Jokes of Nature and Jokes of Knowledge:
The Playfulness of Scientific Discourse in Early Modern Europe*

by Paula Findlen

During the sixteenth and seventeenth centuries natural history, and to a certain extent science in general, rediscovered its capacity for playfulness in the form of the scientific joke. By scientific joke, I mean the *lusus naturae*, or joke of nature, and the *lusus scientiae*, or joke of knowledge, that populated the museums and scientific texts of the period.1 The relation between the natural paradox of lusus and the scientific demonstrations and experiments that were also lusus points to the way in which the dynamic between art and nature and between collector and audience unfolded in the spectacle of science. “Nature has joked (*lusit*) uncommonly in all the outward appearances of natural things,” declared the Danish physician Olaf Worm in the 1651 catalogue of his museum.2 More generally, as an introduction to his monumental *De plantis* (1583), the Italian naturalist Cesalpino commented: “The wonderful wisdom . . . which governs and regulates the nature of the universe, and the incredible

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variety of things, also sports (ludit) with beauty on the earth." In­
corporating phenomena as diverse and seemingly unrelated as flow­
ers, shells, seahorses, fossils, giants, unicorns' horns, loadstones,
and zoophytes, many Renaissance naturalists considered lusus natu­
rae to be the key to an efficacious reading of the book of nature.
Concomitantly lusus scientiae evidenced man's ability to match
nature's complexity with his own artifice.

Despite the wealth of evidence on this subject, it has been largely
ignored or confined to the marginal notes of more mainstream top­
ics. Most discussions of scientific jokes have focused solely on the
jokes of nature, looking at them from the vantage point of the his­
tory of geology and paleontology. The only sustained treatment of
jokes of knowledge appears in the literature on anamorphic art. But
these two subjects represent only a tiny fragment of the numerous
phenomena that were classified as playful. Thus we need to broaden
our definition of lusus to understand fully its implications for early
modern scientific discourse and to explicate the relation between sci­
ence and poetics in the Renaissance.

The multiplication of scientific jokes in the sixteenth and seven­
teenth centuries provides an intriguing way to look at natural his­
tory during this period. First, the direct relevance of classical
thought to natural history, especially Aristotle, Ovid, and Pliny,
will be addressed, as the origins of scientific playfulness are found in
these authors. Second, a discussion of lusus allows us to investigate
aspects of pre-Linnaean taxonomy, in particular the need for alter­
native categories in classifying problematic phenomena, for lusus
was frequently used as an anti-definition—a means of explaining
something that would otherwise have been without explanation.
Third, the social relevance of joking in early modern European cul­
ture offers an opportunity briefly to investigate the development of
an audience for science, to understand the dynamic between curi­
osity and virtuosity which was central to the practice of science.

1Andrea Cesalpino, De plantis libri XVI (Florence, 1583), sig. a.2.
4Nicoletta Morello, La nascita della paleontologia nel Seicento (Milan, 1979); Roy Por­
ter, The Making of Geology (Cambridge, Eng., 1977); Paolo Rossi, The Dark Abyss of
Time, trans. Lydia G. Cochrane (Chicago, 1984). The best discussions of lusus as a
whole are found in Jean Céard, La nature et les prodiges: L'insolite au siezième siècle
(Geneva, 1977), and Adalgisa Lugli, Naturalia et mirabilia: Il collezionismo enciclopedico
nelle Wunderkammern d'Europa (Milan, 1983).
1976).
On an even more basic level, we need to consider to what extent the logic of play shaped the logic of science. Jokes are not self-evident; put in contemporary terms, they were an instance of the seemingly occult properties of nature made manifest through the discerning eye of the Renaissance naturalist. As such, lusus frequently distinguished more unusual phenomena from the quotidian. In other instances, it became an organizing principle that described the process of diversification in nature. Both definitions supported the notion that play could create order, that lusus naturae were in fact examples of the subtlety of nature's architecture and lusus scientiae evidence of man's mastery of this complexity. In treating these jokes, we therefore need to ask whether play can be considered an essential structure for scientific activity, and in general intellectual activity, in the sixteenth and seventeenth centuries—a structure that was as viable in the age of "scientific revolution" as the more rationalist approaches of Galileo and Descartes, who certainly did not make a sport of their science.6

While playfulness has a long intellectual and philosophical tradition, it was only fully activated in the sixteenth and seventeenth centuries. "Pythagoras, Socrates, and Plato had the habit of hiding all divine mysteries behind the veil of figurative language to protect their wisdom modestly from the Sophists' boastfulness, of joking seriously and playing assiduously, iocari serio et studiosissime ludere," wrote Marsilio Ficino in his Platonic commentaries.7 The humanists' fascination with figurative language was borne out by the analogies spun by natural philosophers, which held the fabric of their universe together. In keeping with the Renaissance tradition of serio ludere, as seen in More's Utopia and Erasmus' Praise of Folly, which dealt with the most serious political and theological subjects of the day by treating them with irony and humor, the late Renaissance naturalists framed their reading of nature through a similar process.

For discussions of play as an organizing principle, see Johan Huizinga, Homo ludens (Boston, 1955), and Paul Feyerabend, Against Method (London, 1978). Also important to the specific argument that contrasts the Galilean and Cartesian approaches to a more playful science is Krzysztof Pomian, Collectionneurs, amateurs et curieux (Paris, 1987). I do not wish to imply that the more "mainstream" science of this period did not have its playful aspects. Indeed, Galileo's patronage strategies, particularly his involvement with the Lincean Academy in Rome, indicate that despite his theoretical rejection of this brand of science he did not fully exclude natura ludens from his own world.

of intellectual reversal and transformation that highlighted the paradoxes of the natural world. The heightened interest in lusus represented an attempt to reconcile ancient philosophies with new ways of seeing. Scientific jokes clearly demonstrate the new role of observation in early modern science, and what the naturalists and collectors of the period observed was playful. In this respect, joking can be characterized as a practice central to Renaissance science, for it effectively connected the discourse on playfulness to the social experience of the naturalist-collector.

The historiography of sixteenth- and seventeenth-century science has, in recent years, produced a spate of works attacking the idea that science proper is a wholly rational process that emerged separately from and in opposition to late Renaissance natural philosophy. The corrective to the positivistic approach has set up as an alternative structure an occult tradition of science that co-existed with and flourished in the post-Copernican and Newtonian world. "The occult discourse is essentially symbolic," writes Brian Vickers. "In whatever discipline—astrology, alchemy, numerology, or magic—nature is significant not in itself but as a system of signs pointing to another system of mental categories." While Vickers' observations are certainly correct and explain well the system of meaning under which lusus, as a semantic category, was subsumed, he and many of the other scholars of the occult tradition continue to discuss the persistence of the "irrational" as an oppositional structure, at odds with the process of modern science.

While my own research on playfulness as an epistemological structure indicates that its decline in the eighteenth century was, in

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part, related to the development of more economic—hence "logical"—patterns of explaining natural phenomena, I also wish to demonstrate the flexibility of sixteenth- and seventeenth-century science in moving among the various philosophical approaches to knowledge, combining intellectual categories and experiential data in ways that now seem inherently conflictual. Rather than assuming that the traditional polarities set up within the study of science are constants, I wish to shade the meanings of "rational" and "irrational," investigating the gradations of these categories. As a construct that drew on a wide range of discursive practices, lusus provides an interesting opening into the social, cultural, and philosophical systems of the sixteenth and seventeenth centuries—a way of unraveling the tangled webs of meaning that constituted science from the Renaissance to the Enlightenment.

