

# PUBLIC LECTURES

## I

### ST. ISIDORE AND MEDIAEVAL SCIENCE

**N**EARLY twenty years have passed since I first crossed the threshold of Widener J and K, the Historical Seminary rooms of Harvard University, with a small group of inwardly disturbed, though outwardly self-assured, graduate students to begin Dean Haskins' advanced research course, designated in the Official Register as "An Introduction to the Sources of Mediaeval History." There I was to learn shortly the truth of Professor Laski's observation to the effect that the real intellectual discipline, imposed by the Dean's keen mind and forceful personality, caused the student "to have his mind turned upside down, to be driven back, by continuous questioning, against difficulties he either did not know or sought to avoid."<sup>1</sup> My memory is not entirely clear upon this next point, though I think I may safely assume an awkward attempt on my own part to conceal ignorance. At any rate, I recall the question well. It was probably the first heavy volley that Haskins ever fired at me: "How foolish was Isidore, and why?" The *why* was added characteristically as a caution against that weakness of human nature for making unsupported assertions. It was an eminently respectable question as I was to realize later with a certain feeling of pride that I had been chosen the one—or the first one, perhaps—to appear foolish that after-

<sup>1</sup>For footnotes see page 103 of this pamphlet.

noon in the attempt to answer it. However, a lasting impression had been made. My mind was to revert to this problem and to speculate upon it in many an idle moment during the intervening years, and at last this afternoon I feel that I may suggest some avenues of approach to the answer, though I am not yet promising to answer the question itself.

At a later day, it became abundantly clear that the mind of St. Isidore could not be estimated safely upon any superficial consideration, especially since the greatest authorities on the mediaeval period offer puzzling and contradictory views which often appear the product of short-sighted depreciation. None seems more unfair, largely because of what it leaves unsaid, than the criticism of the great author of *The Mediaeval Mind*, Dr. Henry Osborn Taylor, whose almost invariably sound and balanced judgments make the passage which I cite here all the more surprising. "By reason of his own habits of study, by reason of the quality of his mind, which led him to select the palpable, the foolish, and the mechanically correlated, by reason, in fine, of *his* mental faculties and interests, Isidore gathered and arranged in his treatises a conglomerate of knowledge, secular and sacred, exactly suited to the coming centuries."<sup>2</sup> This statement has done much to place Isidore in the poor light accorded him by subsequent text-book writers and to confirm his reputation for thin, dry, sterile, and jejune thinking. His vast encyclopaedic compilation, the *Etymologies*, is, indeed, often cited as the prime exhibit of mediaeval inanity, even by the professed friends and devotees of the Middle Ages. Thus, Dom Leclerc describes it as a vast lumber-room in which were stowed away all the cast-off clothes of antiquity,<sup>3</sup> and James Westfall Thompson refers to it as "a sort of museum of desiccated antiquities of the classical

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era."<sup>4</sup> Carl Stephenson remarks upon the ridiculous contrast "between the book's lofty pretensions and its feeble performance,"<sup>5</sup> while Lynn Thorndike has the dry suspicion that its handiness and convenience "tended to encourage intellectual laziness and stagnation more than any anthology of literary quotations did."<sup>6</sup> After noting Isidore's lack of critical sense and poor record for veracity in their useful *History of Later Latin Literature*, Professors Wright and Sinclair bespeak their disapproval of the bad influence of this tome upon later centuries, since from it "learned and unlearned alike gathered unquestioningly the fruits of a very much decayed tree of ancient knowledge."<sup>7</sup> This judgment closes, however, in a happier mood by chiding us lest we make merry at Isidore's expense, and by asking us to remember that he was as industrious as those titanic laborers in the vineyards of scholarship, Boethius and Cassiodorus, and that "it was his misfortune to live at the end of a period when secular learning was disappearing."<sup>8</sup> Even Brehaut, the author of the only extended monograph on Isidore, who consistently presents the subject of his study in the best possible light, says that the *Etymologies* "furnish, so to speak, a cross-section of the débris of scientific thought at the point where it is most artificial and unreal."<sup>9</sup> Professor Laistner of Cornell strikes a higher note. He points out that "Isidore was a polymath whose literary labours touched every branch of human knowledge"<sup>10</sup> and that "it is easy to sneer at the *Etymologies* and to point to single items in the book which strike a modern reader as puerile,"<sup>11</sup> but goes on to observe that this compilation was a genuine achievement considering the inaccessibility of the source material and the scarcity of scholars able to comprehend these sources. Finally he states that Isidore's indulgence in etymological detail that is often fanciful and absurd "has tended to ob-

scure the substantial merits and accuracy of much of his information."<sup>12</sup> Haskins who was not given to answering his own questions contents himself by urging, "the very fact that Isidore was only a compiler gives him a representative quality which a more original work would have lacked."<sup>13</sup> Miss Waddell, who always rallies to the cause of unappreciated mediaeval worthies from the *rhinoceros indomitus*, Abélard, to Gerbert "with the light of the everlasting bonfire playing about his head,"<sup>14</sup> alludes in a satisfied manner to Isidore's "monumental common-sense."<sup>15</sup> In a footnote in his *Primer of Medieval Latin*, C. H. Beeson offers a sound and fair, albeit sly, extenuation of Isidore's eccentricity: "His influence was quite out of proportion to the intrinsic merit of his works. Many of his etymologies, however, are no worse than most ancient attempts and some modern ones to explain the origin of a word."<sup>16</sup> Finally we may close with the shrewd Christopher Dawson's comment that, "In spite of their lack of literary quality, writers like Orosius and Isidore of Seville, Cassiodorus and Gregory the Great, did more to shape the minds of later generations than many geniuses of the first order."<sup>17</sup>

In the face of such a diversity of opinion among modern specialists, we may risk several added questions: Did Isidore appear foolish to his contemporaries and immediate mediaeval successors, or is his foolishness a more recent discovery? Was he grossly superstitious, or merely lacking in resources of fact and data? Was he intellectually incompetent, or only struggling amid the thought currents of his time and so condemned to be the product of his age? The first question may be disposed of readily, when we consider that few scholars, if any, were more widely cited for reference purposes by later writers, and that fifty-four MSS of his *Etymologies* are still surviving outside Spain, together with 121

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MSS of selections from the same work, all eloquent testimony of his eminence in the mediaeval world of letters. Indeed, Professor Rand has remarked that, "No better way could be found to an immortal and authoritative existence in the Middle Ages"<sup>18</sup> than to have been commended by St. Isidore. Also he was one of those towering figures, conspicuous in mediaeval times, whose names lent prestige to various works by virtue of false attribution. Isidore's pseudonymousness ranges from the famous *False Decretals* in canon law to various minor lyric poems. And W. P. Ker in his little book, *The Dark Ages*, provides a bit of final evidence in a line from the English version of the romance of the *Destruction of Troy* which he says "is as good an instance as could be found of (the saint's) popularity," at least among the half-learned—"And Ysidre in Ethemoleger openly tellis."<sup>19</sup> It is a simple line; even so, dictionaries and their authors seldom figure in popular fiction.

