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The Guiding Lights of the University of Wittenberg and the Emergence of Copernican Astronomy

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Under the direction of its most celebrated faculty members, Martin Luther and Philip Melanchthon, the University of Wittenberg assumed a position of leadership in the sixteenth-century reformation of the church. The role of the academic community in the process of reform was a pivotal one, and from its inception the Reformation in Germany was a university movement.[1] More than any other institution, the University of Wittenberg provided the impetus and became the instrument through which some of the most profound changes in ecclesiastical history were engineered. The Reformation, however, was not the only movement of historic significance and far-reaching implications to gain momentum during the first half of the sixteenth century. Advances in science, and chiefly the cosmological achievements of Copernicus, gradually began to stir the geostatic world into motion. While many of the tenets of Copernicus were slow to receive recognition, his astronomical assertions represented a major shift away from the prevailing Aristotelian and Ptolemaic approaches to astronomy. The thoughts of Copernicus were not unknown to the leaders at the University of Wittenberg. Contrary to the assumption that Luther and Melanchthon obstructed the spread of Copernicanism, each played a role in its eventual dissemination.

Before the publication of his monumental *De Revolutionibus Orbium Coelestium Libri Sex* Copernicus and his ideas were topics of some discussion in Wittenberg. Theology continued to be the focus of most attention, but science in general, and astronomy more than any other scientific endeavor, proved to be of great intellectual interest. As in theology, so also in astronomy, the University of Wittenberg established interpretive trends that influenced the perspective of most Protestant universities throughout Germany. At the very least the University of Wittenberg did not attempt to stand in the way of emerging Copernicanism. In fact, the evidence indicates that Wittenberg helped create an atmosphere in which Copernican views could be addressed and assimilated.

The reaction in the University of Wittenberg to Copericanism touches on the larger issue of the relationship between the Reforma-

tion and the scientific revolution. With the Reformation and the rise of science coming to prominence at approximately the same time questions about how they may have been related frequently arise. Conclusions about the connections between the two have been varied and conflicting. The nineteenth-century French Protestant historian, Alphonse de Candolle, noted that, of the ninety-two foreign members elected to the Academy of Sciences in Paris from its founding in 1666 to 1866, seventy-one were Protestant, while only sixteen were Roman Catholics, and the remaining five were Jews. This observation, coupled with the fact that during these two centuries European Roman Catholics far outnumbered their Protestant counterparts, compelled Candolle to conclude that Protestantism and science were not only compatible but intimately wedded to one another.[2] Conversely, others have argued that the Reformation and the advance of science were fundamentally antagonistic, with early reformers taking an inflexible stand and arresting the progress of theories such as those espoused by Copernicus. Andrew Dickson White has provided the classic argument for this point of view in his two-volume *History of the Warfare of Science and Theology in Christendom.*[3] Recent studies of the issue have been more sophisticated, neither resorting to the overstated military metaphor of White, nor being reduced to the oversimplified head-counting technique of Candolle. Most investigations, however, continue to characterize the relationship between the Reformation and science as either essentially adversarial or inextricably linked. Such facile categorizations are wholly inadequate and fail to recognize the more subtle dimensions of the question.

The subtleties of the issue are apparent in the case of Lutheran Wittenberg and Copernican astronomy.[4] The position of Wittenberg, represented by its most influential spokesmen, Luther and Melanchthon, has traditionally been understood to be inherently opposed to Copernicanism. The following pages will argue, however, that the University of Wittenberg and its faculty helped shape an intellectual milieu that proved to be helpful to the expansion of Copernican teaching. This argument is not to imply that Luther or Melanchthon endorsed the teaching of their contemporary, Copernicus. They did not, nor was there any compelling reason for them to question the traditional cosmological matrix of their day. Nevertheless, the

guiding lights of Wittenberg did not interfere with this alternative approach to understanding the stars. On the contrary, they helped facilitate much of the earliest reception of the controversial Copernican theory. This transitional time, therefore, ought not be depicted as either a pro-Copernican or anti-Copernican period, for each description says too much. Instead, the example of the University of Wittenberg suggests how complex the response to Copernicus could be. In contrast to its place on the leading edge of ecclesiastical reform, Wittenberg's approach to the initial assertions of the new science was mainly reactive. But react it did and, while generally conservative in its analysis, the University of Wittenberg did not receive Copernicanism with either animosity or aloofness. It engaged the otherwise earth-shaking argument with studied caution and interest—if not always complete agreement.

The teachings of Luther and Melanchthon are consistently cited as evidence of their disapproval of Copernican cosmology. Admittedly, the Wittenberg reformers were not personally impressed with the heliocentric interpretation of the universe, nor could they accept the theory that the earth and not the sun was in motion. Scriptural citations and, especially in the case of Melanchthon, Aristotelian references were raised in opposition; yet neither Luther nor Melanchthon addressed the unconventional ideas with great urgency. In traditional scholarship, however, certain of their comments have been used in a way which misrepresents the positions of the Lutheran reformers. It will be necessary to place isolated remarks into the larger framework, firstly, of Luther's attitude toward astronomy and scientific inquiry and, secondly, of Melanchthon's curricular reforms and accommodating approach toward views to which he did not personally adhere. Finally, the extent to which the University of Wittenberg served to shape the disposition toward Copernicus at other German universities of Protestant persuasion will be considered in further detail. It will be shown that Wittenberg's impact on the teaching of astronomy abroad was extensive and that its measured interest in the theories of Copernicus had a rippling effect throughout Germany. In stepping away from the question of whether or to what extent Wittenberg was for or against Copernicus, this essay will demonstrate how the Lutheran Reformation opened the way for a preliminary but

necessarily limited introduction of the new science.