**Rediscovering Pliny**

Before we go into any detail about the jokes themselves, a brief philological excursion is necessary. Where did the term lusus naturae originate and how did it evolve into its sixteenth- and seventeenth-century forms? The classical world delighted in many forms of play: competitions, public spectacles, games of chance, games of love, jokes of language, jokes of knowledge, and of course jokes of nature were all encompassed within this one world. The most obvious starting point for our purposes, however, is Pliny’s *Natural History*. In this encyclopedic work, lusus and other variants of *ludere* appeared several times. Discussing the endless possibilities of human physiognomy, Pliny stated: “Nature, in her ingenuity, has created all these marvels in the human race, with others of a similar nature, as so many amusements to herself (*ludibria sibi*), though they appear miraculous to us.” In other chapters, Pliny singled out shellfish and flowers as examples of nature’s “sportive mood” due to the variety of their shapes and colors.12

12Pliny, *Natural History*, trans. John Bostock and H. T. Riley (London, 1855) 2: 135 (VII.3), 428 (IX.52); 4:304 (XXI.1). I have used Bostock and Riley’s translation throughout and cite the most relevant parts of the Latin from the Loeb ed. of Pliny’s *Natural History*, trans. H. Rackham (Cambridge, MA, 1938): “Haec atque talia ex hominum genere ludibria sibi, nobis miracula, ingeniose fecit natura” (1: 526); “Firmior is iam testae murices et concharum genera, in quibus magna ludentis naturae varietas” (3: 230); “In hortis seri et coronamenta iussit Cato, inenarrabili florum maxime subtilitate, quando nulli potest facilius esse loqui quam rerum naturae pingere, lascivienti praesertim et in magnō gaudio fertilitatis tam variae ludenti” (6: 160).
Not surprisingly, Renaissance terminology was greatly indebted to Pliny's use of lusus. The humanists' interest in Pliny was as much for the breadth of his vocabulary as for his history; his emphasis on nature's playfulness corresponded with their own conception of a plenitudinous universe. The passages from the *Natural History* referring specifically to lusus naturae appeared frequently in the works of naturalists as diverse as Ulisse Aldrovandi, Guillaume Rondelet, Conrad Gesner, Girolamo Cardano, Levinus Lemnius, and Filippo Bonanni. Aside from the precise acknowledgement of Pliny, his philosophy of nature was generally evident in the language of natural history during this time. "So Mysterious is Mother Nature!" exclaimed George Caspar Kirchmayer. "Thus do the greatest curiosities lie hid in the smallest facts." 

The post-classical conception of lusus also subsumed Pliny's notion of the painting of nature. "So great is the variety [of shells]," wrote Filippo Bonanni, "that one can say that which Pliny said of flowers, nulli facilius est loqui, quam rerum Natura pingere." As a euphemism that reflected the breadth of nature's imagination, the image of *natura pictrix* expressed nature's ability to diversify; in this fashion she added color and shape to the world outlined by God. More specifically, the concept described images made by chance—seemingly random examples of nature's ability to be both artist and canvas. Ulisse Aldrovandi's *Musaeum Metallicum*, for example, was filled with instances of nature's joking in this fashion: stones resembling human appendages as well as ones containing crosses.

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16 Bonanni, 1681, 85. See n.11 for the citation from Pliny.
shields, swords, and torches populated his museum, in Bologna. Describing an unusual stone in his museum, the Veronese collector Lodovico Moscardo underlined its painted quality: "In this stone . . . one sees nature joke with art, since in it she reveals many lines that form the shape of trees, houses, and countrysides, as if the learned hand of a famous painter had sketched them." From this perspective, the naturalists perceived lusus to be nature’s recreation; by diversifying herself in unusual and surprising ways she escaped from the weariness of her more mundane tasks, turning the process of creation into an aesthetic experience whose lusus was played out in the challenge its artifice gave to art itself.

Examples of nature painting herself also featured prominently in the Jesuit scientific enterprise. The polymath Athanasius Kircher, founder of the museum at the Collegio Romano, particularly advised his readers: "in a certain marble-like stone you may see cities, mountains, and clouds painted. In this fashion there is [an image of] a turreted city, complete with houses provided with windows, in my museum. . . ." For Kircher and his disciples Gaspar Schott and Filippo Bonanni, such images were iconographic displays of the word of God which, on a scholarly level, mirrored the popular fascination with prodigies as portents. "If a natural effect may be produced by art," wrote Kircher, "then in this display nature is taught by art to reveal" (fig. 1).

Both Kircher and Bonanni expanded nature’s ability to paint to include the geometry of her creations, perhaps in response to their fear of her more chaotic potential and of certain philosophical tendencies that emphasized this disorder. By adding the play of shapes and proportions to the more general definition of lusus as variety, the Jesuits expanded its importance, transforming it into an essential structure for natural philosophy. Comparing mathematics to the study of nature in his *Arithmologia* (1665), Kircher suggested: "And numerical nature plays in the exact same way with crystal, topaz, amethyst, and other precious stones, some of which Nature has composed as triangles, others as tetrahedrons, and still others as

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19 Note overo memorie del museo di Lodovico Moscardo (Padua, 1651), 148.
Fig. 1—Works of Nature the Painter. Athanasius Kircher, *Ars Magna lucis et umbrae* (Amsterdam, 1671), 709. (By permission of the Biblioteca Universitaria, Bologna.)
hexahedrons, dodecahedrons, and icosahedrons. Thus the play of numbers was not confined strictly to the physical sciences but could be read back into the natural world itself.

In the age of post-Tridentine reform, it was hardly surprising that Catholic scholars, writing from within the Church, would emphasize nature’s capacity to organize rather than present her jokes as examples of her willful independence from any higher order. While accepting Plinian natural philosophy on the whole, the Jesuits rejected Pliny’s insistence on chance as the ultimate creative force in the making of lusus naturae. Bonanni, for example, attacked the atomistic explanation of the formation of matter, which emphasized the randomness of nature’s playful creations. Hypothetically imagining the laughter of Democritus at the sight of the Jesuit’s vast shell collection, “showing himself to be a bad philosopher and no Catholic, by giving no credit to things insignificant in appearance,” Bonanni reaffirmed the centrality of detail to his own natural history.

Unlike the sixteenth-century naturalists, who perpetuated Pliny’s humanistic definition of lusus as variety, the seventeenth-century writers strove to reveal nature’s architecture. Perhaps the most literal application of the seriousness of nature’s hidden structure appeared in Kircher’s *Diatribe de prodigiosis crucibus* (1661). Here the microscope became an instrument of religious as well as scientific revelation, for its magnifying powers allowed the viewer to discern more easily crosses formed naturally in fruit, rather than using the naked eye. In fact it seemed that nature had left her brushstrokes everywhere, if only one looked closely enough.

As humorous as it may seem to us to imagine a large proportion of the scientific community peering through technology’s latest wonder to discern the pattern that God had left behind in his natural productions, the search for symbols in all parts of the natural world participated in a complex system of meaning central to late Renaissance culture. The idea of the “serious joke” (*ioco-serio*), a term reappearing constantly in the literature of scientific paradox, succinctly sums up the ability of seventeenth-century discourse to connect the natural world with the spiritual one.

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22Bonanni, 1681, 31-32.
23Kircher, *Diatribe de prodigiosis crucibus* (Rome, 1661), 60. Similarly Aldrovandi included the natural history of the cross in his treatise *De cruce*, BUB, Aldrovandi, MS 51. At the bottom of a list of plants he hoped to receive from Pietro Antonio Micheli, he noted, “Prima di tutte le altre desideraria havere quelle che sono segnate con cruce”; Aldrovandi, MS 56, c. 446.
express profoundly serious topics through laughter. More importantly, it again points to the ability of polarities to exist within one category and, in fact, to create a separate category through their co-existence.

The notion of the scientific joke, particularly in the hands of the Jesuits, who at times seemed to specialize in nothing but this sort of scientific sophistry, became a didactic tool that organized nature from her smallest to her largest creatures, well beyond Pliny’s more amorphous interpretation of res mirabilia. By incorporating the medieval vocabulary of illusion, which conjured up the lusa diabolica, the seventeenth-century naturalists developed a category expansive enough to include the wonders of nature alongside the greater works of God and the artificial creations of man. While this is only one of the many examples that could be offered to illustrate the dynamic properties of the language with which the sixteenth- and seventeenth-century naturalists discussed the jokes of nature, nonetheless it should sufficiently demonstrate that while nature certainly played from antiquity to the eighteenth century, she did not always play in the same way at any given time.

**De Subtilitate**

Having surveyed some aspects of the vocabulary of scientific jokes, let us now turn to the place of several lusus in late Renaissance cosmology. Did nature joke more in one place than another? In a chapter on fish, Pliny hypothesized: “the vulgar notion may very possibly be true, that whatever is produced in any other department of Nature, is to be found in the sea as well; while at the same time, many other productions are there to be found which nowhere else exist.”