The other questions had best be considered perhaps against the background of the period. Surprisingly few details of Isidore's biography have been preserved, though Lecky quotes from the *De Rebus Hispaniae* of the sixteenth century Jesuit historian, Mariana, the customary charming and edifying tale, appropriate to every mediaeval saint, in this instance attesting the truth of the principle that constant exposure will wear away the most durable of materials. It runs in this wise:

A Spanish boy, having long tried in vain to master his task, and driven to despair by the severity of his teacher [this reminds us of another literary gem, concerning the poet Horace and his master, Orbilius], ran away from his father's home. Tired with wandering, and full of anxious thoughts, he sat down to rest by the margin of a well, when his eye was caught by the deep furrow in the stone. He asked a girl who was drawing water to explain it, and she told him that it had been worn by the constant attrition of the rope. The poor boy, who was already full of remorse for what he had done, recognized in the reply a divine intimation. "If," he thought,

"by daily use the soft rope could thus penetrate the hard stone, surely a long perseverance could overcome the dulness of my brain." He returned to his father's house; he laboured with redoubled earnestness, and he lived to be the great St. Isidore of Spain (*gran doctor de las Españas*).<sup>20</sup>

This is an interesting anecdote and may throw some light on Isidore's later remarkable reputation for industry, though I hardly think it belongs in the same category with the Ciceronian dream of St. Jerome, as evidence for the necessity of divine intervention to guarantee desirable saintly habits. I do not think the compiler of a dictionary is a person who could have ever needed to be urged to work. However, returning to the veritable facts of his life, we know that he sprang from an orthodox Hispano-Roman family of Cartagena, that his younger years were spent under the tutelage of his famous brother, Leander, who, as bishop of Seville, played the leading part, together with King Reccared and Pope Gregory, in the conversion of Spain from the Arian heresy to the Catholic faith, and that he was born in about the year 570, lived through the heart of the Christian "Dark Ages," and died exactly thirteen centuries ago in 636, having succeeded Leander as bishop of Seville and become the most distinguished scholar of the Latin West. Thus, he was almost the identical contemporary of Mohammed whose fiery faith was destined to blaze across Spain and sweep away nearly every vestige of that Visigothic culture which Isidore had illumined. Also his youth and young manhood coincided with the closing years of Gregory the Great and Gregory of Tours. These three, Isidore in Spain, Pope Gregory at Rome, Gregory of Tours in Merovingian Gaul, together with the Venerable Bede in Anglo-Saxon England a little later on, were the brightest intellectual lights to shine over the dull wastes that stretch across two centuries and more from Boethius to Alcuin, or, to preserve the impression of aridity which has intrigued Professor Thompson, "the well

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grows drier and the water worse as we advance from the fourth to the sixth century, and by 600, as Gregory of Tours confessed, it was low tide in western Europe."<sup>21</sup> The conditions of the time did not favor the creative intellect or complete comprehension of the classical masters. Hence Brehaut reminds us that physical reality was no longer apprehended through systematic observation but, instead, attention was concentrated upon the superior realities of the spiritual world.<sup>22</sup> And it is precisely at this point that we discover the clue which explains Isidore's inadequacy in the realm of natural science. His mind was attuned to the otherworldly mystery rather than the secrets of nature, although he seems to be free from the dark, unreasoning terrors and the hideous fear of hell that cast a dull veil of melancholy about the soul of Gregory. He displayed an interest in secular learning and the pagan authors, unusual in the age of the Pope who boasted that he spoke not according to the rules of grammar but as the spirit moved him, and who would have destroyed the Egyptians, not merely despoiled them. However, the writer of the *Dialogues* may be presumed to have been influenced by sentiments and considerations very different from those entertained by the compiler of an encyclopaedia. Nevertheless, in Isidore, too, there was the "upward glance" which distracted from the world and man, despite his interest in the antique wisdom.

Quite likely we need not tarry among Isidore's minor works, largely theological<sup>23</sup>: a volume expounding certain books of the *Old Testament*, the *Sentences* devoted to the nature of the Trinity and of the angels, his polemic against the Jews, *De fide catholica contra Iudaeos*, a book of scriptural allegories, a treatise on the duties of ecclesiastics, a strict monastic *regula*, and a devotional work, the *Synonyma* which has been called "a lamentation for the sorrows of the

world" after the manner of Job, with a *Chronicle* and a *History of the Visigoths* of little value, copied in the main from earlier histories. Besides, somewhat more secular in nature, there are the *Differentiae* in two books—*On Differences of Words* indicative of his etymological predilection, and *On Differences of Things*, as between angels, demons, and men, between angelic and human wickedness, between the grace of God and the will of man—, a cosmological treatise *On the Scheme of Creation*, including the spiritual as well as the material universe, the *Liber numerorum* on the magical properties of numbers, and an important exposition of the physical science of the time, entitled *De natura rerum*. But casting all these into obscurity was the monumental encyclopaedia, designated *Etymologiae* or *Origines*, which must be considered one of the most influential works, regardless of its specific merit, to fall within the purview of the student of the history of European culture, since it provided a large part of the informational content of scholarly thought for centuries in an especially concise, convenient, and accessible form. Isidore belonged to the age of manual, compend, and commentary, of glosses and annotations, of outlines, abstracts, epitomes, and epitomes of epitomes, in short, the text-book habit of mind, now inculcated so effectively in our modern secondary schools that it requires approximately four years for our universities to rescue our students from the "Dark Ages." The tabloid type of mind was dominant then as now, and it is probable that the demand for concentrated and predigested mental pabula remains a constant across the centuries from ancient Alexandria to modern New York, although this hardly excuses the scholar from falling a victim of it.

On the other hand, a much more respectable appearance may be placed on Isidore's labors, if we consider the real



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utility of the *Etymologies* in providing a wide range of information for a time desperately in need of it, to say nothing of the pervasive, continuing influence which this compilation enjoyed through many subsequent centuries. Isidore belonged to a period in which a single mind could still hope to encompass the entire range of human knowledge in the fashion of Aristotle. Also such Roman authors as Varro and the elder Pliny had continued the tradition of collections of general encyclopaedic information, though their works were of narrower scope and of a more literary tone. Thus, Varro and Verrius Flaccus developed a curious literary science of marked antiquarian flavor which interested itself in grammar, word-derivations, philology, and poetic allusions, while Pliny's *Natural History* formed an extended scientific note-book and manual of miscellaneous matter that reached from the commonplace to the outer bounds of credulity and included such varied subjects as "geography, man and his inventions, animals, plants, vegetable products, medicine and medicinal plants, metals, pictures, colours, and gems."<sup>24</sup> Besides, a minor type of encyclopaedia for educational purposes, of which the *De nuptiis philologiae et mercurii* of Martianus Capella expounding the Seven Liberal Arts in elaborate allegory may serve as an example, gave emphasis to the tradition of compends of ordered information, and the alphabetical arrangement of material, introduced by Flaccus, established the conventional dictionary method of presenting topics, which added to convenience and conformed with the epitomizing habit of mind. It was the purpose of these encyclopaedists to provide an authoritative body of knowledge expressed in general terms, in the manner most easy of access and most easy of comprehension, not to extend knowledge through scientific inquiry according to modern ideas.

