first political tracts addressed to a popular audience, but their charming woodcuts are the first body of printed political cartoons.

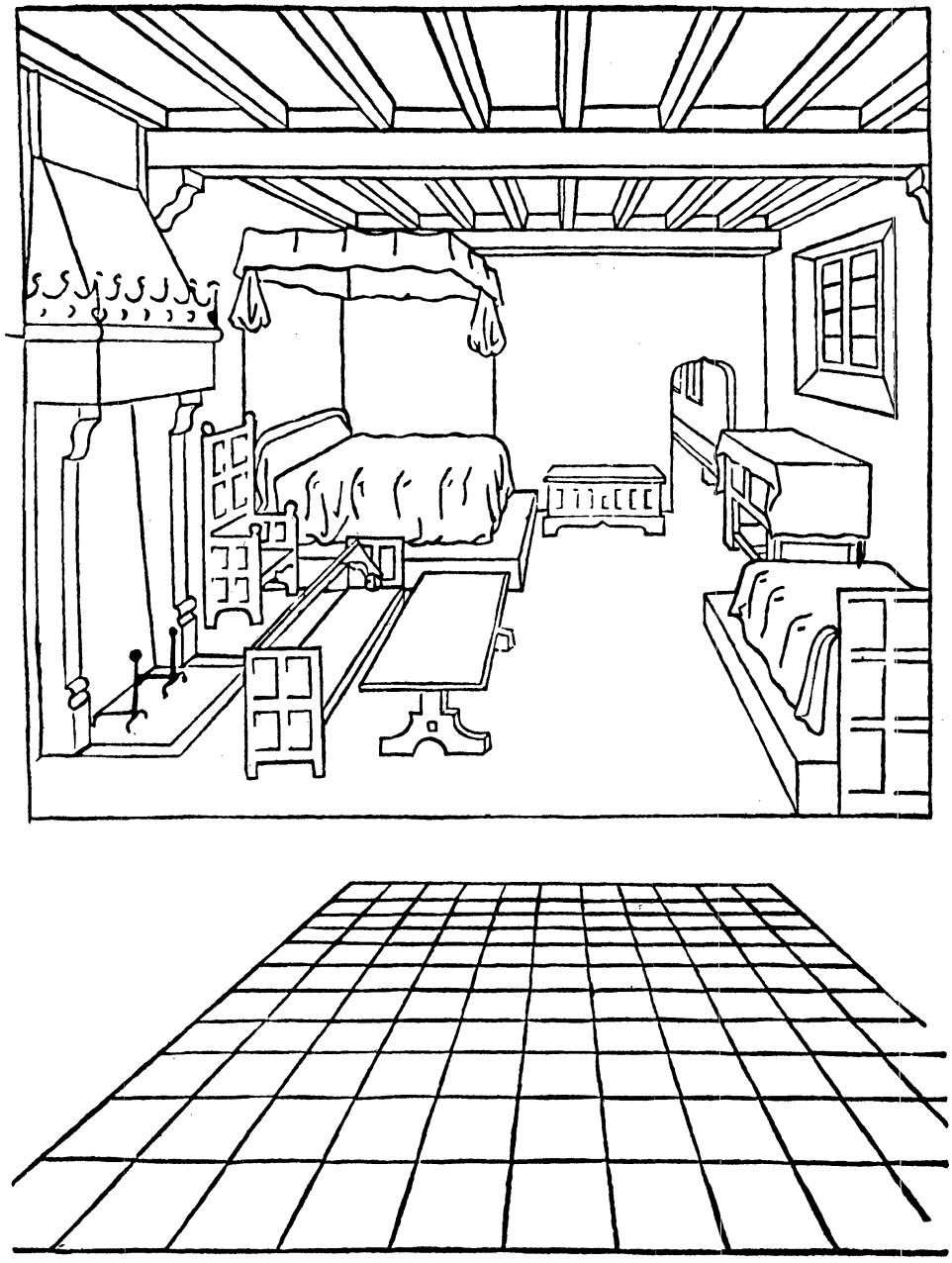
In 1504, at Toul, in France, Pelerin published his book on *Perspective*, the first on that subject to reach print, and also the first to teach the modern 'three point' method. Its illustrations are the first to appear in a printed book in which we feel as though we were looking at pictures of rational spaces.

The earliest fully illustrated account of a craft or art that I recall is Fanti's *Theory and Practice of Writing*, that was printed at Venice in 1514. It is a detailed description of the forms of written letters and of the ways of forming them with the pen.

From this time on illustrated books of information came from the presses of Europe with ever increasing profusion and with steadily increasing accuracy of representation. It is impractical here to give an account of even the most important books of this kind that dealt with astronomy and archaeology, anatomy and animals, birds and fishes, machinery and techniques, costumes and clothing, architecture and engineering, and many other subjects, but I should like to call particular attention to several of the botanies, because in a way they typify the whole movement.

The publication of the herbals of 1484 and 1485 was followed by that of many others in many places. For a period of almost fifty years most of these other books were illustrated with copies of the woodcuts in those two herbals, many of which were copied from them at second and even third hand, with a steadily decreasing size in the dimensions of the pictures and a steady increase in the amount of distortion of the representations. The degradation and distortion thus introduced into the pictures perhaps reached their culmination in the first English herbal, the *Grete Herbal*, of 1526, in which the pictures have at last become little more than decorative motifs much more suited to serve as cross stitch patterns than for the conveyance of information. They constitute a remarkably sad example of what happens to visual information as it passes from copyist to copyist.