Like the mineral world that produced fossils, the sea also housed innumerable jokes, particularly because so many species of

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25 See Du Cange (n. 1) for the medieval definitions of “ludere.” The definition of illusion in the *OED* (5: 48–49), also points out that this word was not in use until the late Middle Ages. Regarding proscriptions against curiosity, see Jean Céard, *La curiosité à la Renaissance* (Paris, 1986), 115, and Krzysztof Pomian, “Collection-microcosme et la culture de la curiosité,” in *Scienze, credenze, occulte, livelli di cultura* (Florence, 1982), 535–57.

26 Pliny, 2: 358–59 (IX. 1).
marine life defied strict classification in one kingdom or another. Was coral plant or mineral? Was the hydra animal or plant? Few sixteenth- and seventeenth-century naturalists pretended to have definitive answers to these paradoxes of classification. Instead the much simpler, and philosophically satisfying, solution was to introduce these problematic phenomena into the ever-flexible category of lusus.

According to classical lore, the sea’s extreme fecundity derived from its warmth; in Aristotelian teleology this added heat facilitated the production of new and diverse phenomena. The sixteenth-century natural philosopher Girolamo Cardano echoed Pliny’s sentiments in his *De rerum varietate* (1557): “In plants and in trees, nature is varied, but she is most diverse in those [creations] which originate in the sea, or at least in a place near the water. . . .” Surely this elaboration of the sea’s procreative powers explains the popularity of wonderous trees in the natural lore of the day which, due to their proximity to water, engendered birds out of shells growing from the branches.

In Cardano’s terms, sea creations like the hydra, coral, pearls, and the nautilus exhibited the *subtilitas* that equated power and order with diversity. Discussing another classic Plinian joke in his *De subtilitate*, Cardano queried: “why, when nature has joked so variously in flowers, nonetheless did she produce neither green nor black ones?” Obviously a further distinction needs to be made between the jokes of nature which exhibited a deficient sort of variety through the absence of probable combinations that the natural philosopher could induce hypothetically and those lusus whose expansiveness surpassed the intellectual powers of the naturalists who classified them. In a universe that operated on the concept of plenitude, quantity was equally as important as quality; to merit sublimity, a joke needed to meet both of these criteria.

At first instance, lusus subsumed particularly rich elements of the quotidian such as flowers and shells. Things unexplainable by or-

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28 Cardano, *De rerum varietate*, 212.


30 Cardano, *De subtilitate*, in *Opera Omnia* (Lyons, 1663) 3:481.
dinary standards and yet obviously not aberrations, hence mon­
strous, were relegated to the realm of jokes—sophisticated deceptions played out by nature in her leisure. Such phenomena were
neither transparent nor potentially diabolical or catastrophic in their peculiarity. Instead, their difference exemplified the “irregular reg­
ularity” with which nature confounded her observers. As such they provided benign fulfillment of the heightened curiosity about
nature’s secrets. “It is the majesty of Nature which cultivates human
curiosity,” noted Gaspar Schott. One example of this more ordi­
nary sort of scientific playfulness was the birth of a gigantic cabbage
in a hospital garden in Nuremberg in 1697. As a scherzo di natura, it
merited an article in the Galleria di Minerva that year. This cabbage
“is privileged in the natural order, because it is not according to the
usual laws of nature. Though it shares its major features in common
with others of its species, [it has] a large and notty stem: thirty-four
massive heads of cabbage resulted from it.”

The best example of this sort of playfulness was the category of
zoophyte in late Renaissance taxonomy. Central to the claim of the
sea’s fecundity, it also applied to a variety of “plant-animals” on land
as well. One of the most fanciful and elaborate zoophytes that puz­
zled naturalists was the Scythian lamb (fig. 2). Described by Scaliger
as a superior ludum and by Claude Duret as a “true zoophyte,” this
creature consisted of the body of a lamb rooted to the ground by a
stem, and reportedly survived by eating the grass around it. Although often skeptical about the veracity of this prodigious creation,
many naturalists nonetheless reported its existence. As one contem­
porary observed, “Indeed if Nature playfully brings forth the monk
fish, affecting an imitation in the sea, why might she not give birth
to a lamb in a row of plants?” The theoretical existence of fantastic
zoophytes in distant lands, like the Scythian lamb, was constantly
reaffirmed by the very real presence of more mundane phenomena
that also crossed and confused these boundaries. From this perspec-

33 “Osservazione fatta da Giovanni Paolo Wurffbaino di una Brassica,” Galleria di
Minerva (Venice, 1697) 1, pt. 4: 143.
34 Duret, 330–345, esp. 331, 335.
35 Benedetto Ceruti and Andrea Chiocco, Musaeum Francisci Calceolarii (Verona,
1622), 642–643; see also Franco’s discussion of zoophytes as lusus in Dornavius, 183.
Similarly, Gesner described the bishopfish as a ludentis miracula, a different example of
crossed genres; Gesner, 4: 439.
Fig. 2—Sylvain Lamb. Claude Durét, *Histoire admirable des plantes et herbes* (Paris, 1663), 310.
(By permission of the Biblioteca Comunale Archiginnasio, Bologna.)
tive, the joke indeed operated as a taxonomic principle, for it dis­solved the difficulties of deciding in which category particularly subtle creations belonged by creating a space in which all of these irregular regularities could fit. 36

"How clever are the jokes (scherzi) of nature," exclaimed Filippo Bonanni in his work on snails and shell collecting. 37 The snail exemplifies the more complex sort of laughter that scientific discourse produced. Its sexual ambiguity, as seen first in the debates over its ability to generate spontaneously and later in the discovery of its her­maphroditism, was a physiological manifestation of the occult properties of ludere and of nature's ability to threaten man's rigid perceptions of normality and abnormality.

In the first instance, the spontaneous generation of snails, an Ar­istotelian dictum defended by Bonanni as late as the early eighteenth century, was perceived to be a physical metaphor for the mystery of creation. Not only was the snail playful in its outer appearance, its shell, but also in its internal organization. Delightfully, for the eighteenth-century naturalists, the lens of the microscope and the tools of dissection revealed that the snail's true generative powers were no less complex. "But the most surprising Circumstance that attends these Creatures, is this," instructed Noel Antoine Pluche; "they are all Hermaphrodites, and have the two Sexes united in them; so that each of them gives to the other that Fecundity which, at the same time is communicated to itself." 38 The seemingly occult joke of one century had become a trope of fecundity in the next.

Discussing some form of stones in oxen, Lorenzo Legati, cata­loguer of the Cospi Museum in Bologna, clearly distinguished them from prodigies or markedly unique phenomena. "Thus nature jokes," he hypothesized, "in this manner making it seem that oxen lay eggs." Like the sexuality of the snail, the apparent signs of female fertility in oxen rendered them biologically problematic. Here a double entendre can be discerned, for stones unto themselves might be classified as lusus—the presence of the mineral world within the animal one—and the purposeful confusion of this sport of nature for

36The best discussion of taxonomy during this period is M. M. Slaughter, Universal Languages and Scientific Taxonomy in the Seventeenth Century (Cambridge, Eng., 1982).
37Bonanni, 1681, 14. See also Daniel Bartoli, La ricreatione del savio (Rome, 1659), and Lorenzo Legati, Museo Cospiano (Bologna, 1677), 108.
another type of joke only heightened the playfulness of scientific discovery.

In all instances, what separated the jokes from the marvelous or the prodigious was the regularity with which they occurred. Elaborating on his discussion of “Diverse Oxen’s Eggs, as Cardano called them,” Legati added: “These are only monstrous in name, not being outside the order of Nature in their fabrication. And more usefully they would be called Balls or Globes, having no other similarity with Eggs than their shape. . . .” The snail would always be hermaphroditical, the chameleon would always change colors, “just as an actor puts on a mask,” and this predictability differentiated them, say, from Siamese twins or two-headed calves whose appearance was truly unheralded.

Given their regularity, what made the jokes of nature unusual? As Legati’s description of the monstrous eggs suggests, all lusus shared the quality of illusion. More or less, they fit Cardano’s definition of the third, and most common, type of secret which “was known to many, but nevertheless without evident cause.” Thus the naturalist, as purveyor of such secrets, held the key to the system of nature through knowledge of its subtlety.