Thus, we find that Isidore stands at the center of a movement, presenting scientific matter in encyclopaedic form, which derives from Aristotle's *History of Animals*, Varro's *Antiquities*, Seneca's *Natural Questions*, Pliny's *Natural History*, the *Geography* of Claudius Ptolemy, the *Collectanea* of Solinus, the *De nuptiis* of Martianus Capella, and a treatise by Cassiodorus on the liberal arts, and which is continued in the *De natura rerum* of Bede, the *De universo* of Hrabanus Maurus, the *De mensura orbis terrae* of Dicuil, John the Scot's *De divisione naturae*, the *De imagine mundi* (ca. 1100) attributed to Honorius of Autun, the odd work of Bartholomew of England *On the Properties of Things* (*De proprietatibus rerum*), Alexander Neckham's *De naturis rerum*, the mighty *Speculum maius* of Vincent of Beauvais, even to the *Margarita philosophica* of 1503, while much of the geographical information in the *Otia imperialia* of Ger vase of Tilbury, the *Chronicle* of Otto of Freising and the *Liber floridus* of Lambert of St. Omer is obtained from Isidore. By piling his debtors like Pelion on Ossa, we begin to appreciate the measure of our man and his significance for the history of learning. However, this is all a scholarship of borrowing. Very much as the mediaeval chroniclers built up their narrative by continuation, each standing on his predecessor's shoulders, so the structure of mediaeval science was erected by a cumulative process. Robert of Torigni continued Sigebert of Gembloux, who continued Prosper of Aquitaine, who continued Sulpicius Severus and St. Jerome, who continued Eusebius Pamphili, who continued Josephus, who stood on the rock of the *Old Testament*, thereby perfecting an historical record which should stand unchallenged from Creation to the Judgment Day. Likewise, Vincent of Beauvais and Bartholomew of England in the great thirteenth century, as well as Hrabanus in Carolingian days, bor-

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rowed from Isidore, who copied from Solinus, who abstracted from Pliny, who appropriated from Aristotle, who sent his students to the far corners of the earth, gathering his data. The ultimate credit for some measure of the valid science, available in western Europe at the dawn of the modern period, belongs to those long-forgotten anonymous students of the "Master of Those Who Know." In the light of such respectable and saintly borrowing, the sin of plagiarism reduces to a pale, thin, academic discussion unworthy of scholars and gentlemen. It was the students then as now who were the true contributors to and sufferers for the advancement of learning. A brief example in illustration of this tendency may be found if we take the case of the salamander. Like the small boy today, mediaeval men were intrigued by Natural History, especially animals [that is why they loved their Pliny so]; hence we may assume this example is typical of the continuing process, whereby antique science was perpetuated. Aristotle in his *History of Animals* in the fourth century B.C. said: "Now the salamander is a clear case in point, to show us that animals do actually exist that fire cannot destroy; for this creature, so the story goes, not only walks through the fire but puts it out in doing so."<sup>25</sup> The story has grown in the telling with Isidore, though he is really only abstracting from Pliny:<sup>26</sup>

The Salamander is so called because he prevails against fire. Among all venemous creatures, he is the mightiest; others kill individuals alone, but the salamander kills several at once. If he crawls upon a tree, he taints all the fruit with his poison, and they who eat of it perish; or if he falls into a well, they who drink therefrom die. He alone of all animals, fighting against fire, extinguishes it; for he lives in the midst of flames, neither harmed nor conquered by them, and not only is he not burned, but he puts out the fire.<sup>27</sup>

When we come to Bartholomew of England in the thirteenth century, the story is shorter but it has also grown: "The sala-

mander quencheth the fire that he toucheth as ice does, and water frozen.'<sup>28</sup>

To those who are curious to know more regarding the specific contents of the *Etymologies* and the way in which the various topics are treated, I must state regretfully that no translation from the Latin text exists save for selections in Brehaut's monograph, and that in many places the work is almost untranslatable, owing to the necessary play upon words involved in establishing their derivations. The structure of the treatise consists of twenty books, devoted to the seven liberal arts, medicine, law, chronology, the Scriptures, the offices of the Church, God, the angels and saints, the alphabet, languages, races, men, monsters and animals, the universe, the earth, stones, metals, plants, architecture and surveying, warfare, games and pastimes, ships, dress, food and drink, even household furniture. Thus, the work is very comprehensive, the *Encyclopaedia Britannica* of the Middle Ages; and the longest book is on animals. I shall try to give a few samples from the section on chronology which is subdivided into minutes, hours, days, months, years, *lustra* (periods of five years), centuries, and ages. Of days, he says:

The day is the presence of the sun, or the sun above the earth, just as night is the sun under the earth. Whether it be day or night depends upon whether the sun be above the earth or beneath it. The true day is twenty-four hours in length, so that day and night include within their span, in accordance with the revolution of the heavens, the interval from sunrise to sunrise. Incorrectly, however, a day is the space from sunrise to sunset. There are, then, two parts of the day, day and night; day is, to be sure, twenty-four hours in length, but it is also a space of twelve hours.<sup>29</sup>

You can see the subject is becoming involved; it becomes positively complex, when he explains the days of the week, so that the battle is on between Saturday, the Sabbath, and Sunday, the Lord's Day, for primacy in beginning the week.

Next he tackles morning, noon, and evening, with much esoteric etymology, but this is all naught compared with the recondite distinctions between today, tomorrow, yesterday, day before yesterday, and day after tomorrow (*hodie, cras, hesternum, pridie, perendie*).<sup>30</sup> If you do not think this is difficult, try writing an essay on these subjects yourself. After this effort, he examines the week, and like one of my colleagues who stimulates his students on occasion by announcing that reading will be assigned hebdomadally, Isidore presents the topic under the caption *De hebdomada* and faces the prospect of Greek derivation cheerfully, if not competently.<sup>31</sup> The ages are interesting and may be distinguished in two ways, as in the ages of man, infancy, youth, and old age, or as in the ages of the world of which the first extends from Adam to Noah, the second from Noah to Abraham, the third from Abraham to David, the fourth from David to the Captivity of the Jews in Babylonia, the fifth from the Captivity to the Advent of the Saviour in the flesh, and the sixth in which we now live, continuing thence to the end of the world and the Last Judgment.<sup>32</sup> Then follows a detailed outline of historical events arranged in a sort of chronological chart or table, so that each is included within its appropriate age.