These herbals, beginning with the *Pseudo-Apuleius* of about 1480 and coming down through the *Grete Herbal* of 1526, are extremely interesting from still another point of view. When arranged in families and in a time order they clearly show the operation of what I suppose is one of the basic human characteristics. So long as the illustrators did not return to the original plants as sources of information about their shapes, but confined themselves to such knowledge of the forms as they could extract from pictures made by earlier men—to what may be called hearsay and not first-hand evidence—it was inevitable that they should rationalize their own pictorial accounts and overlook or disregard what appeared to them to be mere irrationalities in the



24. A Living Room. Woodcut from Pelerin's *De Perspectiva*, Toul, 1504. Reduced.

pictorial accounts given by their predecessors. This rationalization most frequently took the form of an endeavour for symmetry, which produced regular shapes that not only lost all verisimilitude of lines and edges but introduced a balanced arrangement of parts and forms, which, however satisfying to mental habits, resulted in a very complete misrepresentation of the actual facts. I am sure that all sorts of morals can be drawn from these botanical

25. Violets. Woodcut from the *Grete Herbal*, London, 1525. About actual size.

illustrations, but shall content myself with remarking that in their almost comic way these pictures raise some of the most desperately serious problems that are known to man, for these problems are those of thought itself rather than of the materials with which it deals. There is a Latin tag which asks who it is that takes care of the caretakers. According to our temperaments we may laugh at these pictures or be condescending or up stage about them, but if we look at them intelligently they contain matter for the most humble prayer.

As a relief from such solemn notions as these, I may call

attention to one of the most amusing instances of trying to transform a verbal and therefore ideologically analytical and symbolic statement about shapes into a concrete visual image. In the *Hortus Sanitatis* of 1491 there is a description of the barnacle, which, as I remember, is said to be a fish that eats ships and has its bottom on top—which of course is a perfectly correct statement about the

26. Violets. Woodcut from Brunfels's *Herbarum vivae eicones*, Strassburg, 1530. Reduced.

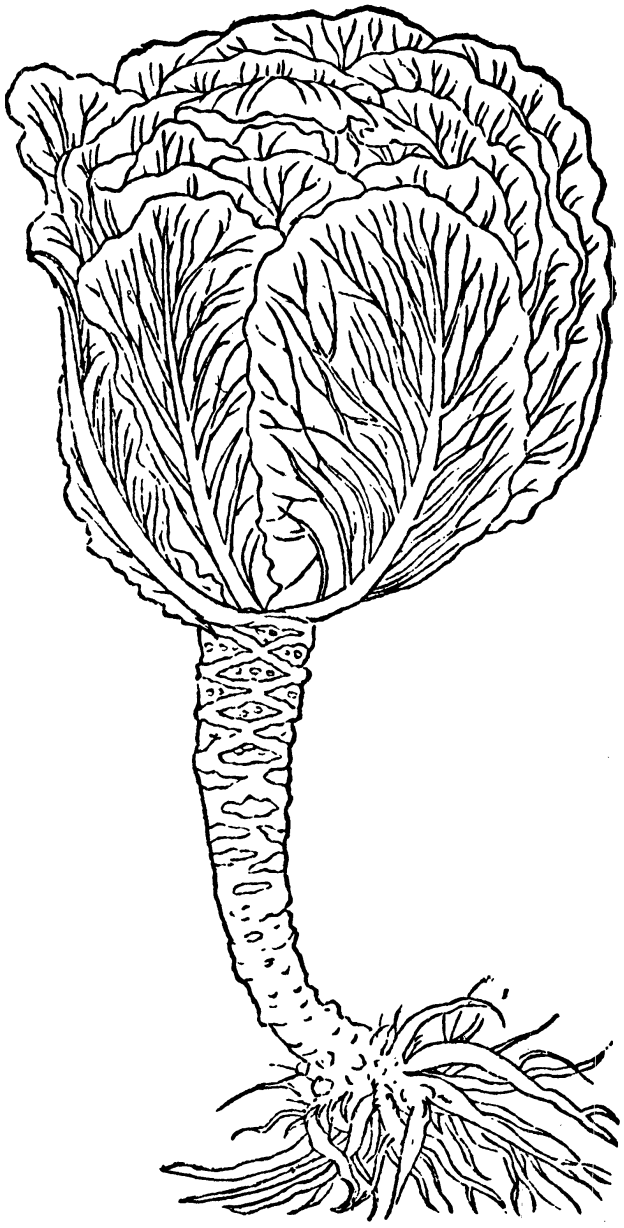
shape of the creature that fastens itself under the hulls of ships. This statement much impressed the poor illustrator, who, accordingly, depicted a fish of some kind, with head, tail, fins and all the rest, but with claws, and, on its back, a very human bottom.

The first return to nature after the herbal of 1485 came when Brunfels issued, at Augsburg in 1530, the first volume of his celebrated herbal. This was illustrated with sharply observed and sensitively drawn woodcuts by Hans Weiditz. Weiditz is mentioned only in some laudatory verses in the first edition of the first volume. His remarkable woodcuts have been adversely criticized

as being portraits of particular plants, showing not only their personal forms and characters but the very accidents of their growth, such as wilted leaves and broken stems, rather than being schematic statements of the distinguishing characteristics of the species and genera. In view of the fact that there was as yet nothing that could be called a workable classificatory system in botany, this criticism has always seemed to me to be a bit forehanded.