“The shell Aura Marina is formed in the likeness of an ear,” reported one collector of scientific jokes. Explaining the nomenclature of articulated coral, the same naturalist noted, “in its joints it seems to want to imitate animal bone.” In categorizing nature’s subtlety, lusus was not merely an alternative category, created in opposition to the more normal taxonomic principles of the day. Rather it incorporated the important organizing principle of homology, such a central feature of pre-Linnaean taxonomy, through its recognition and concomitant naming of parallel structures in diverse organisms. Its crystallization as a category that clarified the rela-

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39Legati, 20–21. See Worm, 311–12, for a different, equally interesting discussion of lusus and fertility; also a letter from Francesco Ginanni to Ferdinando Bassi, Ravenna, 22 March 1755, BUB, Cod. 296 (233), vol. 10, unpag.
40Isaac Schookius, On Chameleons, in Goldsmid 4: 11.
41Paraphrased from Cardano’s De secretis, in Tommaso Garzoni, Piazza universale (Venice, 1651), 152.
42Moscardo, 194, 204.
tions between different kingdoms was a logical outcome of the clas­
sical taxonomic systems of Aristotle, Theophrastus, Dioscorides,
and Pliny which shaped natural history until the mid-eighteenth
century.

Renaissance natural history fabricated categories that purpose­
fully demonstrated the permeability of the boundaries among king­
doms, challenging the ability of the naturalists to taxonomize their
world. A particularly interesting demonstration of nature’s illUsive
qualities concerned the controversy over the existence of giants.
The museums and cabinets of curiosity in early modern Europe
abounded with examples of this instance of nature’s largesse. “I con­
fess,” wrote Thomas Molyneux, “there is hardly a considerable col­
lection of this kind, or a printed description of a Musaeum extant,
where some part or other of a Giant is not to be met with.” The
lusus of giants lay not only in the quality of seeming, that is, in the
animal bones that seemed human or at times were simply mineral
formations in the shape of a human appendage; the joke was a trope
of proportion as well. For those who believed in giants, the play of
nature was worked out in their grandeur. “Here there are jokes of
nature, as marvellous in the smallest things as in the largest of her
productions,” remarked Cardano (fig. 3). The specific controversies over the existence of giants have been
well discussed by Jean Céard and Antoine Schnapper, so I shall not
repeat the details here. What concerns us is the paradox of classifi­
cation which these arguments engendered. For if giants did not ex­
ist, as many critics argued, then what was the provenance of such
explicable large remains?

Regarding the furor over the remains of a Teutonic king un­
covered in France in 1613, the acerbic spokesman for the Parisian med­
ical community, Jean Riolan the Younger, preferred the explanation

(Rome, 1987). For a review of recent literature on this subject, see Paula Findlen,
“Empty Signs? Reading the Book of Nature in Renaissance Science,” Studies in the His­
tory and Philosophy of Science, forthcoming.

489. A museum description that extensively discusses giants’ bones is the “Lettera del­
eccell.mo Cavallara all’Eccellentissimo Signor Girolamo Conforto” in Discorsi di M．
Filippo Costa (Mantua, 1586), sig.Ee.4'. Antoine Schnapper lists many examples in his

*Cardano, De rerum varietate (VIII.43), in Céard, “La querelle des géants et la jeu­
Bonanni also makes this explicit comparison between the smallest and the largest
creations.
Fig. 3—Giant. *Athanasius Kircher, Mundus subterraneus* (Amsterdam, 1664), 2:56. (By permission of the Biblioteca Universitaria, Bologna.)
that the bones belonged neither to men nor to elephants but were fossils. He and many of his contemporaries who advocated this form of the lusus explanation simply transferred the Plinian notion of the sea's fecundity to the earth by pointing out that the play of fossils was much more diverse and perplexing than that of the sea. Once again the innocent jokes of nature were confounding the scientific community.

The illusive nature of unicorn's horns, also a popular item in the naturalist's repertoire, strengthened the interpretation of giant's bones as fossil plays. In his *De unicornu* (1645), the Danish physician Thomas Bartholin described an example of *Homo Monocerotus* (half man, half unicorn) as an instance in which *Natura lusit*. Besides unicorn's horns, the other obvious analogy to the place of giants lay in the perception of pygmies. The classical explanation of this example of nature's deficiency also revolved around the quality of seeming. Galen "judges pygmies to be a certain species of apes," wrote Conrad Gesner, "not men, but with a shape and erect stature similar to men..." While the ancient perception of pygmies occasionally reinforced the arguments against the existence of giants, the presence of diminutive men in the courts and museums more often was cited as evidence that giants had their place among nature's creations. The famous naturalist Ulisse Aldrovandi collected broadsheets depicting contemporary dwarves, and the museum of the senator Ferdinando Cospi in seventeenth-century Bologna employed a dwarf as both exhibitor and exhibit—a specific example of the facility with which the practice of joking moved easily from the intellectual to the social realm. "Among the other worthy and notable particulars that are conserved in our museum," wrote Francesco Imperato, son of the Neapolitan apothecary Ferrante, "is a small pygmy, a little less than a span in height." The physical presence of the stuffed body, preserved for the anthropological delectation of visitors to his museum, served to remind its viewers that such things did exist, and that if nature saw fit to create tiny

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66Riolan, *Gigantomachie pour répondre a la Gigantostologie* (Paris, 1613); Céard, 1978, 74–75. Regarding the transferral of the sea's fecundity to the earth, see Anton–Lazzaro Moro, *De' crustacei e degli altri corpi marini che si trovono su' monti* (Venice, 1740), 11.

67Bartholin, *De unicornu observationes novae* (Padua, 1645) 18, 53.

68Gesner, 1: 855.

69BUB, Aldrovandi, Tavole di animali 6: fig. 41. See also the frontispiece of Legati's catalogue of the Cospi museum.

70Imperato, *Discorsi intorno a diverse cose naturali* (Naples, 1628), 32.
men it was no less improbable that she would construct others on a
gargantuan scale.

"Similarly why indeed might [man] not be given to deficiency,
especially given the excessive magnitude of Giants?", queried Cas­
par Bartholin in his *De pygmaeis* (1628). To be effective, the trope
of proportion had to operate in both directions. Subtilitas was not
only found in the delicate and minute intricacy of nature’s smallest
beings; rather it was the web of elaborate and harmonious relation­
ships between smallest and largest, between ordinary and extraor­
dinary, that forged the intricacy of sixteenth- and seventeenth-cen­
tury taxonomy.

**Metamorphosis and Mimesis**

Returning to the classical canons that gave play a central role in
scientific discourse, let us consider the role of Ovid’s *Metamorphoses*. Ovid held a particularly important place in all aspects of Renaissance
thought. From the numerous editions, translations, and imitations
of his poetry to the artistic renderings of his tales which appeared in
cycles as noteworthy as those decorating the *studio* of Francesco I
de’ Medici and in gardens and grottoes, encapsulating the perpetual
tension between nature and art, Ovidian imagery was a powerful
presence in the Renaissance imagination. The fascination with
Ovid makes evident the centrality of fables to all aspects of Renais­
sance culture, including science. Aldrovandi, for example, included
*fabulae* as an important category of description for any natural ob­
ject, and he even made a pilgrimage to the location of Ovid’s house
to pay homage to the poet. Thus the place of *lusus* in sixteenth- and
seventeenth-century science underscored its poetic construction.