There remains still the matter of Isidore's criteria in the selection of his material. For the most part, he accepts St. Augustine's principle that secular knowledge must conduce to Christian ends and approves the patristic practice of utilizing the pagan authors in the interest of Christian truth. However, Isidore does not disparage or reject his classical heritage; he merely adapts it to the lower intellectual level of the seventh century, but in this process of adjustment the antique habit of thought is transformed to meet Christian needs. Brehaut points out in this connection that Pliny wrote

a survey of "what was known," while Isidore wrote a survey of "what ought to be known." The relative scientific objectivity of the ancient writer is replaced by an authoritarian formulation, resting upon dogmatic preconceptions, though it is only fair to add that Pliny's credulity is sometimes such that Isidore could have imagined nothing more unlikely. Hearsay may be as misleading as revelation or the authority of a book. Finally, Isidore faced the difficult problem of selecting from a wide range of material, and the resultant eclecticism led to incoherence. However, since his inconsistency was based upon authority, he was never called upon to face the question of intellectual integrity and so easily became an authority himself. Had he questioned his sources, he would have lost standing forthwith. But as an authority, he remained a soundly catholic, conservative scholar, not to be mentioned in the same breath with that line of dangerous radicals, leading from Eriugena, Gerbert, and Abélard, through the Averroists and Siger de Brabant, Michael Scot, Roger Bacon, Leonard of Pisa, Raymund Lully, and Arnald of Villanova, to Copernicus, Giordano Bruno, and Galileo. Isidore's science was "good" science, deductive and authoritative by grace of God; theirs was "bad" science, induced from nature in some cases and only as sound as human understanding; to them fumes of sulphur clung faintly, and about them hung a lurid glare. In this connection, I am tempted to quote a statement from Lecky's *History of the Rise and Influence of Rationalism in Europe* that during the Middle Ages, "Innovation of every kind was regarded as a crime; superior knowledge excited only terror and suspicion. If it was shown in speculation, it was called heresy. If it was shown in the study of nature, it was called magic."<sup>33</sup> Nevertheless, this attitude lingers still at the present time. Not so long ago I read an editorial in which the writer

sneered at the views of Einstein, on the ground that the editor himself could not understand them, thereby making the measure of Einstein's genius the degree of his own comprehension.

If we attempt to analyze and account for the peculiar cast of mind apparent in Isidore, we must turn back some centuries to the Academy where Plato advanced his doctrine of absolutes in which ideas are regarded as objective in character and antecedent to things. These ideas rise from the concrete to the general until at the pinnacle of his thought-structure, we reach certain ultimate concepts or universals, as "the Good, the Beautiful, and the True," which are highly abstract and comprehensive and which represent final reality. It was an axiom of the Realist school of the later Middle Ages that *universalia sunt ante res*; ideas pre-exist things, the world, and man. In other words, reality consisted in certain transcendental concepts which are immaterial and metaphysical by nature, and, therefore, not susceptible of any scientific physical analysis. Next let us ask: What happens to things in such thought processes? What is the nature of *res*? In short, we may reply that the natural universe and everything in it become a reflection and a shadow of a mental and spiritual realm which is ultimate and real. And because these ideas are a final goal and essential reality, they are complete in themselves, ideal, perfect, and absolute in authority. To such an extent was the mediaeval mind committed to this view of reality or, as certain critics might say, charmed by its own creations that some thinkers denied the perceptions of the senses willingly, when their evidence ran counter to accepted principles. I shall not confuse the matter by entering into the discussion of the relative ranks or grades of ideas, for we have ideas about ideas as well as ideas about simple things. Years ago a fraternity brother took his doc-

torate in Philosophy and centered his dissertation more or less about this problem. He wrote on the nature of *res* or "the thing," and became such an intellectual contortionist as to confuse me about every or any *res* thereafter.

However, we must beware of the misconception that mediaeval men went about ever-conscious of their debt to Plato, for, while the typical mediaeval habit of mind was Platonist, the men of the Middle Ages were largely unaware of Plato and Platonism, or, as Friedell puts it, Plato merely taught this theory of ideas whereas the Middle Ages lived it.<sup>34</sup> The Platonism of the Middle Ages was not an academic or a scholastic Platonism; in fact, Plato was not widely read throughout that period, save, perhaps, for the *Timaeus*, a metaphysical treatise which hovers between mind and matter. His discursive style and dialogue form were not attractive in an age devoted to compend and manual, while the text-book character of Aristotle's writing was fitted exactly to the mental habits of the time. Whether you are reading the *Poetics* or the *History of Animals* Aristotle sticks to his topical arrangement with main headings and sub-headings in perfect outline, but Plato writes in a literary manner, compelling his reader to seek his meaning. Thus, the form of Aristotle's thought with its ordered learning is much closer to that of the mediaeval encyclopaedists and commentators; yet the color, atmosphere, and substance of the mediaeval mind, as a whole, are predominantly Platonic.

It is obvious that, since the Middle Ages did not become acquainted with Plato through his books, the channels through which his attitudes and views flowed down into the later time must be traced back to other sources. There is the direct Christian channel, proceeding from St. Paul as exemplified in the Fifteenth Chapter of First Corinthians where the distinction between the natural body and the spiritual body is



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expressed in terms, readily understandable in the light of the Realist philosophy and its doctrine of objective universals. But more significant for the history of science is the murky, sluggish, devious current of Neoplatonism, which falls as off a precipice from the transcendental realms that lie beyond reason to lose itself in the stagnant swamps of magic and superstition. Yet, at its best, Neoplatonism retained the exalted idealism of Plato and his disinterest in material things, so that it underlies both the otherworldly motive and the ascetic impulse which are intrinsic in the mediaeval soul. On the other hand, in the Neoplatonic system the ultimates which are less sharply formulated in Plato's teaching are perceived in a central unifying principle, an absolute comprehensive Unity, which passes by emanation down to the *Nous* or perfected universal Mind and so through the World-Soul to the souls of men. In its extreme manifestation, asceticism resulted in a contempt of the flesh, an abhorrence of matter, and a disparagement of empirical knowledge, fatal to the development of a sound objective and inductive scientific method. The abandonment of the world of particular phenomena was accompanied by the adoption of purgative measures intended to lead man upward through ever more refined and perfect stages until his soul was fit to know the Absolute Intelligence, the Ultimate Unity, or, let us say, to know God. These last steps could not be achieved by any exercise of reason but by a mystic process, a final leap into the unknown, an ecstatic emotional experience in which knowledge is attained by agencies that lie beyond the imperfect senses and reason in what Taylor terms the sphere of the *suprarational*. The Neoplatonist metaphysics with its doctrine of discarnate and incorporeal mediate intelligences or *daemones* made possible an eventual hierarchy of mind and spirit, extending from the material world to the Absolute.