Twelve years later, in 1542, at Basel, Fuchs published his celebrated herbal, in which the abundant woodcut illustrations no longer represented particular plants but were careful schematic representations of what were considered the generic forms. They contain no indication of either the personalities or the accidents of growth of the plants. The illustrations were drawn from the actual plants by an artist named Albert Mayer, whose drawings were then copied on the blocks, and doubtless given their schematic form, by Heinrich Fullmaurer, after which the woodcutter, Hans Rudolph Speckle, did his work of cutting the blocks. We know this because at the end of the volume there are portraits of the three men at work, with their names and callings. These portraits are the first explicit statement I recall that a set of illustrations, although based on drawings specifically made for the purpose of illustrating a text, were, as actually printed, second-hand and not first-hand reports. This is the first time that both artist and woodcutter are given full recognition in the informational book they concerted to illustrate, and it is the first specific statement of the fact that the drawing on the block was not made by the original draughtsman but was a revised version of his drawing made by a specialist whose business it was to draw with lines that were suitable for their technical purpose. I shall have much to say about the inevitable results of this practice and its effects upon the communication of information and ideas. It is important to notice that in this first forthright example the result was no longer a portrait of a particular thing but a schematic representation of its generalized or theoretical generic forms. It thus represents not only one of the most important steps ever consciously taken in the

Brassicæ quartum genus.
Kappißkraut.



27. 'Kappiskraut', woodcut from Fuchs's *De Stirpium Historia*, Basel, 1545. Enlarged.

long search for a scientific classification of natural forms, but it also represents, quite unconsciously, one of the great steps in the substitution of rationalized statements of natural forms in place of the older, sometimes very good and sometimes very bad, attempts to represent the personal idiosyncrasies of such forms. In other words, it was a deliberate step away from the particular to the generalized, and as such is of the greatest importance in view of the subsequent history of visual information and the thought based on it.

Before leaving the fifteenth- and sixteenth-century woodcuts, it should be said that with few exceptions they were what are called 'facsimile' cuts, that is to say that the woodcutter's task was primarily to cut out the whites from between the lines of the artists' drawings on the blocks. This was, therefore, in theory not a translation or rendering but a preserving of the artist's drawing on the block. Some of the German woodcutters reached a very high degree of skill in their ability to cut out the whites without too much hurting the qualities of the lines. As examples I may mention the blocks for Holbein's *Dance of Death*, and for such prints by Dürer as his little round Virgin and Child after the engraving by Mantegna. There is strong reason to think that Dürer himself cut some of his earlier blocks, though many of the later ones were cut by professionals, some of whom are known to us by name.

Of the relief metal cuts of the late fifteenth century there is little to be said beyond the facts that comparatively few of them were made and that among them are the first examples of relief work in white on black grounds. Some of the white lines and dots were made by striking punches into the soft metal of the printing surfaces, much in the manner still used by silversmiths. Others were simply excavated with the ordinary engraving tool. The technical notion implicit in this latter method did not come into its own until the end of the eighteenth century in England, when for the first time it became common knowledge that an engraving tool could be used on a wooden block, provided the printing surface

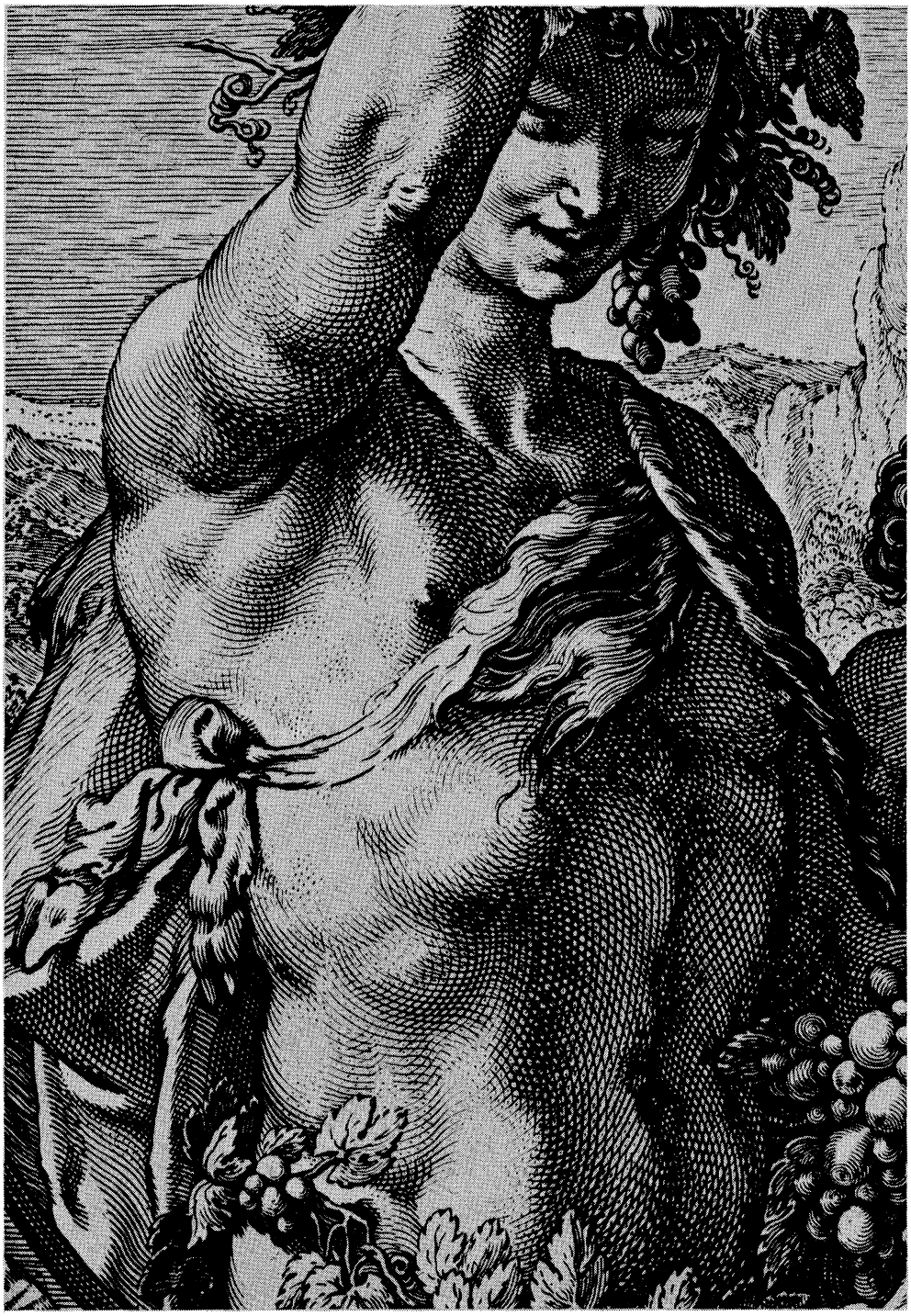
of the block was at right angles to its grain. As developed, this method of working on wood provided most of the nineteenth century's book and magazine illustration.