Martin Luther was a university man. More than any other, his name is associated with the Reformation, and an integral feature of Luther's agenda was the introduction of university reform. Addressing the German nobility, Luther wrote, "The universities, too, need a good, thorough reformation. I must say that, no matter whom it annoys."[5] The brunt of the responsibility for this task was left to Melanchthon, but Luther's input and participation as dean of the theological faculty were indispensable.[6] Certainly, his interests focused mainly on the department of theology rather than the sciences, but Luther maintained an active interest in what was transpiring throughout the university.

In addition to academic and institutional interests the professor of theology remained a keen observer of nature, and his writings and sermons are replete with references to the natural world. As Luther scholar Heinrich Bornkamm has put it, "Luther had the necessary talent, the prerequisite for a proper study of nature: a sense of primal wonder and awe."[7] It is not surprising, therefore, that rumors of startling new cosmological theories would come to Luther's attention. His apparent response leaves evidence to suggest that "primal wonder and awe" only went so far and that finally Luther's view of the solar system was governed by traditional geocentric and geostatic assumptions. In an often cited quotation from Luther's *Tischreden* dated June 4, 1539, his student Anton Lauterbach recorded Luther as having said:

> There was mention of a certain astrologer who wanted to prove that the earth moves and not the sky, the sun, and the moon. This would be as if somebody were riding on a cart or in a ship and imagined that he was standing still while the earth and the trees were moving. . . . So it goes now. Whoever wants to be clever must agree with nothing that others esteem. He must do something of his own. That is what the fellow does who wishes to turn the whole of astronomy upside down. Even in these things that are thrown into disorder I believe the Holy Scriptures, for Joshua commanded the sun to stand still and not the earth [Joshua 10:12].[8]

To what extent do these remarks reflect Luther's attitude toward scientific inquiry and the value of astronomy? Such a statement appears damaging to the argument that Luther himself contributed to the acceptance of the theories of Copernicus. Moreover, the parallel citation in Johann Aurifaber's version of the statement renders an even more disparaging assessment. Included in the quotation is a phrase frequently reproduced by those desiring to demonstrate Luther's hostility toward Copernicus and the new science. Aurifaber added these words: "The fool wants to turn the whole art of astronomy upside down."[9] Though comparably mild by the reformer's often caustic standards, it is not surprising that those eager to portray Luther as one of the key figures in the early Protestant suppression of science have latched on to the phrase. At a glance these words seem to go some distance in support of the contention that Luther's literalist interpretation of the Scripture inhibited his appreciation of science and was an obstacle to his understanding the contribution of Copernicus.

A mere glance, however, will not suffice to explain the whole of Luther's scientific perspective. This statement must be placed alongside the far more extensive *corpus* of Luther's writings about science and astronomy to give a more complete reading of his opinions. Furthermore, elaboration upon Luther's thoughts about the authority of Scripture for theology and how this authority relates to other disciplines is necessary in order to grasp more accurately his understanding of the interaction between science and faith.

Before proceeding with these explanations, however, there is much that calls into question the extent to which his off-hand "table talk" should be taken as a reflection of Luther's sentiments about Copernicus. Informal conversation with the steady stream of dinner guests at the Luther household was an important feature of the Wittenberg professor's rapport with his students and other interested parties. His comments ranged over a vast array of topics, and his eager pupils assiduously took notes on nearly everything Luther had to say. The dynamic of these kind of discussions was such that rarely were the words carefully conceived or considered in advance. It is clear that idle conversation should not bear the same weight of authority in interpreting Luther's point of view as treatises or

commentaries in which his choice of words was more deliberate. It is necessary, too, to raise the question of reliability. It is certainly not difficult to imagine that Luther might have made such a remark, even in its least flattering form. The possibility that a later editor, because of personal opposition to Copernicus or simply on the basis of hearsay, incorporated the statement in question has also been suggested.[10] In any event, the only recorded negative comments Luther ever made against Copernicus (presumably, although the astronomer is never mentioned by name) came not from his own pen but from the notes and recollections of his students.

More significant, however, is the fact that Luther's remarks came in 1539, four years before the *De Revolutionibus* of Copernicus was made public. Even the *Narratio Prima*, a preliminary Copernican treatise written by the mathematician Georg Rheticus (a colleague of Luther's on the faculty of Wittenberg), was not published until 1541. Many of the ideas of Copernicus were circulating before this date, but Luther's comments about "the new astrologer who wanted to prove the earth moves" predated the formal presentation of Copernicanism by at least two years. He might be blamed for a few premature and harsh words, but to consider Luther anti-Copernican before Copernicanism was off the ground is anachronistic.

Luther likely believed that rumors about the radical postulate regarding the earth's motion could be refuted on the basis of Scripture, but he did not thereby dismiss the valuable role of science or the legitimacy of astronomical reflection. He was critical of a mere naturalistic explanation of what could be observed; Luther believed that the behavior of all things, whether in the heavens or upon the earth, depended upon the Creator God who could command all of creation to act according to or in opposition to its nature.[11] Luther acknowledged that this view could not be understood apart from faith and wrote: "This is so because, when God's miracles are performed, they are understood by none but the godly. The ungodly indeed disparage all of God's miracles and say they happened by chance. They attribute them to some essential and formal causes, as the mathematicians do."[12] Luther was unable to conceive of cause-and-effect scientific interpretations that failed also to take into account the guiding hand of God. He was concerned that this kind

of explanation, if allowed to stand alone, would obscure the supreme power of the deity. But this concern does not mean that Luther perceived the intensive study of nature to be a threat to theology. Knowledge of nature did not encroach upon revelation or diminish the message of the gospel, and thus Luther could encourage a freedom of research and scientific teaching.[13]