Only once in his work did Ovid explicitly use *ludere* with the
same connotation that Pliny gave it. More influential, however, was
his image of metamorphosis. At one point in the fifteenth metamor­
phosis, Pythagoras reflected: "Nor does anything retain its own ap­
pearance permanently. Ever-inventive nature continually produces
one shape from another. Nothing in the entire universe ever per­

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51 Bartholin, *Opuscula quatuor singularia* (Hafniae, 1628), 10, 19.
52 The literature on this topic is enormous. For a comprehensive survey of the in­
terdisciplinary nature of Renaissance Ovidian imagery, see Leonard Barkan, *The Gods
Made Flesh: Metamorphosis and the Pursuit of Paganism* (New Haven, 1984); also Eugenio
53 BUB, Aldrovandi, MS 136, XII, c.2.
ishes, believe me, but things vary and adapt a new form.” The nat­
ural history of the sixteenth and seventeenth centuries abounded
with such transformations, for the most part lifted directly from Ar­
istotle, Ovid, and Pliny. Paraphrasing Kircher, Gioseffo Petrucci
explained: “The works of Nature are prodigious. Whoever does not
penetrate the reasons behind them, imagining it to be impossible,
does not believe in them. . . . Do not doubt that the most extrava­
tagant Metamorphoses that we hear of occurring at all hours in lands
distant from our own are jokes [scherzi] of ingenious Nature.”
Certain naturalists seemed to make the observation of these trans­
formations their specialty. The best illustration of Ovid’s influence
is undoubtedly Giovan Battista Della Porta’s Magia naturalis (1558).
Here horses engendered wasps, mules drones, and red toads arose
from dirt and menstrual blood. It appeared that nature was con­
stantly in flux, always in the process of becoming something else.

The most frequently cited passage from Ovid regarding the or­
igin of nature’s transformative powers concerned the tale of Perseus
and the Medusa’s head. After saving Andromeda, Perseus hid the
head among the weeds to protect people from its terrible power:

The freshly gathered weed, still living and absorbent, drew into itself the
power of the monster; hardening at the touch of the head, it acquired a strange
new rigidity in its leaves and branches. The sea nymphs tested this miracle, try­
ing it on several twigs, and were delighted to find the same thing happening
again. By scattering seeds from these plants over the waves, they produced
more of this substance. Even today coral retains this same nature, hardening at
the touch of air: that which was a plant when under water becomes rock when
brought above the surface.

Describing the coral displayed in the museum of the Veronese
apothecary Francesco Calzolari, Benedetto Ceruti used this tale to
explain the plant’s transformation. Ovid’s fictive device served to
explain scientific fact. “We have our own Gorgons,” advised Paolo
Terzago of Manfredo Settala’s museum in Milan. “If you wish to

54Referring to the arrival of spring, Ovid mused: “Everything then is in flower, the
fertile earth plays [ludit] with brightly colored flowers” (XV, 204–05). The above quo­
tation is my translation from the Latin; Ovid, Metamorphoses, ed. and trans. Ferruccio
Bernini (Bologna, 1968) 2: 296. All other citations are taken from Ovid, Meta­
45.
55Petrucci, Prodomo apologetico alii studi Chircheriani (Amsterdam, 1677), 143–44.
56Della Porta, Natural Magick (London, 1658), ed. Derek J. Price (New York,
1957), 28, 30; see also Duret, 221, 287, 303.
57Ovid, 114.
approach these Niobean metamorphoses, Ulisse Aldrovandi makes as many of them as possible accessible to you." Appropriately Aldrovandi explained the etymology of *pietra gorgonia* as a name for coral “because the poets pretend that the Gorgons transformed themselves into stone.”

Drawing on another passage from Ovid, in which the urine of lynxes turned to stone, John Jonstone wrote of juices that calcified: “Nature hath wonderfully sported herself in them, sometimes it hardens before it touch the ground and sometime when it is fallen down.” Truly at times we must wonder whether or not the naturalists drew on Aesop as well as Ovid, ironizing the concept of metamorphoses by pointing out that they did not always turn out well!

The last element of my brief lexicography concerns the relation between lusus and mimesis. Yet another aspect of the joke’s possibilities was its ability to imitate and transform. In scientific terms, this definition had two applications. The first, cast in the Ovidian and Plinian modes, concerned the joke of nature. The importance of mirror images in Greek thought, particularly the notion that similarity produced a magical bond between two objects, must certainly be the origins of this relation. Yet we also need to consider the tale of Narcissus who, looking into the pool of water, was “excited by the very illusion that deceived his eyes.” As Agrippa described nature’s mimetic propensities in his *De occulta philosophia* (1533): “The world is the image of God, man the image of the world, animals that of man, plant life that of animals, metals that of plant life, and stones that of metals.” More specifically, the French surgeon Ambroise Paré directly related lusus and mimesis in his popular treatise *Des monstres et prodiges* (1573), remarking: “one sees in rocks and plants

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58 Ceruti and Chiocco, 5, 10; BUB, Aldrovandi, MS 143, V, c.332.
59 Jonstone, 102; Kircher, 1677, i: 286; Legati, 128; Paolo Terzago, *Musaeum Septalianum* (Tortona, 1664), 258.
60 Jonstone, 102; Kircher, 1677, i: 286; Legati, 128; Paolo Terzago, *Musaeum Septalianum* (Tortona, 1664), 258.
63 Ovid, 85.
64 Henry Cornelius Agrippa, *De occulta philosophia*, 1:37.
effigies of men and other animals, and there is no explanation for them, except to say that Nature is disporting herself (se ioue) in her creations."  

While the idea of nature unfolding herself could be applied to a variety of phenomena, it was most precisely delineated in the discourse concerning fossils and generally in the ability of the mineral kingdom to serve as a repository of the images extant in the other two kingdoms. Although a growing number of naturalists had their suspicions about the inorganic nature of fossils by the end of the seventeenth century—"nature neither jokes nor imitates but makes real and perfect minerals," observed one critic—during this period they were usually classified as spontaneously generated mineral formations on which the book of nature was writ, just as Aristotle had suggested. Describing an armarium filled with figured stones (Lapides ΙΔΙΩΜΟΠΘΟΙ) in the sixteenth-century Vatican mineralogical collection, its keeper Michele Mercati noted: "The plays of nature are united here, almost as a likeness in stone of living things, shaped by no other assistant than the innocent joke of nature."  

Similarly prized by collectors of rare horticulture were the flowers that assumed various shapes. In a description of an anthropomorphic orchid found in the Roman College museum, Gaspar Schott conveyed the sense of wonder that the viewing of such exotica produced: "Whoever examines the figures or rather the signatures of this plant, impressed in many flowers, frequently is rightfully amazed at the power or rather zealouosity of nature in her productions. Thus nature has joked (lusit), imprinting a human figure in some of them." Nature, in this conception, was cast as Narcissus—forever looking at herself in the mirror that the juxtaposition of the three kingdoms provided.  

On a more abstract level, the increased interest in physiognomy during the sixteenth and seventeenth centuries, as seen in the popularity of Della Porta's De humana physiognomia (1586), can be viewed as the sublime example of the obsession with nature's pro-

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65 Torellio Saraina, Dell'origine et ampiezza della città di Verona, trans. Orlando Pescetti (Verona, 1649), 8. This is a paraphrase of Girolamo Fracastero's opinion about fossils. See Martin Rudwick, The Meaning of Fossils, 2d ed. (Chicago, 1985), 1–100, passim.
66 Michele Mercati, Metallotheca (Rome, 1717), 216.
67 Schott, Physica curiosa (Herbipoli, 1697), 2: 1362; Ceruti and Chiocco, Museum Francisci Calcetorii, 521; Kircher, 1677, 2: 348.
penisity to imitate. In the study of signs in the human body, the body itself became a repository of all the images of the natural—and frequently the unnatural—world, as Pliny had initially suggested (fig. 4). Elaborating on the analogies between macrocosm and microcosm, Kircher described the play of nature on the earth "just as eternal Wisdom has played with the fabric of the human body."68

Just as nature imitated man, from the apes that "imitate the form, effigy, and human gestures" to the anthropomorphic bits of flora and fauna, man himself mimicked nature.69 In a remarkable passage of Laurent Joubert's Tractat du ris (1579), the ability of man to apply nature's transformative powers to himself was delineated:

It is written that a barbarian, when asked what he thought was the most remarkable thing in this theatre of the world, answered (not as a barbarian but as a wise person) that man surpassed completely all capacity of admiration. For he is not only prince among the animals, and of a divine splendor by virtue of his reason and understanding, interpreter of all Nature, but also of the nature of a Proteus, or of a chameleon; of a frail and unsteady strength, he transforms himself into everything he wishes again and again. This is found to be very true when one observes that the mind's vehement movements dissolve and undo the body, just as devil-fish and polyps change their diverse colors at every occasion, according to their surroundings.70

The mirror of nature worked both ways. Not only did the lower creations serve as repositories of the higher ones in the great chain of being, but man, the most perfect of all natural creations, became the ultimate lusus.