In the course of the first half of the sixteenth century what I may call the informational pressure on the woodcut illustration, that is, the cramming of more and more lines and detailed information into the given areas, became notable. This resulted in immediate difficulty for the printers, and probably explains why it was that such very finely detailed blocks as those for Holbein's *Dance of Death,* although presumably made about 1520, did not appear in book form until 1538. Wood-blocks, until the early years of the nineteenth century, were inked, as was type, not with rollers, as in our modern techniques, but by pounding them with large stuffed leather balls charged with ink. The least carelessness in the use of the balls produced spotty and clogged impressions, and this meant that good impressions could only be produced by very slow and correspondingly expensive press work. In the book form of the *Dance of Death,* two good impressions are followed by two poor ones, the good ones on the face of the paper and the poor ones on its back. This unevenness of impression could not be avoided by the printer of books with very fine cuts, because it came from the paper, which as made in those days was much smoother on one side than on the other. When the lines and the furrows in the paper were coarser than the lines on the block the tops of the lines in the paper took more ink from the block than did the furrows between them. There are many fine textured woodcut book illustrations of the middle of the sixteenth century which were rendered almost illegible by the streakiness that came from this.

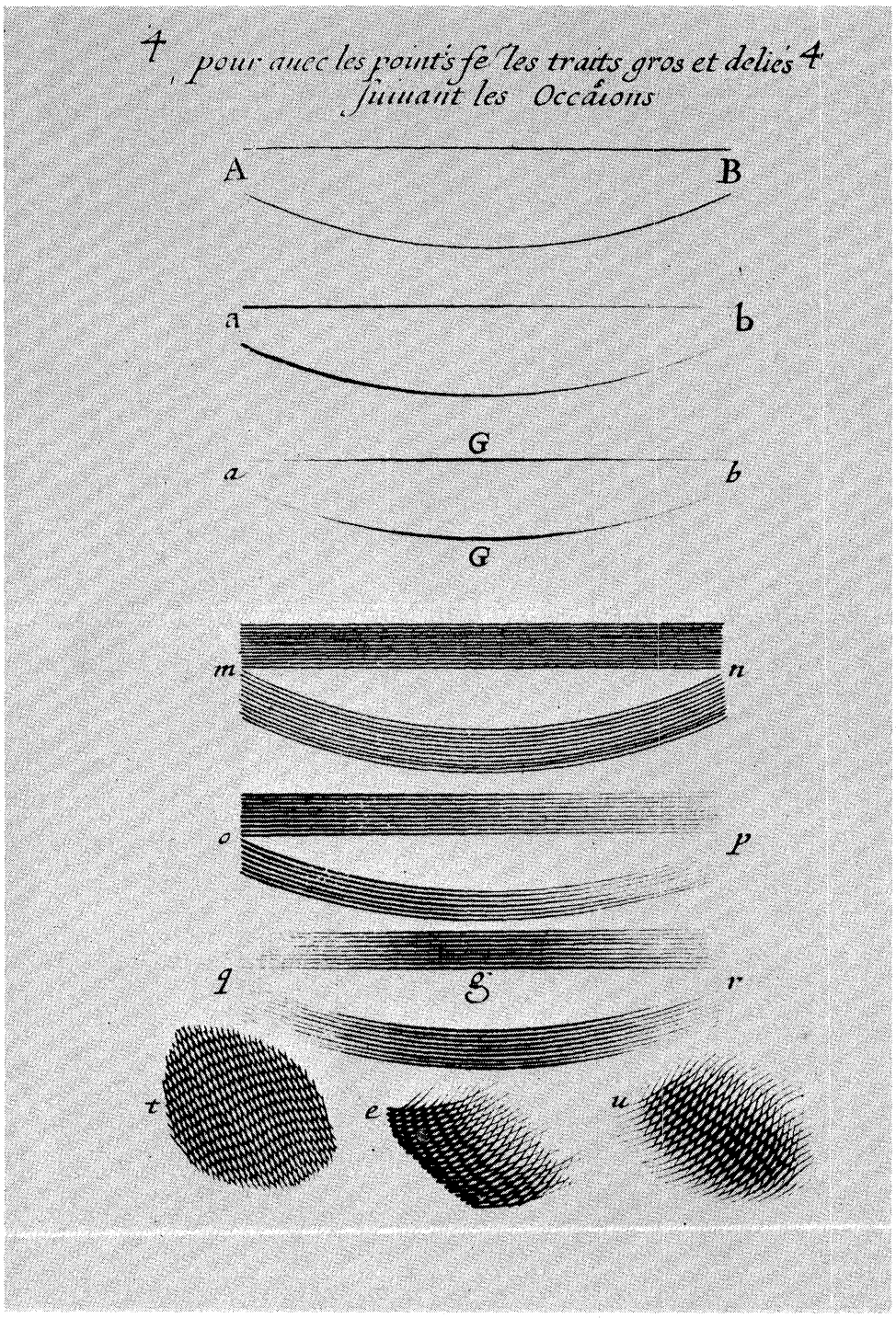
By the fifteen-fifties the woodcut had reached the limit of minuteness of work beyond which it could not go so long as there was no change in the techniques of paper-making and of inking the blocks. Although a few fifteenth-century books had been illustrated with engravings, it was not until about the middle of the sixteenth century that there began, slowly and sporadically at