Astronomy was a science that Luther held in particular esteem. Numbered among the liberal arts, astronomy was one of the *quadrivium* of subjects taught in secondary schools. It was a part of the strong pedagogical emphasis Luther encouraged for the young of Germany in order to provide the nation with much needed educated men.[14] Even beyond its utility, Luther spoke of the great pleasure to be derived from such stimulating pursuits:

> Therefore we should not follow the imaginations of the interpreters who suppose that the knowledge of nature, the study of astronomy or all of philosophy, is being condemned here and who teach that such things are to be despised as vain and useless speculations. For the benefits of these arts are many and great, as is plain to see every day. In addition, there is not only great utility, but also great pleasure in investigating the nature of things.[15]

While not hesitating to acknowledge the legitimacy of astronomy, Luther was more skeptical toward astrology. "We will gladly allow astronomy," he once stated, "but I cannot bear astrology because it has no demonstrable proof—its prophecies are doubtful."[16] Astronomy, on the other hand, was affirmed by Luther as "the oldest science and has been instrumental in introducing many arts."[17] The distinction which Luther recognized between astronomy and astrology was not typical of his day. The two were regularly interwoven in the minds of many, including the likes of Copernicus and also Melanchthon. According to Luther, Melanchthon pursued astrology "as I take a drink of strong beer when I am troubled with grievous thoughts."[18] Concerning his colleague, Luther lamented, "I regret that Philip Melanchthon adheres so strongly to astrology. He is very much deluded for he is easily affected by signs in the sky and deceived by his own thoughts. He has often been mistaken, but he cannot be dissuaded."[19] Eager to separate astronomy from pseudo-

science, Luther's unfavorable attitude toward astrology provides insight into what he believed constituted genuine science. Commenting on Genesis 1:14, Luther wrote:

> I shall never be convinced that astrology should be numbered among the sciences. And I shall adhere to this opinion because astrology is entirely without proof. The appeal to experience has no effect on me. All the astrological experiences are purely individual cases. The experts have taken note of and recorded only those instances which did not fail; but they took no note of the rest of the attempts where they were wrong and the results they predicted as certain did not follow . . . and so I do not believe that from such partial observations can a science be established.[20]

Luther's sense of astronomy as a legitimate science, on the other hand, underscores the assertion that he recognized the natural sciences as having a foundation of knowledge distinct from scriptural revelation. What is more, given Luther's attitude toward those whose investigation of the stars led to the plethora of predictions and speculations, it might be expected that Luther would dismiss such practices and their practitioners out of hand. However, this was not his position:

> If someone should uphold them with less insistence, I for my part have no great objection. Geniuses must be allowed their pastime! Therefore, if you put aside all superstition, it does not offend me greatly if anyone exercises his ingenuity in toying with these predictions.[21]

It would stand to reason that, if he could tolerate astrology, an authentic science such as astronomy provided an even more appropriate context for research and reflection. Luther's willingness to allow geniuses their pastime with no great objection was based upon a pair of underlying and connected principles. Firstly, Luther was confident that the fundamental content of Scripture remained unthreatened and untouched by astronomy and other disciplines. His biblical hermeneutic did not hinder but rather could easily adjust to science. This was true, secondly, because Luther recognized two distinct sources of knowledge—reason and revelation. Science and

Scripture, he believed, each explained things differently, utilizing different systems of language. The differing discourses, however, while often contrasting, were not mutually exclusive or contradictory. A more detailed analysis of these features of Luther's thought will demonstrate how he could restrain himself from interfering with a cosmological perspective which he did not hold despite a growing adherence to Copernicus at the University of Wittenberg.

Increasing approval of Copernican theory was not confined to mathematicians or astronomers on the faculty. Caspar Cruciger, Luther's colleague in the department of theology, was charmed by what he knew of the teaching of Copernicus. Certainly, Luther had the ability as dean of the theological faculty to take action against any differences of opinion within his department which he considered a serious problem, and he was undoubtedly a formidable enough force to restrict views which he opposed anywhere in the university. It has even been argued that, in view of his influence over a number of princes, Luther could have seen to the suppression of Copernican teaching throughout the Lutheran territories.[22] He was not compelled to proceed with any stringent measures, however, because his understanding of Scripture did not require him to attempt to suppress scientific explanations of the operation of the universe.

What little he knew of the new science, admittedly, would prove difficult to harmonize with his biblical understanding, and Luther never abandoned Ptolemaic assumptions. Luther, however, did not regard Scripture as a scientific textbook, nor was his acceptance of the prevailing cosmology such that his theological perspective was dependent upon it. He viewed Scripture christologically. In other words, the person and work of Jesus Christ were seen as the sum and substance of Holy Writ.[23] The Bible was not a scientific explanation of nature, and Luther was not confined to a rigid biblicism that prevented him from seeing the value of natural science. Instead, he was aware that science and faith were distinct disciplines, each being directed by its own discourse and each autonomous within its own sphere. He was, therefore, willing to accept the astronomers' conclusion that the moon was the smallest and lowest of the stars even though Scripture referred to it as one of the "two great lights" with control over the night and the heavenly

bodies. The Old Testament scholar conjectured that Scripture was simply describing the moon as it appeared from the perspective of earth.[24]

Religious and scientific terms, therefore, do not refer to the same thing in precisely the same way. Recognizing that Scripture and science describe things differently, indeed at times even contrastingly, Luther asserted that each possessed autonomy within its own domain. This view was framed most succinctly in theses prepared by Luther for the regular quarterly disputation at the University of Wittenberg in January of 1539. It is safe to assume that Luther gave more thought to the relationship between theology and other disciplines in the preparation of these theses than in his after-dinner comments about Copernicus a few months later. In this disputation Luther was responding to a proposition advanced by the University of Paris asserting that truth was the same in philosophy and theology. Luther argued that philosophy had its own independent meaning and was qualified to set forth the truth in the realm of nature while theology was to be preeminent in the realm of grace. Thus, it followed that, while reason was to keep silent in the church, it was nevertheless understood by Luther to be a divinely given gift by which humanity was to assert dominion in the world of nature.[25] Selections from Luther's theses of 1539, "The Disputation Concerning the Passage: The Word Was Made Flesh," provide a sense of how he could permit astronomy, which was among the disciplines of philosophy, its own autonomy:

> *Theses 1.* Although the saying, "Every truth is in agreement with every other truth," is to be upheld, nevertheless, what is true in one field of learning is not always true in other fields of learning.
>
> *Theses 2.* The Sorbonne, the mother of errors, has very incorrectly defined that truth is the same in philosophy and theology.
>
> *Theses 36.* Finally, something is true in one area of philosophy which is, nonetheless, false in another area of philosophy.
>
> *Theses 38.* Thus, in particular liberal arts, or rather crafts,

> if you look them over, you will discover that the same thing is not true in all of them.
>
> *Theses 39.* How much less is it possible for the same thing to be true in philosophy and theology, for the difference between them is infinitely greater than that between liberal arts and crafts.
>
> *Theses 40.* We would act more correctly if we left dialectic and philosophy in their own area and learned to speak in a new language in the realm of faith apart from every sphere.[26]

Luther did not espouse the medieval "theory of double truth" condemned at the Fifth Lateran Council (1512-1517) but claimed that the same thing was not always true in different disciplines. Contrasts, however, are not the same as contradictions. While contrasting versions of truth occur between disciplines—for example, between astronomy and theology, Luther maintained contradictions occurred only within the same system of language and not between one discourse and another. For Luther, words were like coins which are the acceptable currency only in the place where they are minted, and so also the various disciplines have full autonomy within the limits of their own individual spheres. The meaning of words is tied to a specific discourse and, when transferred to another, may be interpreted differently according to the new context.[27]

Luther had no theological reason to hinder scientific progress. His literal biblical exegesis does not imply that he understood each scriptural reference as a matter of scientific truth. Inconsistencies between disciplines and their discourses could be met with adjustments. For Luther, of course, the adaptations would take place within traditional rather than Copernican science, but he made available a pattern which others, including colleagues at the University of Wittenberg, could alter to fit their own astronomical conceptions.

The most influential of Luther's colleagues was the rector of the university, Philip Melanchthon. His key post in the faculty made Melanchthon's response to Copernicanism critical to whether or not the view would be permitted expression within the academic

community of Wittenberg. Melanchthon came to Wittenberg in 1518 to assume a newly created chair in Greek at the age of twenty-one. When the Elector Frederick the Wise established the University of Wittenberg in 1502, the imprint of the humanistic movement was immediately present, but the addition of Melanchthon marked the beginning of a thrust to incorporate more fully *humanitas* into the curriculum.[28] Among the measures of educational reform that Melanchthon stressed was the study of mathematics and thus astronomy. He believed astronomy merited a prominent place in the curriculum because the study of the heavens lent itself to a greater appreciation of the order and beauty of the divine creation.[29] Linking the study of nature with the adulation of the Creator, Melanchthon offered this praise of astronomy:

> To recognize God the Creator from the order of heavenly motions and of his entire work, that is true and useful divination, for which reason God wanted us also to behold his works. Let us therefore cherish the subject which demonstrates the order of the motions of the description of the year, and let us not be deterred by harmful opinions, since there are some who—rightly or wrongly—always hate the pursuit of knowledge.[30]

By 1525 two lectureships were devoted to mathematics, with scientific expertise and aptitude for teaching being among the requirements expected of candidates under consideration for the positions.[31] The university's renown as a center for the study of mathematics grew under the rectorate of Melanchthon. The great French educational reformer, Peter Ramus, admiringly called Germany "the nursery of mathematics" and praised Melanchthon, the *Praeceptor Germaniae*, as the leading force:

> Just as Plato revived the study of mathematics in Greece through the great power of his eloquence and erudition, so Melanchthon found [mathematical studies] already greatly encouraged in most academies in Germany, with the exception of Wittenberg. Whereupon, through the force of of much and varied instruction and through the example of a pious and upright life, which, at least in my opinion, no doctor or professor in that country has ever attained, he

> wondrously ignited [those studies] with the result that Wittenberg became superior not only in theology and eloquence, in which fame it especially excels, but also in the studies of the mathematical discipline.[32]

Wittenberg attracted important and influential mathematicians and astronomers such as Georg Rheticus and Erasmus Reinhold. The powerful tradition of mathematical astronomy that Melanchthon introduced into the curriculum of Wittenberg did not of itself predispose the faculty toward a particular cosmology, but it was within this environment that traditional views were challenged and newer theories considered.

Melanchthon himself approached Copernicanism with ambiguity. The strong words of objection he used at first were eventually tempered, and over time Melanchthon began to write and speak of Copernicus more approvingly. More significantly, the manner in which he interacted with those who demonstrated Copernican sympathies reveals that, while Melanchthon was personally unconvinced by most of the theory, he remained extremely supportive of and encouraging toward younger faculty members who were inclined otherwise.

This flexibility must be placed alongside his persuasiveness within and beyond the "Melanchthon Circle."[33] Melanchthon's cautious attitude toward Copernicus created a model of circumspection emulated not only by most of those who were a part of the Wittenberg faculty, but also by the many German universities that came within Wittenberg's orbit of influence. Melanchthon and his circle left their stamp on the discipline of astronomy by staffing many leading German universities with their pupils and preparing the textbooks used in those institutions.[34] Robert Westman argues: "The effect of this informal scientific group on the early reception of the Copernican theory cannot be underestimated."[35] His view, however, is that Melanchthon's impact hindered the realist and cosmological claims of Copernicus from receiving full consideration. Yet, as will be shown, the recognition granted Copernican thought, albeit limited, opened the way for a more complete consideration of his theory. Though by no means progressive in his thinking about astronomy, Melanchthon helped introduce a pivotal transitional phase of

receptivity to Copernican cosmology.