The Illusions and Delusions of Science

As has been extensively discussed in the art historical literature, the notion of nature as her own transforming agent had its parallel in the ability of man to imitate or recast nature.71 Nature did not only produce her own metamorphoses and mimeses; she also could be reshaped and recreated in the laboratory. The play of science evolved

68 Kircher, 1677, 1: 297.
69 Imperato, 12–13.
70 Joubert, Treatise on Laughter (1579), trans. Gregory David de Rocher (University, AL, 1980), 71.
71 See Janson and Lugli, 111. "Lusus scientiae" is a phrase coined by Adalgisa Lugli in her book. (I would like to thank her for confirming this for me). Despite its absence, it is a particularly apt way of summing up this aspect of scientific play, especially since a variety of experiments were frequently described as "lusus" or "ludi," and many of the artificial devices constructed to mimic or contort nature, particularly in gardens or grottoes, were called "giuochi."
FIG. 4—Similarities, Giambattista Della Porta, De humana physiognomia (Naples, 1610), 121.

(By permission of the Biblioteca Universitaria, Bologna.)
from the play of nature; the identification of lusus was an integral part of scientific practice since the model for experimental activity was drawn from experience, which included the spontaneous “experiments” found in nature. “A curious thing has just accidentally happened to me,” wrote Francesco Carli in a hasty postscript to the Jesuit Kircher. While performing an experiment to produce talcum, Carli had left a residue of the mixture in a glass vial, after transferring the compound to another container; “the next day I found the residue condensed into many figures, each representing a living flower,” explained Carli. Kircher, in turn, responded: “Before the second of the current month, I received your most learned letter, and with it the marvellous experiment (esperienza) of the distilled talcum—effects which demonstrate how playful nature is (quanto scherzevole la Natura) more than they bring honor to you. And if my studies allow me enough leisure to try this experiment, I wish to see it for myself.”

Not unlike something that might appear today in the Journal of Irreproducible Results, the jokes of knowledge complexified the Ovidian and Plinian implications of ludere. Their variety was not found in nature but derived from it.

On the most basic level, man’s ability to play mimicked nature’s own instincts. “Whoever imitates, does he not make a joke of sorts? So says Plato in his tenth law.” Should it surprise us that this comment was made in the context of a discussion of Giuseppe Arcimboldo’s paintings, the creator of fantastic visions of nature and art at the court of Rudolf II in Prague? The penchant for arcimboldesques—monstrous and artificial physiognomies as one contemporary illustration labelled them (fig. 5)—in the sixteenth and seventeenth centuries provides ample evidence of the expansion of nature’s metamorphic potential. Water, for example, removed from its natural context to the painted canvas, became a compendium of its parts, the sum of which produced a human face whose physiognomy, or rather readability, defied even Della Porta’s complex categories.

72 Pontificia Università Gregoriana (hereafter PUG), Kircher, MS 564 (X), f.104 (Carli to Kircher, Verona, 10 September 1668); f.113 (Kircher to Carli, Rome, 4 February 1669).

73 Gregorio Comanini, Il Figino overo della fine della pittura (1591), in Trattati dell’arte del Cinquecento, ed. Paola Barocchi (Bari, 1962), 284–85. There is a vast and expanding literature on Arcimboldo, most of which is cited in the bibliography of Effetto arcimboldo (Milan, 1987).
FIG. 5—Arcimboldesques. Michael Rupert Besler, *Gazophylacium rerum naturalium* (Leipzig, 1733). (By permission of the Biblioteca Universitaria, Bologna.)
Not surprisingly, many of the museums that contained lusus naturae often displayed arcimboldesques, reworking all of the constituent elements of the collection into these figurines. In one of Pluche's dialogues in his *Spectacle de la nature*, the Count de Jonval, about to introduce his audience to the world of testaceous wonders, described the artifice with which shell collections were arranged: “Some curious Persons, who are not studious of the Natural History of those Shells, as they are of the different Effects they are capable of producing, by the Assemblage and Disposition of their amiable Colours, make large Collections of them in all Shapes, and work them into artificial Rarities of a peculiar Taste; such a Sprigs of Flowers, Garlands, Grottos, Landskips, Architecture, and Figures of Men and Animals, the whole composed of large and little Shells.” The use of lusus naturae, as shells certainly were, to create a lusus scientiae that was an image of the ultimate lusus, man, set in motion a chain of operations that playfully inverted (or even subverted) nature’s ability to mimic and ultimately transform herself. While the eighteenth-century naturalists classified this particular form of lusus as an aesthetic rather than a scientific joke, Renaissance virtuosi incorporated both components of playfulness into a larger philosophical framework.

Besides the jokes that perpetuated the variety found in nature, there were also many that added to it. Many museums offered purported examples of “real” giant’s bones, unicorns’ horns, or the famous basilisk, a lizard of legendary ferocity. On one level, the physical existence of these legendary creatures, whose presence in a collection was considered proof of their authenticity, was designed to fulfill the variety of nature which the classical literature promised. Equally, the renowned many-headed hydra or the imaginary fish created by Spallanzani in his eighteenth-century natural history collection served as more ironic comments on the obsession with rarity during this period. On a trip to Modena in 1664, the English virtuoso Philip Skippon visited the ducal palace where he was given a

74A particularly popular item was the figurine of a man made out of shells. Many examples of this arcimboldesque are still extant; Lugli, fig. 99; Antonio Aimi, Vincenzo De Michele, and Alessandro Morandotti, eds., *Museo Septalianum: Una collezione scientifica nella Milano del Seicento* (Florence, 1984), 54, 64; also the frontispiece of Bonanni’s *Ricreatione*, and Albert Seba, *Locupletissimi rerum naturalium thesauri accurata descriptio* (Amsterdam, 1734–65) 3: 112–13, fig. 37.

75Pluche, 1: 193–94.

76Regarding Spallanzani’s fish, see Lugli, 111.
tour of the Este collection. He particularly noted the presence of: “A Hydra with seven heads, the middlemost of which was biggest, and had two canine teeth, and six little ones between, a long tail, two feet, with four claws on each, and five rows of tubercles on his back. . . . Very probably this Hydra was fictitious, the head being like that of a fichet, or of that kind, the body and feet were of a rabbet or hare, and the tail was made of common snake’s skin, the back and neck covered with the same.”77 Forged of many parts of various animals, such spectacles prefigured Barnum’s mermaid. They invited the viewer either to participate in the joke, by understanding the subtle transition from natural to artificial, or to be deceived by it and, in a sense, to become the joke himself.

But the practice of joking was not simply about taxonomy. It also entered the theatrical world of scientific demonstration and experiment, where illusion and delusion were bywords. In the prologue to his Magia universalis (1657), Gaspar Schott warned his readers: “Here the theater where art and nature play is exposed to curiosity: but while they play for the learned, they deceive (illumunt) the ignorant.”78 Deception was a particularly important feature of the lusus scientiae; play and illusion were never very far apart, both linguistically and practically. Upon seeing the English Jesuit college in Antwerp in 1663, Skippon remarked, “In their Officina pharmaceutica we observed curious shells, and many artificial imitations of nature.”79 Books of secrets like Alexis of Piedmont’s Secreti (1555) and Della Porta’s Magia naturalis (1558), such an important part of the diffusion of scientific knowledge in the sixteenth and seventeenth centuries, were filled with recipes that advised their readers on the counterfeiting of nature, and all of the objects present in the Renaissance museums invited the viewer to authenticate their verity as well as their rarity.80

While on a popular level, the illusory qualities of scientific play were classified as charlatanism, the more scholarly play of the virtuosi increasingly became a central feature of scientific activity. “I shall not pass by a merry conceit of the loadstone,” wrote Della

78In Colie, 306.
79Skippon, 380.
Porta, “that I have oft-times made my friends sport with, for the
good of those that are curious in the search of the reasons of things.”
Suggested experiments included the creation of a ouija board by put-
ting a wooden figurine in a rowboat in the middle of a container of
water, surrounded by the letters of the alphabet. Through the ma-
ipulation of a magnet, the rowboat mysteriously spelled out words
to the amazement and delight of the audience. Another popular item
involved a sheet of paper with a piece of metal attached to the back.
When placed against a wall, behind which a boy with a magnet was
hidden, the paper unfathomably moved on its own.  