In its Christian application at the hands of Dionysius the Areopagite (the pseudo-Dionysius), this assembly of mediators blossoms forth in the graded ranks of the Celestial Hierarchy, arranged in nine orders: Angels, Archangels, and Principalities; Powers, Virtues, and Dominations; Thrones, Cherubim, and Seraphim; while to each order is assigned its specified task. Thus, it was allotted to the highest order of the Seraphim that they should "veil the face and feet of God." And in the Absolute One, the Universal Immanence, it is not hard to discern the Triune God.<sup>35</sup> From these beginnings, St. Thomas constructed his theory of angels as incorporeal beings who think only in terms of universals or, at least, comprehend the particular only through the universal, whereas man's limited intelligence must deal with particulars alone or, at most, comprehend the universal dimly through the particular. It must be noted that the psychology of the angels is developed soundly from his fundamental premises by deductive logic, but it does not demonstrate the objective existence of angels following observational modes of approach.<sup>36</sup> The metaphysical method shows that angels are intelligible and possible, but does not prove that they exist in any forms satisfactory to natural science, since, indeed, by definition they cannot have any tangible, material actuality, and, hence, cannot be inspected or dissected in a laboratory. In the same way, disembodied spirits become credible or, at least, plausible, such as we find in the legend of the priest of Isis who declared to Plotinus that he could raise up the spirit of Plotinus himself in visible form which he proceeded to do after the appropriate invocation with the singular result that "Plotinus stood face to face with his own soul."<sup>37</sup> Of course, I am not asking you to believe that this tale is necessarily true, nor can I explain how an immaterial spiritual substance may become visible.

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Nevertheless, the implication of these beliefs is significant for the history of science. A habit of mind appears, highly favorable to the idea that spirits or superior powers may be utilized or invoked to control matter and nature. Here men do not attempt to investigate nature, only to control her through the proper occult formulae. This strange mental climate belongs to the realm of magic and theurgy.

The problem of magic is too confused and complex to consider in brief space. However, the essential feature of magic appears to me to consist in a failure to comprehend natural causation. Instead, it seeks "short-cuts" into the supernatural to explain and to produce the natural, because it considers that the forces or powers which occasion nature lie outside and above nature. There is no clear conception of the scientific relation of cause to effect within the material world, so that false causes are attributed constantly to the most obvious phenomena. Under such circumstances, it became easy for St. Isidore to regard words as "transcendental entities,"<sup>38</sup> similar to the ideas in Plato's scheme of thought. Thus, words hold much the same place in the economy of Isidore's thought as universals among the later Realists. They are objectively existent and independently efficient. In the same way, St. Augustine's theory of number dissolves into number mysticism, providing "paths of intelligence" through the universe, material and immaterial.<sup>39</sup> According to such a doctrine of absolutes, Isidore's *Liber numerorum* which "tells the qualities and mystical significance of every number from one to sixteen, and of the chief ones between sixteen and sixty" becomes comprehensible, if not convincing, and is certainly no mere foolishness but posited on a definite philosophy. I cannot agree with Taylor apropos of this work that it is difficult to find "an apter instance of an ecclesiastical writer elaborately exploiting the most foolish state-

ments that could possibly be found in the writings of a great predecessor."<sup>40</sup> Nor can I go quite as far as Thorndike who says that we have only an example of "mental magic and pious 'arithmetic'," combining the mysterious properties of numbers and words,<sup>41</sup> when Isidore defines the *modius* in his *Etymologies* as follows:

The *modius* is so-called because it is of perfect mode. For this measure contains forty-four pounds, that is twenty-two *sextarii*. And the reason for this number is that in the beginning God performed twenty-two works. For on the first day He made seven works, namely, unformed matter, angels, light, the upper heavens, earth, water, and air. On the second day only one work, the firmament. On the third day, four things: the seas, seeds, grass, and trees. On the fourth day, three things: sun and moon and stars. On the fifth day three: fish and aquatic reptiles and flying creatures. On the sixth day four: beasts, domestic animals, land reptiles, and man. And all twenty-two kinds were made in six days. And there were twenty-two generations from Adam to Jacob—And twenty-two books of the *Old Testament*—And there are twenty-two letters from which the doctrine of the divine law is composed. Therefore in accordance with these examples the *modius* of twenty-two *sextarii* was established by Moses following the measure of sacred law.<sup>42</sup>

Brehaut seems to me to be correct when he says that the dictionary method of Isidore in the *Etymologies* is based not on mere convenience alone but upon philosophic grounds as well, and that the weakness of this method consists in an avoidance of "consecutive thought."<sup>43</sup> Isidore's thought does not follow through. In other words, it neglects or does not perceive the fundamental relation of "cause and effect"; hence his treatment is magical, not scientific in the best sense. But it is not foolish.

Mediaeval science, then, regarded nature as the result of an absolute and superior power which revealed itself in special ways, and allegory played its part in causing this science to be organized on a basis of mechanical correlations which were established by artificial analogy, not by logical analysis. The mediaeval mind was satisfied with surface relationships among disparate data, whereas the tendency of

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modern thinking is toward the establishment of an organic synthesis of such material. We must remember that mediaeval thought began from a pole opposite to that of the present day, as, for example, when we find moral and mystical meanings attached to the letters of the alphabet or to animals, metals, colors, and gems. Also the attempt is made to account for the material universe by processes of reasoning, not observation, as when we are told that the earth, being round and in a circle, has neither beginning nor end. In accordance with these tendencies, mediaeval scientific method becomes a search for the *unique* rather than the *typical*, and *analogy* is preferred to *analysis*. Such casual mechanical correlation and mere superficial resemblance, lacking organic significance, led to the doctrine of correspondences which was accepted as valid proof. We have already seen an example of this in the *modius* where Isidore places great weight upon certain coincidences involving the number *twenty-two*. However, the analogical approach is as fundamental as the acceptance of the objective existence of ideas, universals, and their appropriate discarnate spirits or intelligences. Theoretical physics begins with the four ultimate elements (fire, air, earth, and water), themselves sometimes regarded as derived from a *prima materia* or *quinta essentia* still more ultimate. The four kinds of matter in the physical universe are based upon these elements and stratified according to the principle of weight, while each stratum is inhabited by suitable creatures: the fiery heavens, by angels; the air, by birds and demons; the water, by fishes; the earth, by the animals and man. These four elements may be transmuted from one to another through the four possible combinations of the basic qualities (hot and dry, hot and wet, cold and wet, cold and dry). Thus, ice (cold and dry) becomes water (cold and wet); this becomes steam (hot and wet)