28. Otto Heinrich, Count Schwarzenburg. Portion of a woodcut by Tobias Stimmer (1539–1582). Enlarged.

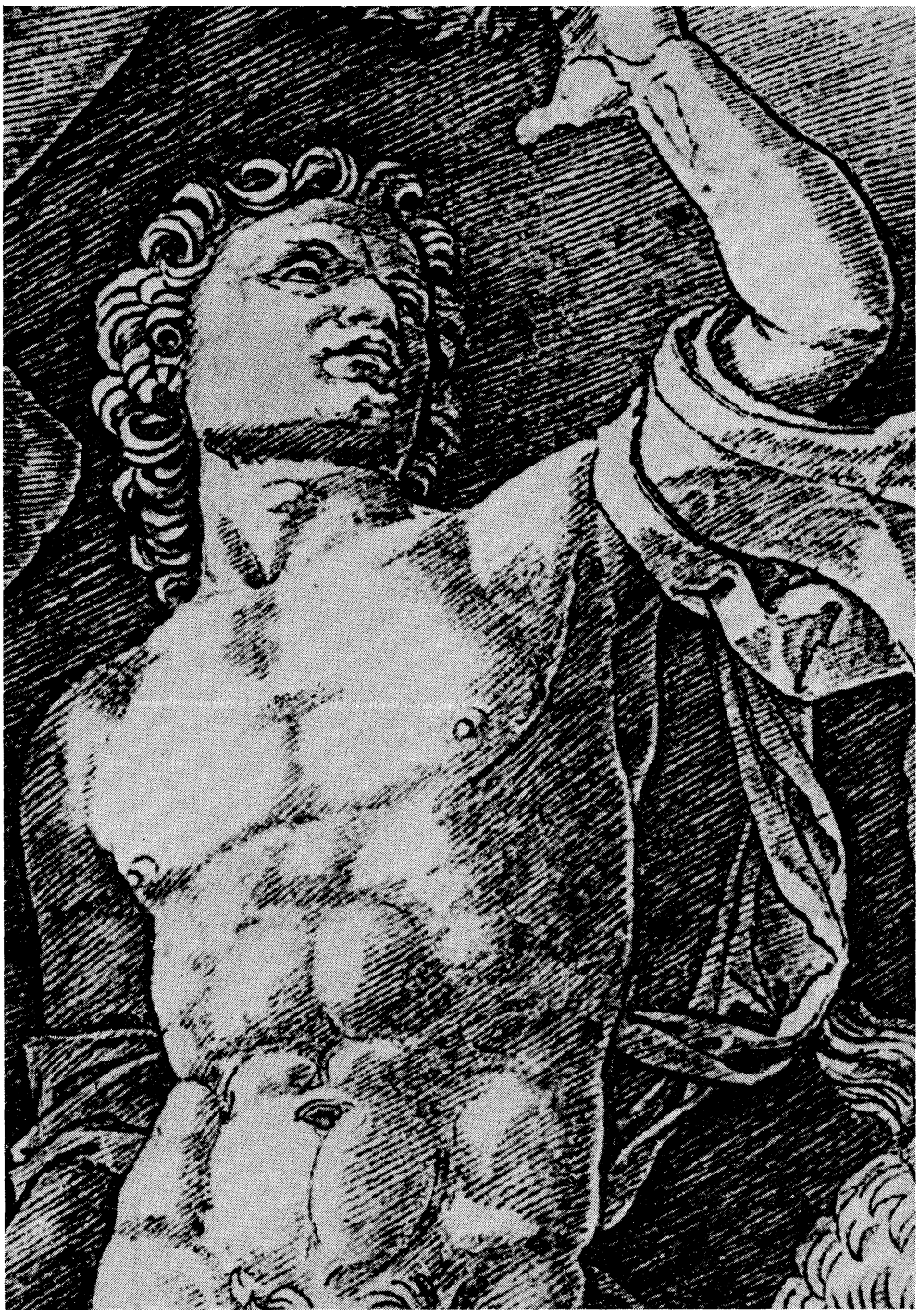
29. Portion of an engraving by C. Cort (c. 1530–1571) after Titian. Enlarged.