Considering Melanchthon's own philosophical background, arriving at a position of tolerance of Copernicanism could not have been easily accomplished. For his time Melanchthon was somewhat of an authority in the field of the natural sciences. He encouraged expansion within the discipline and recruited talented men for the faculty, but these actions were not indicative of a wide-open attitude toward scientific innovation. On the contrary, Melanchthon at first opposed Copernicus. This reaction was not due to the fact that Melanchthon himself was a practicing astronomer; his concerns were based upon theoretical rather than practical considerations and were guided more by ancient texts than an informed criticism of the new astronomy. Melanchthon was a gifted humanist scholar as well as university administrator, yet each of these roles contributed to his initial discomfort with Copernicus.

As a humanist Melanchthon was concerned with classical thought including a traditional conception of nature that was widely accepted and rarely challenged. Melanchthon was aware of how antiquity struggled to arrive at a satisfactory explanation of the orbits of the planets. He knew that the ancients generally disregarded the view of Aristarchus of Samos concerning the immobility of the sun and movement of the earth.[36] Werner Elert has written: "It is self-evident that his attitude toward Copernicus is part of this whole sphere of ideas which characterizes Melanchthon as a genuine humanist but has nothing at all to do with his evangelical theology."[37] Melanchthon's lectures on physics and astronomy were firmly entrenched in the teachings of Aristotle and Ptolemy and, looking at Copernican cosmology through his humanist lenses, Melanchthon saw it as less an innovation than a revival of Aristarchus who had been already discredited in the ancient world.[38]

In his position as university rector Melanchthon reintroduced Aristotle into the curricular program in a variety of areas, not the least of which were the natural sciences. Luther's attitude toward Aristotle was mainly hostile, and the package of university reform which he recommended early in the Reformation initiated more than a decade of de-emphasizing Aristotelianism.[39] Following the extensive university reforms in 1536, however, Luther acquiesced in

Melanchthon's restoration of Aristotle and then became convinced himself of the appropriateness of Aristotelian precepts in various areas of learning. Melanchthon successfully rekindled interest in the study of Aristotle and republished works of an Aristotelian inclination such as Sacrobosco's introduction to astronomy.

With reference to the study of nature, Melanchthon regarded Aristotle as the unequaled authority. When he first learned in some detail of the Copernican theory through the *Narratio Prima* of Rheticus sent to him on February 15, 1540, Melanchthon could not have approached the material with complete objectivity. His humanist bent with its Aristotelian outlook informed Melanchthon's assessment of Copernicanism and prompted his less than favorable response.

Melanchthon's earliest reference to Copernicus came in the form of a letter to Mithobius on October 16, 1541, in which he casually mentions the theory and regards it more as a disturbance than a serious threat.[40] A more detailed analysis of the Copernican system is found in the *Initia Doctrinae Physicae*, a series of lectures published in 1549.[41] In a section pertaining to the movement of the world, Melanchthon opposed the system in the first instance by citing scriptural passages which led him to conclude: "strengthened by these divine proofs, let us embrace the truth, and let us not permit ourselves to be led away from it by the deceptions of those who think it is an ornament of the intellect to throw the arts into confusion."[42] But Melanchthon was not satisfied to refute Copernicus exclusively on the basis of Scripture; a far more extensive compilation of *argumenta physica* were also incorporated to defend his position. Within these physical arguments it was reiterated that the earth was situated at the center of all the universe and that it was immobile—a position consistent with the Aristotelian doctrine of simple motion which claimed that, if the earth moved, everything would break into pieces.[43] Melanchthon's reading of Copernican astronomy could not be reconciled with his Aristotelian predisposition, and, therefore, the cause of his opposition was not so much specifically biblical as it was philosophical.

His opposition, however, was not absolute or unyielding. As Melanchthon continued in his *Initia*, he expressed a more positive

and favorable interpretation of aspects of the Copernican theory. For example, in reference to Copernican lunar theory he spoke of its description of the movement of the moon as "beautifully put together." Nevertheless, he hastened to express his preference for the traditional teaching of Ptolemy, "in order that we may attract studious persons to the common teaching adopted in the schools."[44] It is important to note, however, that Melanchthon did acknowledge certain features of the Copernican theory to have merit and in several places utilized data drawn from Copernicus to support his own conclusions.[45]

Even more significant is the evidence of an adjustment in Melanchthon's thought toward Copernicus. In 1549, the year of the initial publication of his *Initia Doctrinae Physicae*, Melanchthon wrote in a speech to honor Cruciger, "We have begun to admire and love Copernicus more."[46] And in the second and all subsequent editions of the *Initia* Melanchthon deleted the antagonistic allusions to those who argue "either from love of novelty or from the desire to appear clever" that the earth moves.[47] There is a clear indication that Melanchthon's original resistance to Copernicus and his astronomical assertions diminished in intensity by 1550.