which dissolves into air (hot and dry).<sup>44</sup> Physics and chemistry are simple enough, if you know the proper equations, although this arrangement had its complexities in the mediaeval pharmacology when you prescribed a remedial compound according to the *degrees* or relative proportions of the several qualities of its components. Sugar, for instance, is cold in the first degree, warm in the second degree, dry in the second degree, and moist in the first degree. Mediaeval science is a seamless garment, and medicine is associated with physics. By analogy man is the universe writ small, and an exact parallel exists between man and all his parts, and the structure of the universe. Thus, six hundred years later, Robert Grosseteste, arguing in exactly the same way, declared that man, like the world itself, is compounded of the four elements: his flesh is earth; his blood, water; his *spiritus*, air; his vital heat, fire.<sup>45</sup> This curious doctrine of the microcosm and the macrocosm made possible a visual representation in the anatomical or astronomic man who still remains as a mediaeval survival on the front page of our modern almanac. The Humoral Pathology, based on the four cardinal humors (black bile, yellow bile, blood, and phlegm), was developed by a correlation with the four ultimate elements and the four basic qualities, so that health depended upon the right balance or blending of these humors.<sup>46</sup> This, in turn, made possible further permutations and combinations in the medical equations. Geography fell into line with the quarters of the compass and the seasons of the year, and biology with the four ages of man. It was no coincidence surely that, when the bodies of the *three magi* were exhumed at Milan in 1164, as Robert of Torigni tells us, one seemed to be fifteen years of age, the second thirty, and the third sixty.

Throughout mediaeval science is an integrated nexus of

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ideas resting upon ultimate universals. Consequently it is deductive and authoritative in character, establishing its proof by dialectic, not inductive and analytical, although it is observational to the extent that it notes analogies and seeks for them. Even history, lacking an adequate perspective of the past, yields to the analogical method by adopting the hexameral chronology of the six ages, corresponding to the six days of Creation. Brehaut has suggested that the mediaeval scientist was fascinated by the doctrine of the creation much the same as a modern scientist by the doctrine of evolution. He means that each of these theories may serve as a decisive point of departure or a sign pointing the way toward a path fruitful for further speculation. The creation appeared a most significant scientific fact, because it was the precise "point at which the natural emanated from the supernatural."<sup>47</sup> Also the supernatural world was the demonstrable and real; its phenomena alone possessed order and validity. On the other hand, the material universe was relatively unknown and unknowable, since no importance could be attached to the faulty evidence obtained through mere sense-perception.<sup>48</sup> Elsewhere Brehaut makes another important statement regarding the remarkable coherence of the mediaeval system of science :

[Mediaeval thinkers] were firmly convinced of the solidarity of the universe; they felt its unity much more strongly than they did its multiplicity; what we regard as separate kinds of phenomena and separate ways of viewing the universe they regarded as of necessity closely inter-related. There were no categories of thought that were for them mutually exclusive; they carried their ideas without hesitation from the material into the immaterial, and from the natural into the supernatural. No conception established in one sphere seemed impertinent in any other. It was this state of mind that enabled the mediaeval thinker to take such erratic leaps from one sphere of thought to another without any feeling of uncertainty or any fear of getting lost.<sup>49</sup>

In the end, it must be borne in mind that mediaeval science is always *science* in its broadest literal sense of organized

knowledge regardless of whether the knowledge rests upon authoritative statement or observed fact. As we have seen, the encyclopaedic approach, authoritarian and deductive from accepted principles and standard subject-matter, is characteristic of the Middle Ages, whereas the experimental method, based on induction from observed and controlled data, leaves during the same period only vague and occasional traces to serve as harbingers of the modern age. Nevertheless, curiosity seems to be a quality of mind that, fortunately for human progress, is at no time wholly dead. Such men as Adelard of Bath, the Emperor Frederick II, and Roger Bacon continued from time to time to question, to examine, and to experiment, though Henry Osborn Taylor points out that Bacon is never entirely clear about the nature of the *scientia experimentalis* which he had learned from the amazing Master Peter of Maharcuria (Maricourt)—whether it was a science in its own right and an end in itself that could test the soundness of the conclusions in all the other sciences or whether it was “a means and method universally applicable to all scientific investigation” in the Aristotelian sense.<sup>50</sup> But there was no doubt of deliberate method and rigid control in Frederick’s experiment to determine the original tongue of man by secluding from all hearing of human speech two infants who had not yet learned to talk, until he could learn whether they would speak Hebrew spontaneously which seemed probable, or whatever other less likely circumstance might ensue. It is an unimportant epilogue to note that the children died before the completion of the experiment.<sup>51</sup> It is, indeed, not inaccurate to say that mediaeval science had always been observational in its search for analogies and experimental, in some measure, in its attempt to control nature, as in magic and alchemy; yet these exceptions do not vitiate the general principle that the



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primary purpose of that science was the *construction* of a universe rather than *investigation* of the universe.

Mediaeval research remained at all times very largely research in books, and the problem of going out to nature or back to books, if it arose at all, was settled by the cloistered scholar who went back to books. An amusing, though pointed, illustration is given by Lewes in his *History of Philosophy* concerning a mediaeval student who "having detected spots in the sun, communicated his discovery to a worthy priest. 'My son,' replied the priest, 'I have read Aristotle many times, and I assure you that there is nothing of the kind mentioned by him. Go rest in peace, and be certain that the spots which you have seen are in your eyes and not in the sun.'"<sup>52</sup> However, the story seems less ridiculous, when we recall that the Ptolemaic theory constructed a universe which was mathematically true to its hypotheses and was demolished only when the burden of accumulated observed evidence to the contrary was too great for tradition to resist. Similarly modern mathematical physics or astrophysics constructs our universe from the point that it leaves observed data and begins to infer the unseen. The form of modern thought differs from that of the Middle Ages as we have noted; yet there may not be such wide variance between truth in the guise of an angel or *universal*, and truth expressed in a mathematical symbol or Dirac's non-observable particle of negative mass (let us say), as Eric Temple Bell might lead you to suppose in his recent frantic *Search for Truth* which he finds "bogged" in the mediaeval morass.<sup>53</sup> He might do well to consider an observation once made by Ferdinand Lot that "mathematical speculation, wherein the mind wanders through infinity without ever meeting an obstacle or attaining control over facts, presents certain analogies with metaphysical speculation. Its processes and

solutions cast the soul into an ecstasy, almost pathological. Discovery by the power of reason alone leads to the belief that by juggling with formulae, one can penetrate the secrets of nature and submit them to the will of man. Thoughtless admiration for mathematics supports or reintroduces the mentality of magic.<sup>54</sup> This, too, is extreme, sardonic, and somewhat facetious; possibly both critics are mistaken. Perhaps the one should seek the peace of the Holy Grail and the inner vision of Parzival, while the other should study more mathematics. In the end, it seems best to say that, when the infinite extent of the realm of learning is perceived and taken to heart and mind, we cannot longer regard any human knowledge or the results of any investigation as final whether they eventuate in the rigid mechanical determinism of recent science, in the mediaeval resort to providential explanation, or in the worship of *Tyche*, the Greek goddess of "gambler's choice" or utter chance. Viewed in perspective, can we assert that the universe of Einstein will be lasting, whereas the universe of Ptolemy has passed away, or shall we assume that we must go on constructing universes as long as science shall endure, all equally true and all equally non-existent?