“Did you not see how miraculous the play of the elements would be?,” exclaimed
Kircher in an elaboration of his theory of universal magnetism.  

And indeed the scientific ludi dreamed up by the natural philoso-
phers prefigured the more spectacular demonstrations of electricity,
those “physical and magnetic recreations” that populated eight-
teenth-century science.  

The games of knowledge unfolded in several different stages.
First was the remystification or masking of natural phenomena
through artificial devices; second, the presentation of the game
through demonstration; and third, the repeatability of the play for
the initiated which the textbook explanations of these academic ridd-
dles offered. The jokes of knowledge did not have a purely social
function, though their preponderance was no doubt due to the pop-
ularity such demonstrations and puzzles enjoyed in the courts, uni-
versities, and academies of early modern Europe. Rather, they pro-
vided the perfect mixture of docere and delectare, for they taught and
amused simultaneously.  

“For several days I have had a public demonstration of the im-
possibility of motus perpetui artificialis,” wrote Gaspar Schott to Kircher.  

The experimental work of the seventeenth-century Jes-
uits at times drew heavily on the experimental tradition laid out in
the books of secrets. They too offered their audience a chance to play
of its own, to practice the paradoxes and metamorphoses so lavishly

81 Della Porta, 1957, 204–05.
82 Kircher, Magneticum naturae regnum sive disceptatio physiologica (Amsterdam, 1667), 47.
83 John L. Heilbron, Elements of Early Modern Physics (Berkeley, 1982), 8–9, 179–82.
84 For a discussion of the docere-delectare relation, see José Antonio Maravall, Culture of the Baroque, trans. Terry Cochran (Theory and History of Literature, 25 [Minne-
apolis, 1986]), 77.
85 PUG, Kircher, MS 567 (XIII), f.45 (Schott to Kircher, Herbipoli, 16 June 1657).
illustrated in the museums, public lectures, and textbooks of the scientific community. "The marvels that you deigned to show me in your most curious gallery, Father..." wrote Filippo Sbarra after a visit to the museum at the Collegio Romano, "have led me to submit to your criticism some of my inventions, which I have worked on as a diversion from domestic cares." Describing his own collection of human stones, Kircher suggested to his readers a formula for creating their own lusus: one needed only to fill a jar with urine and wait for it to calcify. On the less mundane side, compression experiments in a glass tube in which "the various spectacles of the plays of nature... are exhibited" were also popular items in the Jesuit repertoire. Performed before an amazed and appreciative audience, experimental play revealed a human subtilitas that scientific showmanship demanded.

The optical work of the Jesuits combined ludere and illudere with the greatest sophistication. Like Cardano and Della Porta, they were fascinated by magic lanterns, distorting mirrors, and other forms of optical illusions. Narcissus no longer looked into the mirror and saw simply himself; rather, as Kircher suggested, the mirror told him "that man can be transmuted into any possible form." Was this not a fulfillment of the taxonomic principle upon which Della Porta had based his De physiognomia? One looked into an ordinary mirror and saw only the mask of humanity. But a distorting mirror revealed one's true self: "For had you looked into the mirror when it was upright, you would have seen your face changed into the head of a crane with a great long neck. If you inspected it [closer], like the flooding of a dike, similarly you would make a rhinocerus' horn grow out of the front of your head.... In a word, no monstrous thing is so deformed, that you might not adorn yourself with a similarly formed shape by gazing at yourself in the mirror." In this respect, the games of distortion were emblems of moral truth. One looked in the mirror, never knowing what sort of phantasm might emerge. The mirrors also distinguished one's ability to read a joke, to get the trick. As Kircher described in his Ars magna (1761), "Many of the unlearned were fooled by the phantasm of each Catoptricus. As long as their eyes cannot discern the outward appearance of the

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86PUG, Kircher, MS 564 (X), f.150 (Sbarra to Kircher, Rome, 19 July 1667).
87Kircher, 1677, 2: 52-53; see also Schott, Ioco-seriorum naturae et artis, sive magiae naturalis centuria tres (Wurzburg, 1677), 43; Kircher, Physiologia Kircheriana Experimentalis (Amsterdam, 1680), 149.
things shown, they investigate [them] with palpitating hands, not without causing laughter, so wonderfully does the work of the Catoptricus elude the vision of the eyes."^{88}

Pietro Scarabelli described Manfredo Settala’s collection of optical illusions—filled with “a thousand playful deceits”—as a means of transforming images with extravagant diversity: “From this mirror Democritus would have no less reason to laugh than Heraclitus to cry, for together they laugh and cry at the monstrous inconstancy of the human condition, of which Ovid would laugh:

\[
\text{Nihil est, toto quod potest in orbe} \\
\text{Cuncta fluunt, omnisq; vagans formatur imago.}
\]

Thus the scientific playfulness of mirrors was a conscious attempt to rewrite the fable of Narcissus, blending “poetic fiction” and scientific fact.^{89}

It was a short step from the creation of artificial metamorphoses, plays that reproduced transformations found in nature, to the invention of anamorphoses, distortions of the mind that produced supernatural effects in the literal sense of the word. The anamorphic art of the sixteenth and seventeenth centuries, if not created by the Jesuits, was fostered by their passion for it. The works of Kircher, Schott, Mario Bettini, and Jean-François Niceron were filled with examples of tricks of perspective. In fact, the term anamorphosis first appeared in Schott’s *Magia universalis*.^{90} The anamorphoses paralleled the optical tricks we have just discussed. In the first instance, the mirror itself transformed and distorted the regular form presented in front of it, just as the “mirrors” between each kingdom transformed phenomena in the translation from one kingdom to another. In the latter instance, the mirror or particular point of perspective made the already distorted image clear and transparent.

Describing the process of anamorphosis, the creators of this “secret” of perspective made it clear that they were aware of the limits that they had surpassed. Comparing the construction of grottoes, another lusus scientiae, to the fabrication of these marvelous distort-
tions, Jean–François Niceron pointed out ways in which the process of illusion could be transferred to other domains:

It seems to me that one can apply all of the propositions in this book, still with much gracefulness, to the embellishment of artificial grottoes and their rock-work. For those who work in them usually create masks, statues, satyrs, or other grotesque figures made of shells, using their natural color and configuration according to what is most appropriate for the representation of certain parts. By using these rules, they could also create some disfigured and deformed figures from inlaid work or shells, which would neither be well-ordered nor represent anything [like the objects from which they were created], thus resembling those of the second part of this book. And this will be so much the more agreeable, that through these works, which seem to demand nothing more than rusticity, one will see perfect images and well-ordered pictures emerging from a confusion of shells, stones, putty, etc. placed in a disorderly fashion and without a plan to their appearance. These can be made so dexterously and with such artifice that, looking at the figure through the hole of a sight, one will not perceive the material of which the work is composed, but instead will think one is seeing an ordinary, well-executed picture.91

As Niceron noted, confusion and contortion—the recreation of the labyrinth that Ariadne’s thread alone could unlock—were an equally important part of scientific play. The model of the labyrinth was perceived to be a more accurate mirror of the social and political confusion of the seventeenth century; as Kircher and many of his contemporaries articulated, after the turmoil of the Thirty Years’ War and the numerous other upheavals that they had experienced, the only thing that remained clear was that no boundaries were absolute and no categories transparent.92 From this perspective, the semantic field of lusus offered a flexible terminology that succinctly, if imperfectly, taxonomized the confusion of the scientific and philosophical world.