Moreover, in examining the relationship between Melanchthon and those on the Wittenberg faculty who approached Copernicus with greater sympathy during the previous decade, it becomes clear that the university rector's flexibility accommodated views not completely consistent with his own well before 1550. Melanchthon's reputation as a theologian who often negotiated and occasionally compromised on articles of Lutheran doctrine is frequently attributed to his irenic spirit. The Philippists, that contingent of more moderate individuals who were one of the contending factions in the late sixteenth-century struggle for ecclesiastical supremacy within Lutheranism, were named for Melanchthon and observed his more widely inclusive theological stance. The extent, of course, to which Melanchthon's desire for concord in the church caused him and his followers to stray from the purer strains of Luther's theology is not within the scope of this essay, but identifying Melanchthon's adaptability in the controversial realm of theology makes the idea of his flexibility in the less consequential sphere of astronomy seem the more

plausible. Caspar Peucer, Melanchthon's son-in-law and his successor as the rector of the University of Wittenberg, was jailed for being a crypto-Calvinist but not for his introduction of various elements of Copernican thought into his teaching of astronomy. Scientific deviation was not perceived to be as much of a threat as theological aberration during the Lutheran Reformation, and Melanchthon could allow and even encourage latitude in his faculty with few qualms.

Under the aegis of Melanchthon the University of Wittenberg permitted the cultivation of Copernican sympathies among some prominent faculty members. In turn, these men introduced Copernicus in their own teaching. The most convinced adherent of Copernicus in the University of Wittenberg was the mathematician Rheticus. Through the efforts of Melanchthon he came to Wittenberg as professor of mathematics in 1537 at the age of twenty-three. A preliminary draft of the conclusions of Copernicus, the *Commentariolus*, began to circulate as early as 1530, and Rheticus was interested enough in the content to pay a personal visit in the spring of 1539 to Frauenberg, where Copernicus was a canon in the cathedral chapter.[48] Rheticus later reflected on the inspiration for his journey:

> I heard of the fame of Master Nicholas Copernicus in the northern lands, and although the University of Wittenberg had made me a public professor in those arts, nonetheless, I did not think that I should become content until I learned something more through the instruction of that man. And I also say that I regret neither the financial expenses nor the long journey nor the remaining hardships.[49]

Although there was already an awareness of the Copernican heliocentric theory in Wittenberg, the visit of Rheticus went unimpeded. Rheticus became the first major disciple of Copernicus and in 1540 took the initiative to make public a preliminary report on the Copernican system in the *Narratio Prima*.[50] In the autumn of 1541, a year and a half after his original departure, Rheticus returned to Wittenberg where his new-found allegiance to Copernicus was undoubtedly known from the *Narratio Prima*:

> I sincerely cherish Ptolemy and his followers equally with my teacher, since I have ever in mind and memory that sacred precept of Aristotle: "We must esteem both parties but follow the more accurate." This is so perhaps partly because I am persuaded that now at last I have a more accurate understanding of that delightful maxim which on account of its weightiness and truth is attributed to Plato: "God ever geometrizes"; but partly because in my teacher's revival of astronomy I see, as the saying is, with both eyes and as though a fog had been lifted and the sky were now clear, the force of that wise statement of Socrates in *Phaedrus*: "If I think any other man is able to see things that can be naturally collected into one and divided into many, him I will follow after and walk in his footsteps as if he were a god."[51]

If the conversion of Rheticus to Copernicanism had been unacceptable to Melanchthon, it is doubtful that the former's professorship would have been restored. In fact, his faculty position was left open for Rheticus for the entire length of his absence. Indeed, he not only resumed his regular faculty responsibilities but was almost immediately made dean of the faculty of arts. Following his return to Wittenberg, Rheticus made repeated journeys to Nuremberg to supervise the publication of *De Revolutionibus*, which he had persuaded Copernicus to publish. Commenting later on his visit to Copernicus and the role which he filled in prodding his teacher along, Rheticus remarked, "Yet, it seems to me there came a great reward for these troubles, namely, that I, a rather daring young man, compelled this venerable man to share his ideas sooner in this discipline with the whole world."[52] Copernicus commissioned Rheticus with the responsibility of overseeing the publication, and, in order to enable him to fulfill this task, Melanchthon arranged a leave of absence with full salary. Melanchthon also provided letters of recommendation on behalf of Rheticus to his friends in Nuremburg. Writing to Veit Dietrich in May of 1542, Melanchthon called Rheticus "a man who is learned and capable of teaching this most pleasing knowledge of the movements of heavenly bodies."[53] And to Erasmus Ebner, in a letter written in July of that same year, Melanchthon stated that Rheticus was "born to search out learning."[54]

The fact that Rheticus took the work of publishing *De Revolutionibus* to Nuremberg does not indicate that he faced stricter censorship in Wittenberg, nor does it mark the beginning of a separation from those local connections. The fact is that Rheticus had a shorter version of the *Narratio Prima* published previously in Wittenberg by Hans Lufft, the printer of Luther's German Bible and, although he did leave the University of Wittenberg for a post at Leipzig, he did not depart under pressure because of his views. Leopold Prowe, a nineteenth-century biographer of Nicholas Copernicus, promised to write an additional volume in which he would provide evidence that Rheticus was obliged to abide by the Ptolemaic astronomy in his teaching in Wittenberg and that he subsequently removed himself thence to escape the conflict between obligation and conviction.[55] Prowe, however, never wrote the promised volume, and the evidence that Rheticus was restrained from teaching tenets of Copernicanism has not been brought forward. Indeed, by the time of the astronomer's move the University of Leipzig had also become solidly Lutheran, and from all the subsequent correspondence it is evident that Melanchthon missed Rheticus and held him in high regard.[56] The relationship between Melanchthon and Rheticus may not have been one of complete agreement, but the university rector respected his colleague and in many way and on various occasions supported his effort to make the views of Copernicus more widely known. Far from obstucting the progress of Copernican teaching, the University of Wittenberg helped facilitate the spread of his work by its steady support for Rheticus.