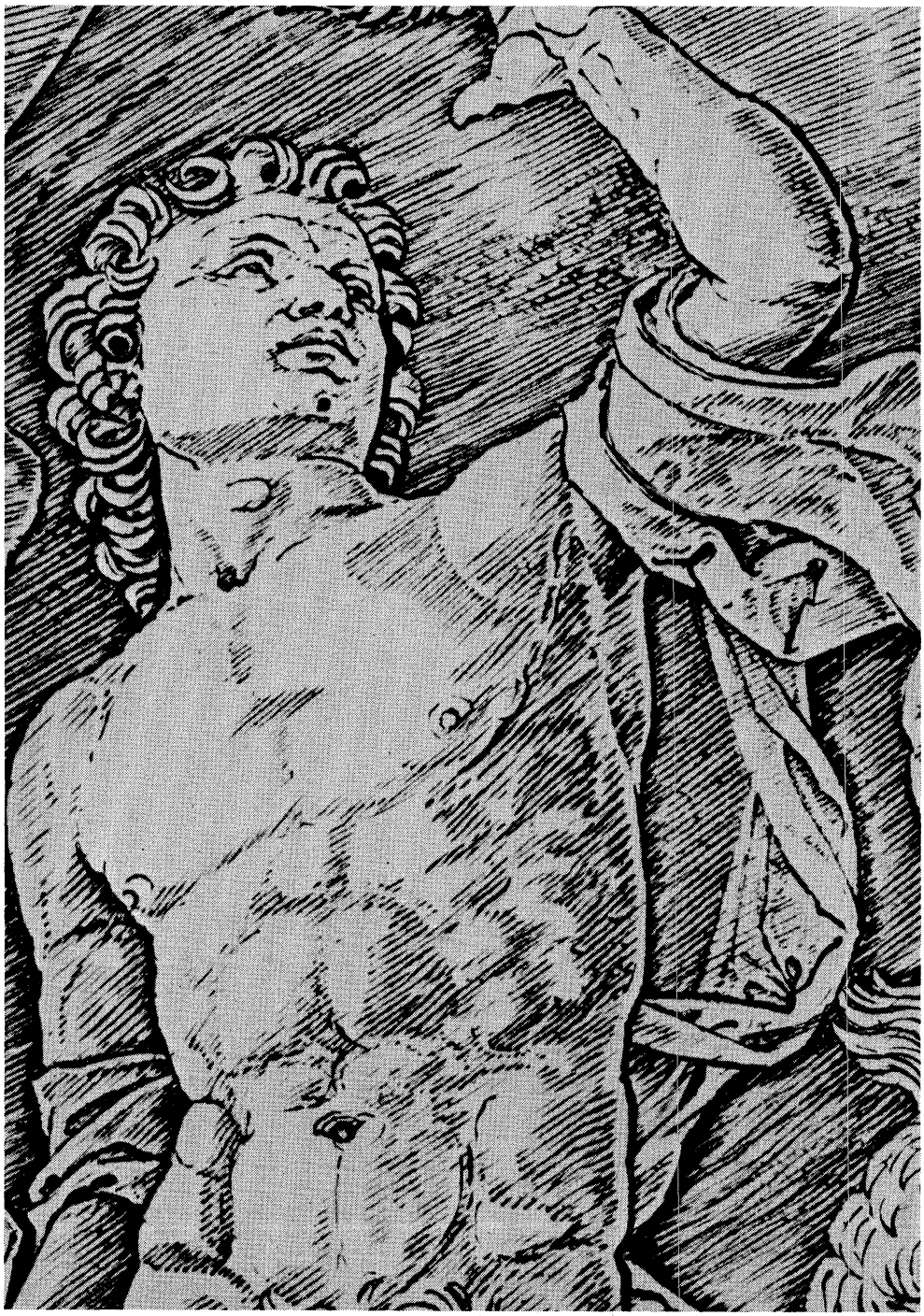
30. Torso from an engraving of Bacchus by Goltzius (1558–1616). Enlarged.