But, since Providence reigned supreme in the Middle Ages, a concluding word must be spoken of her exalted expression in mediaeval allegory and symbolism. Professor Rand has remarked that, when St. Ambrose read a passage from the *Scriptures*, he read it not merely once at a time, but four times at a time, "literally, morally or tropologically, allegorically or mystically, and anagogically" in accordance with mediaeval canons of scriptural interpretation.<sup>55</sup> Likewise, when mediaeval man read the Book of Nature, he had no eyes for the beauty depicted therein, but sought secret hidden meanings and saw only a high symbolic and sacramental

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purpose. To be acceptable natural beauty must be interpreted; she must be helped to rise above herself. Otherwise she was a thing to be shunned as the tempter's snare set in lurking to catch the unwary traveler along the path of life. St. Benedict established that mighty fortress of God and sacred learning, the monastery of Monte Cassino, in an isolated place of rare beauty midway between Rome and Naples, overlooking the countryside. Here he looked in on himself and down on the world (*inspexit et despexit*). Nature was not to interfere with the soul's salvation. Much later and more surprisingly, Petrarch, sometimes called not altogether correctly "the first of modern men," while standing on a mountain-top, desires to view the beauty of the scene below. Then, remembering his St. Augustine as he looks, he recalls that Augustine would have him search his own heart. However, though there was no place for the beauty of nature in most mediaeval religious literature, certain knowledge of nature might edify and show forth God's purpose unto men. "Spiritual truth and moral truth transcended the truth of material facts," and "Natural science was, indeed, concerned with the lowest and faintest form of reality, namely, the material world; [yet] even material things had their spiritual implications, and because of this were worthy of an orderly survey."<sup>58</sup> In these words Brehaut finds a justification in the mediaeval scheme for the study of the world of phenomena and matter, for an examination of the particular, the concrete, and the disparate. Nevertheless, the mediaeval mind is ever painfully conscious of the untraversable abyss that separates man's evanescent and transitory home below from that world without end which was promised as the ultimate reward of a truly contrite heart. These two realms were separated by the irrefragable judgment of their creator, so that no earthly

wisdom or knowledge could ever bridge the gap, opened by Adam's sin,—a judgment that could be shaken only by a miracle of saving grace. However, to the eyes upturned to God through love of Jesus was granted a holy vision that revealed even the gross world as a mystic sacrament with virtue which could save. These mysteries were expounded most fully by Hugh of St. Victor who presents his theory of the universe in a great treatise on the Sacraments.

For our purpose is to treat of the sacrament of man's redemption. The work of creation was completed in six days, the work of restoration in six ages. The latter work we define as the Incarnation of the Word and what in and through the flesh the Word performed, with all His sacraments, both those which from the beginning prefigured the Incarnation and those which follow to declare and preach it till the end.<sup>57</sup>

Thus, the earth, man and all his works, and all human knowledge combine to illumine the hidden road and join in the miracle whereby the impassable is passed. In this labor of love Isidore shared in his humble way. The degree of his foolishness can be measured only in terms of the quality both of the soul and of the mind of his critic. I have neither answered the question with which I began nor have I left it unanswered. Under the long evening light of Eternity, the words of St. Paul carry across the mediaeval centuries admonishing us that the wisdom of this world is but foolishness in the sight of God, and amid these Gothic shadows the voices of the skeptics, reiterating their petulant query "What is the Truth?" sound thinly, attenuating into empty silence, unconvincing and disregarded. And beneath the all-embracing majesty of God the world and its creatures stand for one brief moment of history, transfigured by His Glory.

FLOYD SEYWARD LEAR.

NOTES

<sup>1</sup>Cf. Harold J. Laski, *The Dangers of Obedience and Other Essays* (New York: Harper, 1930), pp. 102, 110, 141.

<sup>2</sup>Henry Osborn Taylor, *The Mediaeval Mind* (4th ed., New York: Macmillan, 1925), I, 103.

<sup>3</sup>Ferdinand Lot, *La Fin du Monde antique et le Début du Moyen Âge* (Paris: La Renaissance du Livre, 1927), p. 330, quoting Dom H. Leclerc, *L'Espagne chrétienne* (Paris, 1910), p. 319: "grenier où il a remis la défroque de l'Antiquité."

<sup>4</sup>James Westfall Thompson, *The Middle Ages, 300-1500* (New York: Knopf, 1931), II, 800.

<sup>5</sup>Carl Stephenson, *Mediaeval History: Europe from the Fourth to the Sixteenth Century* (New York and London: Harper, 1935), p. 220.

<sup>6</sup>Lynn Thorndike, *A History of Magic and Experimental Science during the First Thirteen Centuries of Our Era* (New York: Macmillan, 1923), I, 623.

<sup>7</sup>F. A. Wright, and T. A. Sinclair, *A History of Later Latin Literature from the Middle of the Fourth to the End of the Seventeenth Century* (London: Routledge, 1931), p. 119.

<sup>8</sup>*Ibid.*, p. 121.

<sup>9</sup>Ernest Brehaut, *An Encyclopedist of the Dark Ages: Isidore of Seville* (New York: Columbia University Press, 1912), p. 16.

<sup>10</sup>M. L. W. Laistner, *Thought and Letters in Western Europe: A.D. 500 to 900* (New York: Dial Press, 1931), p. 89.

<sup>11</sup>*Ibid.*, p. 92.

<sup>12</sup>*Ibid.*, p. 93.

<sup>13</sup>C. H. Haskins, *The Renaissance of the Twelfth Century* (Cambridge: Harvard University Press, 1927), p. 304.

<sup>14</sup>Helen Waddell, *The Wandering Scholars* (Boston: Houghton Mifflin, 1927), p. 67.

<sup>15</sup>*Ibid.*, p. 165.

<sup>16</sup>C. H. Beeson, *A Primer of Medieval Latin* (Chicago: Scott, Foresman, 1925), p. 136, n. 1.

<sup>17</sup>Christopher Dawson, *The Making of Europe: An Introduction to the History of European Unity, 400-1000 A.D.* (London: Sheed and Ward, 1932), p. 98.

<sup>18</sup>E. K. Rand, *Founders of the Middle Ages* (Cambridge: Harvard University Press, 1928), p. 63.

<sup>19</sup>W. P. Ker, *The Dark Ages* (Edinburgh and London: Blackwood, 1923), p. 138.

<sup>20</sup>See W. E. H. Lecky, *History of European Morals from Augustus to Charlemagne* (New York, 1887), II, 204-205.

<sup>21</sup>J. W. Thompson, *op. cit.*, II, 800.

<sup>22</sup>E. Brehaut, *op. cit.*, p. 16.