The theories of Copernicus did not fade into obscurity at the University of Wittenberg after the move of Rheticus to Leipzig. Erasmus Reinhold, who lectured on higher mathematics (which included astronomy), became interested in Copernicus and convinced by many aspects of his theory. Rheticus had acquainted him with Copernicus and, like Melanchthon, Reinhold was especially intrigued by his lunar theory. Reinhold wrote:

> I know of a recent author who is exceptionally skillful. He has raised a lively expectancy in everybody. One hopes that he will restore astronomy. He is just about to publish his

> work. In the explanation of the phases of the moon he abandons the form that was adopted by Ptolemy. He assigns an epicycle to the moon. . . .[57]

Reinhold spoke with praise of Copernicus, "whose divine intellect all posterity will have good reason to admire," and gave thanks that "God in His goodness kindled a great light in him so that he discovered and explained a host of things which, until our day, had not been known or [were] veiled in darkness."[58] Reinhold proceeded to provide the *Tabulae Prutenicae*, tables for the working astronomer based upon the planetary motions set forth in *De Revolutionibus*. He continued to speak admiringly of the Copernican writing throughout his own publication.[59] It must be admitted that Reinhold had little to say about the more revolutionary cosmological arguments of Copernicus; he maintained what has been called "the most perfect neutrality on the problem of geocentrism and heliocentrism."[60] The *Tabulae Prutenicae*, however, demonstrate that Reinhold was not only interested in the details of Copernican theory, but was also willing to develop the material and make it more accessible.

All of this activity, of course, was accomplished under the academic supervision of Melanchthon and with his administrative approval. Reinhold's work on the planetary tables received Melanchthon's moral and financial support, and on his behalf Melanchthon also wrote to Duke Albrecht of Prussia.[61] As was true with Rheticus, there is no evidence to suggest any interference with Reinhold's teaching activities at Wittenberg. In 1547 he was named dean of the faculty of arts, and from 1549-1550 he was the rector of the university. In 1553 he left Wittenberg on account of an outbreak of the plague, and soon afterward he died in his native city of Saalfeld. His appreciation of Copernicus, while perhaps not all-encompassing, never proved to be an impediment to Reinhold's career. Indeed, the publication of the *Tabulae Prutenicae* was his finest and most enduring achievement and showed that the teachings of Copernicus could be embraced at the University of Wittenberg without fear of censorship. Once again the University of Wittenberg, through one of its faculty members, played a role in the advance of Copernican astronomy.

A foundation was laid for the reception of Copernicus by Martin Luther, the name most synonymous with the German Reformation, and by Philip Melanchthon, the *Praeceptor Germaniae*, together with others on the faculty of the University of Wittenberg. It was on this foundation that the academicians at various other institutions gradually built. Indeed, Wittenberg became the prototype of an overall program of educational reform followed by a number of universities beginning with the organization of the University of Marburg in 1527. Philip of Hesse persuaded Melanchthon to fill a key role in Marburg's establishment, the first of many opportunities he had to influence the direction of university education outside of Wittenberg by helping to write or reformulate existing university statutes. Basel was reformed in 1532, and in 1536 Melanchthon introduced new measures at Tubingen. In 1539 reform at the University of Leipzig, the bastion of Luther's adversary Duke George of Saxony until the principality turned evangelical, was also begun. The new measures were implemented by the time Rheticus arrived in 1543. Also in 1539 the Wittenberg model was adopted at Greifswald and Copenhagen, and Frankfurt-on-the-Oder followed suit in 1540. Duke Albrecht of Prussia founded the University of Koenigsberg in 1544 as a "purely Lutheran place of learning," while Jena was established in 1558 in order to provide an orthodox Lutheran university. Melanchthon supervised the reorganization of the University of Heidelberg in 1557 and 1558. The spirit of his reforming efforts continued after Melanchthon's death in 1560 with the reorganization of the University of Rostock in 1564 and the founding of the Lutheran University of Helmstedt in 1575.[62]

The impact of Melanchthon's reforming energies specifically upon the field of astronomy was profound. The emphasis upon mathematics in the curricular program at Wittenberg was instilled in other places, and the measured reception of Copernicus was not unknown abroad. Lucas Valentin Otho, who completed the trigonometrical tables of the aging Rheticus, praised Wittenberg as a place where mathematical studies were flourishing and added that "there were evidences of Ptolemy, likewise evidences of Copernicus."[63] A large number of students and former professors left Wittenberg for other universities to assume positions that involved the teaching of astronomy. Undoubtedly, many of these took with them the

elements of both Ptolemaic and Copernican thinking which they had encountered in Wittenberg—studying under Melanchthon, Reinhold, Rheticus, and Peucer—and incorporated them into their classrooms through texts and lectures. At Leipzig were Melanchthon's close friend and biographer Camerarius and the astronomer Johannes Homelius. Homelius was a former student of Rheticus at Wittenberg and was later joined by him on the Leipzig faculty. He also became one of Tycho Brahe's first instructors in astronomy. The imprint of Wittenberg through the migration of faculty and students to other universities (German and Scandinavian) can also be traced to Tubingen, Koenigsberg, Heidelberg, Neustadt, Jena, Altdorf, and Copenhagen.[64] Educational reform at the level of the German gymnasium was also the object of Melanchthon's urgent attention, and former students often occupied faculty positions in these schools as well.

Copernican astronomy gained support in other parts of Lutheran Germany without direct influence immediately traceable to the University of Wittenberg. An example of one who championed the teaching of Copernicus elsewhere was Michael Maestlin at Tubingen. For a time Maestlin served as a Lutheran pastor in Wurttemberg prior to becoming professor of mathematics first at Heidelberg and then at Tubingen. Maestlin, along with Tycho Brahe and Peucer's former student, Johannes Praetorius of the University of Altdorf, were among the first Lutherans to take the entire Copernican cosmological system seriously.[65] Under Maestlin's most famous pupil, Johannes Kepler, the transition to a fuller engagement with Copernican theory was virtually completed. Luther provided a framework in which astronomy could be studied as a discipline distinct from theology, and Melanchthon inspired a pattern of limited acceptance of Copernican teaching. It was left to the next generation to build upon this foundation and consider in greater detail the broader implications of what Copernicus maintained.