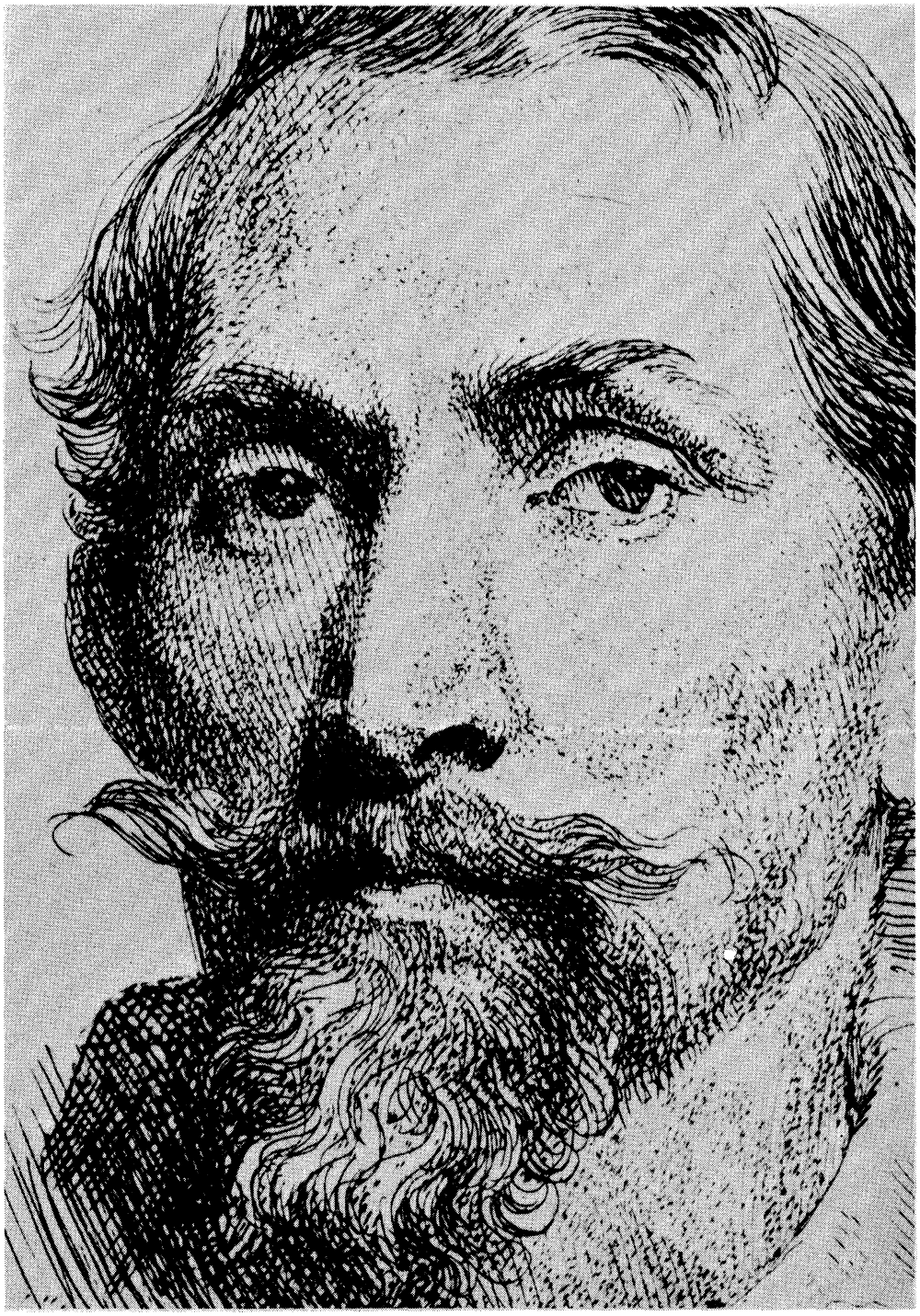
31. A Page from Bosse's *Treatise on Engraving* of 1645. Enlarged.