<sup>23</sup>The best account of Isidore's life and works may be found in Max Manitius, *Geschichte der Lateinischen Literatur des Mittelalters (Erster Teil: Von Justinian bis zur Mitte des Zehnten Jahrhunderts)* (Munich, 1911), pp. 52-70. Also see M. L. W. Laistner, *op. cit.*, pp. 89-94; E. Brehaut, *op. cit.*, pp. 15-34; J. E. Sandys, *A History of Classical Scholarship from the Sixth*

*Century B.C. to the End of the Middle Ages* (2nd ed., Cambridge: University Press, 1906), I, 456-458.

<sup>24</sup>See article on "Education" by J. W. Adamson, in *The Legacy of the Middle Ages* (Oxford: Clarendon Press, 1926), p. 278.

<sup>25</sup>Aristotle, *Historia animalium* (trans., D'Arcy W. Thompson, Oxford, 1910), v., 19, 15.

<sup>26</sup>Pliny, *Naturalis historia* (ed., D. Detlefsen, Berlin, 1871), xxix, 4, 23. See *The Natural History of Pliny* (trans., J. Bostock and H. T. Riley, London, 1855), xi, 116 (Vol. III, p. 98): "The animals which feed upon poison have been already mentioned. Some of them, which are harmless of themselves, become noxious if fed upon venomous substances. The wild boar of Pamphylia and the mountainous parts of Cilicia, after having devoured a salamander, will become poisonous to those who eat its flesh; and yet the danger is quite imperceptible by reason of any peculiarity in the smell and taste. The salamander, too, will poison either water or wine, in which it happens to be drowned; and what is more, if it has only drunk thereof, the liquid becomes poisonous. The same is the case, too, with the frog known to us as the bramble-frog. So numerous are the snares that are laid in wait for life!" This passage affords an interesting contrast with the statement made by Aristotle. In Isidore's compend the *fire* tradition of Aristotle has been combined with the *poison* tradition of Pliny.

<sup>27</sup>Isidore, *Etymologiae sive origines* (ed., W. M. Lindsay, Oxford, 1911), xii, 4, 36.

<sup>28</sup>Bartholomaeus Anglicus, *De proprietatibus rerum* (trans., Berthelet), xviii, 92.

<sup>29</sup>Isidore, *Etymologiae*, v, 30, 1-2.

<sup>30</sup>*Ibid.*, v, 30, 18-22.

<sup>31</sup>*Ibid.*, v, 32, 1.

<sup>32</sup>*Ibid.*, v, 38, 5.

<sup>33</sup>W. E. H. Lecky, *History of the Rise and Influence of Rationalism in Europe* (London: Longmans Green, 1913), I, 275.

<sup>34</sup>Egon Friedell, *A Cultural History of the Modern Age* (New York: Knopf, 1930), I, 76.

<sup>35</sup>On Neoplatonism, Dionysius the Areopagite and the "magic-mystery," see H. O. Taylor, *The Classical Heritage of the Middle Ages* (3rd ed., New York: Macmillan, 1929), pp. 82-106.

<sup>36</sup>H. O. Taylor, *The Mediaeval Mind*, II, 486-492.

<sup>37</sup>See J. W. Draper, *History of the Intellectual Development of Europe* (rev. ed., New York, 1876), I, 404.

<sup>38</sup>E. Brehaut, *op. cit.*, p. 33.

<sup>39</sup>*Ibid.*, pp. 29, 65.

<sup>40</sup>H. O. Taylor, *The Mediaeval Mind*, I, 105.

<sup>41</sup>Lynn Thorndike, *op. cit.*, I, 628.

<sup>42</sup>Isidore, *Etymologies*, xvi, 26, 10. I am citing here Thorndike's abridged translation (*op. cit.*, I, 627-628).

<sup>43</sup>E. Brehaut, *op. cit.*, p. 34.

<sup>44</sup>Cf. Isidore, *Etymologiae*, xiii, 7, 1-2.

<sup>45</sup>Cf. G. G. Fox, *The Mediaeval Sciences in the Works of John Gower* (Princeton: Princeton University Press, 1931), pp. 18-36, for literary applications of the doctrine of the *microcosm*.

<sup>46</sup>See F. H. Garrison, *An Introduction to the History of Medicine* (Phila-

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delphia and London, 1914), pp. 61-62; W. Libby, *History of Medicine* (Boston: Houghton Mifflin, 1922), p. 43; D. Riesman, *The Story of Medicine in the Middle Ages* (New York: Hoeber, 1936), pp. 304-307.

<sup>47</sup>E. Brehaut, *op. cit.*, p. 79.

<sup>48</sup>*Ibid.*, p. 67.

<sup>49</sup>*Ibid.*, p. 64.

<sup>50</sup>H. O. Taylor, *The Mediaeval Mind*, II, 532-534.

<sup>51</sup>C. H. Haskins, *Studies in the History of Mediaeval Science* (2nd ed., Cambridge: Harvard University Press, 1927), p. 262; E. Kantorowicz, *Fredrick the Second* (London: Constable, 1931), pp. 350-359.

<sup>52</sup>See W. H. Hudson, *The Story of the Renaissance* (New York: Holt, 1924), p. 6, quoting from Lewes, *History of Philosophy*, II, 95-96.

<sup>53</sup>See Eric T. Bell, *The Search for Truth* (Baltimore: Williams and Wilkins, 1934), pp. 132-46, for a diverting, though unsympathetic, satire upon mediaeval thought; H. E. Barnes, *The History of Western Civilization* (New York: Harcourt Brace, 1935), I, especially Chs. X and XX, for a critical estimate, based on the criteria of modern science; Egon Friedell, *op. cit.*, I, Chs. II and III, for a psychological interpretation, emphasizing the rôle of metaphysics in mediaeval thought; J. Huizinga, *The Waning of the Middle Ages* (London: Arnold, 1927), for numerous references to psychopathic social phenomena of the later Middle Ages; Ralph Adams Cram, *The Great Thousand Years* (Boston: Marshall Jones, 1919), and *The Substance of Gothic* (2nd ed., Boston: Marshall Jones, 1925), for enthusiastic approval of the mediaeval spiritual and artistic sense, hailing the coming of the "new Middle Ages"; N. Berdyaev, *The End of Our Time* (London: Sheed and Ward, 1933), pp. 69-120, on the "new Middle Ages." H. O. Taylor, *The Mediaeval Mind*, is still the soundest critical, but sympathetic, analysis of mediaeval thought and emotion.

<sup>54</sup>Ferdinand Lot, *op. cit.*, pp. 190-191.

<sup>55</sup>E. K. Rand, *op. cit.*, pp. 86-87; E. Brehaut, *op. cit.*, pp. 66-68.

<sup>56</sup>E. Brehaut, *op. cit.*, p. 77.

<sup>57</sup>See H. O. Taylor, *The Mediaeval Mind*, II, 95.