In part, we can view the creation of anamorphic games as a social message, an intellectual metaphor for the age. Within the narrower parameters of scientific play, however, it exemplified the desire to traverse the boundaries between the natural and unnatural world. Contemporary descriptions of these spectacles suggest how closely

91Jean–François Niceron, La perspective curieuse ou magie artificielle des effets merveilleux (Paris, 1738) bk. 2, 7.
92There is a large literature on the relation between the social and political structures of the seventeenth century and their cultural manifestations. Particularly helpful for my own research have been Maravall; Amadeo Quondam, La parola nel labirinto (Rome and Bari, 1973); R. J. Evans, Rudolf II and His World (Oxford, Eng., 1973); idem, The Making of the Hapsburg Monarchy (Oxford, Eng., 1979).
they approached the popular interpretation of magic. "And would not such pictures seem to have been painted rather in order to represent visions of sinister nightmares or witches' Sabbath revels, capable of evoking fear and gloom and even of causing abortions in pregnant women," wrote Gregoire Huret, "than in order to depict natural and pleasing subjects in the normal way?" Surely some of the more mathematically naive viewers must have thought that they had finally witnessed a *ludibrium daemonorum* (demon's jest), and one that illustrated the ability of demons to insert themselves in all forms of human activity, including the ecclesiastical laboratory. Early in his career, in fact, Kircher was accused of black magic after demonstrating one of his optical illusions and was forced to reveal the mechanism of his apparatus to save himself from further suspicion.

The emergence of the majority of these illusory productions from the monastic scientific culture of the seventeenth century, in particular the Jesuits and the Minims (to which both Mersenne and his pupil Niceron belonged), is important in understanding the social context of this form of scientific play. The optical work in which these orders specialized served scientific and religious ends simultaneously. Working within the Jesuit community, for example, Kircher and Schott had little reason to fear the charge of witchcraft which the creation of such diabolical phenomena might have produced for a less well-connected laymen. Rather, these scientists assumed the guise of the Christian magus, conjuring up images to provoke the ignorant into obedient and awestruck silence, and to teach the learned that even the devil's play could be scientifically dissected if not in fact turned into white magic. From magic squares to magic lanterns to tricks of perspective, the plays of knowledge were designed to demystify natural operations that had been categorized as beyond plausibility and therefore dangerous to know. At the same time, lusus maintained a hierarchy of knowledge which distinguished the learned from the ignorant in a way that neatly corresponded with the moral hierarchy of the universe.

The scientific jokes, both of nature and of knowledge, throughout this period were constructed to parallel each other in their at-

93In Baltrusaitis, 76.
tempts to keep the boundaries between natural and artificial flexible, if not to dissolve them entirely. The functions of lusus, in all instances, was to identify the precise moment in which these paradoxes of classification arose. “Nature, in fact, is nothing but a greater art,” observed Leibniz, “and we cannot always clearly distinguish the artificial from the natural.” And the perpetual confusion between these two categories fueled the playfulness of scientific discourse in early modern Europe.

By the late eighteenth century, the jokes of nature had disappeared almost entirely from science. Relegated to a smaller and more precisely delineated portion of the natural world, they could no longer claim to be a taxonomic principle that ordered and explained nature. No longer did nature play in infinity. Under the influence of Galilean, Cartesian, and Newtonian science she submitted herself to an increasingly rational and selective structure, one that offered less scope for the poetic propensities of sixteenth- and seventeenth-century science.

The Renaissance system of nature, constructed through use of analogy, established meaning through a reflexive system of signs, symbols, and correspondences which created horizontal relations among kingdoms and worlds. By the eighteenth century, the hierarchies of correspondent meaning in which lusus participated had been replaced by an increasingly vertical taxonomy that explained natural operations in functional rather than symbolic terms. Similarly, natural philosophers like Robert Boyle sought to correct the perception that nature was allowed any independent action in the process of creation. More than any other component of late Renaissance natural philosophy, lusus testified to the existence of an animated nature, at odds with the late seventeenth- and eighteenth-

95Leibniz, Protagaea, in Rossi, 61. “Quinci si puo notare come, non solo le cose della natura hanno il consenso a quel fine per cui sono fatte, ma quelle anco dell’arte, perché la medesima anima del mondo guida l’una e l’altra, onde sono similiassime”; Tommaso Campanella, Del senso delle cose e della magia, ed. Antonio Bruers (Bari, 1925), 218.

century emphasis on God as a creator of absolute categories, impermeable to the changes that a playful nature wrought. “So that, instead of a True God, they have substituted, for us, a kind of Goddess, with the Title of Nature,” reflected Robert Boyle on earlier visions of scientific agency. And the disappearance of lusus signified increasing approval of a more passive role for nature in eighteenth-century science, denying her the right to arbitrarily adjust or even rewrite the framework of the universe.

Within this new epistemological framework, what replaced lusus? In the first instance, naturalists sought to explain away the playfulness of various phenomena. Fossils found their place in the animal and vegetable kingdoms, nature’s paintings were classified as trivial irregularities in stone, and giant’s bones and unicorn’s horns were revealed as the remains of entirely ordinary beings or as frauds. Similarly, the English naturalist John Ray sought to convince his readers that mountains were not monstrous, “examples of confusion in Nature,” but part of nature’s regularity and beauty. Particularly important to the regularization of nature were the methodological procedures used to arrive at these conclusions. “If one were to open up more cadavers, says Monsieur de Fontenelle, the singularities of the jeux de la nature would become more common.” Thus dissection, the technology of the life sciences, became an apparatus for unmasking lusus.

Despite the attempts to rid nature of her playfulness, jokes did not entirely disappear from science during the Enlightenment. Given the pervasiveness of lusus in the language of science until the eighteenth century, it would have been a gargantuan task to eliminate this vocabulary entirely, no matter how preferable a portion of the scientific community thought this would be. The language of play was a particularly rich and descriptive terminology; as such, it retained a certain usefulness to elucidate natural processes for which more precise terms were unnecessary, mainly because they were no

99John Ray, Miscellaneous Discourses (1692), in Porter, 44.
longer of taxonomic interest to their observers. On a limited scale, lusus continued to describe the process of diversification. Even Giacinto Gimma, a man who specialized in turning Renaissance lusus into Enlightenment fables, allowed that the variety of colors in certain species of coral were instances in which “nature has wished to joke” (“ha voluto scherzar la Natura”). However, in another passage on coral, he elaborated on his intent: they were a sleight-of-hand (“giuoco di mani”).

The other aspect of nature’s playfulness which lingered in the vocabulary of the eighteenth century concerned artifice. Whatever attempts scientists made to organize nature, they could not deny that she still had the capacity occasionally to surprise them with her tricks. The collector Francesco Ginanni described the contents of one section of his museum in Ravenna, containing stones painted and sculpted by nature, as “accidental jokes, and jokes of nature.”

Gimma and the author of the 1765 Encyclopédie article on “jeu” also conceded that such stones could be described as plays, provided that one separated them from the mistaken lusus of fossils, which had since been revealed to be the imprint or calcified remains of living creations. Gimma added a further caveat. Specifying that the joke was only a matter of form and color, and therefore not essential, he underlined the quality of seeming in the language of scientific play. It was the superficial exterior alone that played; the vital operations of the internal organism remained sacrosanct, removed from such frivolity. Continuing this line of thought, he suggested, “indeed jokes of nature are not dissimilar from what occurs in ice.” Likewise Battarra affirmed that “Stalagmites and Stalagtites are plays of nature,” in contrast to fossils that long ago had lost their poetic image.

By reducing nature’s playfulness to her most superficial aspects, scientists essentially eliminated lusus from the language of active sci-
cientific research. Its cosmological significance was formally and finally conflated with the social playfulness of ludi, emphasizing its attractiveness as a parlor game rather than as an intellectual construct. The premise of Renaissance natural history had itself become the joke for the eighteenth-century scientists, at the expense of the naturalists who preceded them. “There are some people who know the taste of collectors of natural history for the marvelous,” reported the editors of the *Encyclopédie*. “Knowing how to put it to profit, they make [the collectors] pay dearly for stones changed by accident, as *jeux de la nature*, that they have had the secret of forming by art.”

Thus while the plays of nature continued to work themselves out in the *cabinets d'histoire naturelle* and public spectacles of the eighteenth century, they no longer disrupted the realm of science. The paradox of lusus is this: in the desire to play with rational discourse, to insert herself at every opportunity, she eventually exhausted her possibilities. The competing systems of meaning between which she fit were no longer central to the scientific discourse of the late eighteenth century, and without them lusus quietly slipped away into the realm of fantasy.

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