32. Portion of an early impression of Mantegna's engraving of the Bacchanal with the Wine Press. Enlarged.

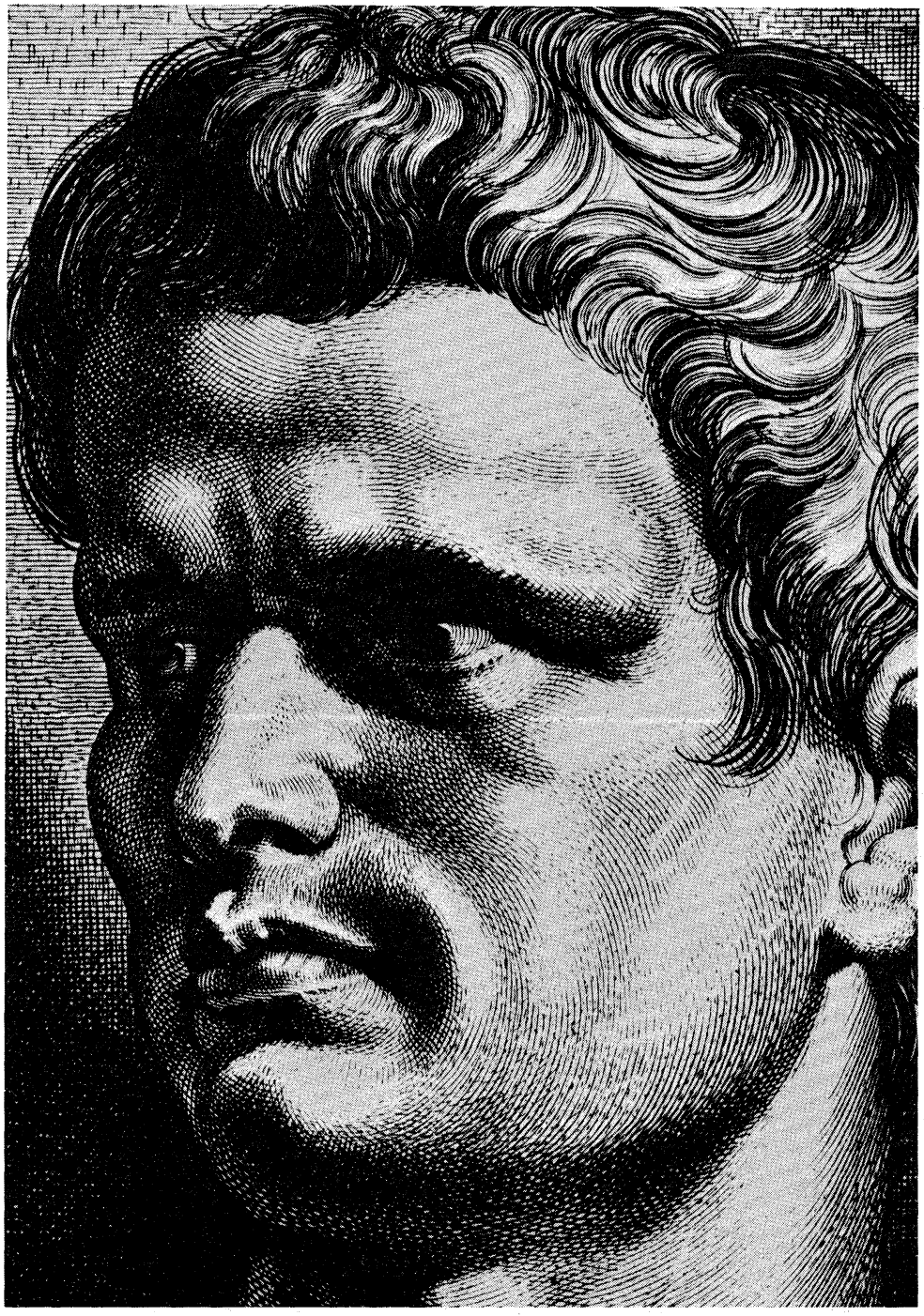


33. The same portion of a late impression of the same engraving.



34. Head from the etched portrait of Frans Snyders by Van Dyck (1599–1641). Enlarged.

35. Head from the engraved portrait of Van Baelen by du Pont (1603–1658) after Van Dyck. Enlarged.



36. Head from an engraving by Vorstermans (1595–1667) after a drawing of an ancient marble by Rubens. Reduced.

first and then with increasing commonness and regularity, the flood of books illustrated with engravings and etchings—processes which did not suffer from the limitations interposed by the paper and the method of inking.

An adequate explanation of these limitations would require a long and boring description of minute details, but it may be said that in spite of all our modern skills it is still a mechanically simpler task to ink and pull good clean impressions from microscopically fine lines sunk below the surface of a sheet of polished metal than it is to ink and pull good clean impressions from what in comparison are very coarse lines which stand up from a surface, whether it be of metal or wood. It depends on the difference between filling sunk lines with ink and then wiping away the excess of ink from the surface, and covering the tops of raised lines with ink and not being able to get rid of any excess of ink on the shoulders and sides of the lines. It also depends on the difference between squeezing softened paper into the ink contained in sunk lines and squeezing ink on the tops of raised lines into paper. We must always remember that while an etched or engraved line stands up above the surface of the paper, a woodcut or other relief line is sunk into the surface of the paper. The extent to which any line stands up from or lies below the surrounding paper has much to do with what is called quality of impression.

The engraved and etched copper plates were more expensive to make and use than wood-blocks. They were slower to print from and could not be made to yield such enormous numbers of impressions, but they were able to provide far more detail without getting so fine in texture that they wore out before a sizable edition could be run off from them. We shall see how in the late sixteenth and early seventeenth centuries the engravers worked out techniques of engraving that greatly increased the number of good impressions they could get from their plates.

For a while the woodcutters tried to compete with the copper engravers by imitating as best they could their linear techniques, as can be seen for example in the blocks made for the mid-century

Venetian publishers and in those by such northern artists as Amman and Stimmer, but the result was merely a generation of bad and streaked and spotty illustrations.

By early in the 1600's the pictorial woodcut had been driven from the pages of all but the smallest number of serious and elegant books. It lingered on in the chap-books and fly sheets made for sale to the peasants and the less educated classes, but retained its place in the purely decorative initials and head and tail pieces which were recognized as necessary parts of the printer's equipment. A few artistic single-sheet woodcuts were made during the seventeenth century, but their number is small and they were apt to be large and decorative rather than small and informative. Naturally, a few original prints managed to find their way into books, but they were unusual, and, in general, not having the fashionable textures that came from the interposition of the reproductive engraver between the artist and the printing surface, they were not popular.

The reign of the woodcut was over. The importance of this comes from the fact that with the woodcut's disappearance from the pages of books the original print, that is, the first-hand pictorial statement of facts, also almost vanished from the pages of books. This was a great but ignored event in the history of European eyesight and had consequences of the greatest importance.

III

SYMBOLISM AND SYNTAX

A RULE OF THE ROAD

THE SIXTEENTH CENTURY

My story has now reached a point at which it is necessary to give thought to some problems of a very general nature. Awareness of them is essential to an understanding of my argument. Many people regard these problems as highly theoretical and of no practical interest, but as I look back at my thirty years in an art museum it seems to me that a great deal of my time was devoted to wrestling with them as immediate and concrete difficulties. Here it is only possible to call attention to them, for their careful analysis would require a long and difficult treatise.

In the museum I learned the bitter way how inadequate words are as tools for description, definition, and classification of objects each of which is unique. I found that while I was not much interested in the actual processes which go on inside a man's brain and nervous system, I was desperately interested in the extent to which he could communicate the results of those processes. I also learned