Of course, the debate between the church and science over matters of astronomy was by no means complete. The famous struggle between Galileo and the Roman Catholic Church in the seventeenth century is evidence enough that issues such as these were not settled easily.[66] The same also held true for Lutheran Germany in the late

sixteenth and early seventeenth centuries. By the turn of the century there were a host of men unabashedly teaching the Copernican system in German universities, and there were no doubt instances in which this development did not please their theological counterparts.[67] From Luther on, however, there were no measures enacted at Lutheran universities designed to suppress the teaching of Copernicus. Indulgence, obviously, is not the same thing as endorsement or approval; yet, while the university did not take steps to replace Ptolemaic constructions with Copernican ones, the two approaches enjoyed a relatively peaceful coexistence during the era of the Reformation. Melanchthon, an ardent Aristotelian, created an environment in which his colleagues who were more inclined toward Copernicus could work comfortably and advance in their careers. Luther, the driving force behind the Reformation and the most prominent figure on the entire faculty of Wittenberg, had relatively little complaint and exerted no formal opposition.

Science and religion are not completely compatible. The former holds an unwavering devotion to reason, while the latter lays claim to that which transcends reason and is accessible only through faith. There have been and continue to be examples where the rational and the suprarational have come into conflict, highlighting differences in their respective methods and purposes. The emergence of the Reformation and the scientific revolution in early modern Europe has made their relationship a topic of considerable inquiry. The period provides ample evidence of their mutual incompatibilities, but the example of Lutheran Wittenberg and Copernican astronomy suggests that the relationship is not easily defined. Views that conflicted with traditional assumptions were approached with hesitation, not merely because science was relegated to an inferior status by the religious community, but because familiar explanations were generally considered satisfactory. New conclusions, however, were not simply dismissed or disregarded but evaluated and eventually improved. The environment existing at universities such as Wittenberg proved to be more conducive than obstructive to ideas such as those coming from Copernicus. The transition was accomplished gradually, but the religiously motivated University of Wittenberg did more to enhance than impede the progress of the new scientific astronomy.

Endnotes

1. See Lewis W. Spitz, "The Importance of the Reformation for the Universities: Culture and Confessions in the Critical Years," in *Rebirth, Reform and Resilience: Universities in Transition, 1300-1700*, ed. James M. Kittelson and Pamela J. Transue (Columbus: Ohio State University Press, 1984), pp. 42-67.

2. Alphonse de Chandolle, *Histoire des Sciences et des Savants* (Paris: 1873).

3. Andrew Dickson White, "A History of the Warfare of Science with Theology," in *Christendom*, 2 vols. (London: Arco Publishers, 1955).

4. The idea that the "Wittenberg Interpretation" represented a transitional phase is discussed in Robert S. Westman, "The Melanchthon Circle, Rheticus, and the Wittenberg Interpretation of the Copernican Theory," *Isis* 66 (1975), pp. 165-193.

5. *Luther's Works: American Edition* [henceforth cited as *LW*], ed. Jaraslav Pelikan and Helmut T. Lehmann (St. Louis: Concordia Publishing House; Minneapolis: Fortress Press, 1955-1986), 55 vols., 44, p. 200.

6. See James M. Kittelson, "Luther's Impact on the Universities and the Reverse," *Concordia Theological Quarterly*, 48 (1984), pp. 23-38.

7. Heinrich Bornkamm, *Luther's World of Thought*, trans. Martin H. Bertram (St. Louis: Concordia Publishing House, 1983), p. 182.

8. *LW*, 54, pp. 358-359.

9. *D. Martin Luthers Werke: Tischreden* (henceforth abbreviated *TR*), 6 vols. (Weimar: Hermann Böhlau, 1912-1921, in association with the "Weimar Ausgabe" [hence cited as *WA*], i.e., *D. Martin Luthers Werke: Kritische Gesammtausgabe* [Weimar: Hermann Böhlau und Nachfolger, 1883-]), 1, no. 855.

10. John Dillenberger, *Protestant Thought and Natural Science: A Historical Interpretation* (Nashville: Abingdon Press, 1960), p. 38.

11. See Gary B. Deason, "Reformation Theology and the Mechanis-

tic Conception of Nature," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, ed. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), pp. 175-178.

12. *LW*, 16, p. 326.

13. Werner Elert, *The Structure of Lutheranism*, trans. Walter A. Hansen (St. Louis: Concordia Publishing House, 1962), p. 417.

14. See *LW*, 46, p. 252.

15. *LW*, 15, p. 9.

16. *TR*, 1:17.

17. *TR*, 4:4705.

18. *TR*, 2:2730a.

19. *LW*, 54, pp. 219-220.

20. *LW*, 1, p. 45.

21. Ibid., p. 45.

22. Elert, *The Structure of Lutheranism*, pp. 423-424.

23. See Dillenberger, *Protestant Thought and Natural Science*, p. 37.

24. *TR*, 5:5259. See also B. A. Gerrish, "The Reformation and the Rise of Modern Science," in *The Impact of the Church upon Its Culture*, ed. Jerald C. Bauer (Chicago and London: University of Chicago Press, 1968), pp. 249-250.

25. See Gerrish, "Reformation and the Rise of Science," pp. 249, 253.

26. *LW*, 38, pp. 239-242.

27. See Gerrish, "Reformation and the Rise of Science," pp. 251-254.

28. For a discussion of humanism and the early history of the University of Wittenberg, see Robert Rosin, "The Reformation, Humanism, and Education," *Concordia Journal*, 16 (1990), pp. 301-318.

29. See Robert S. Westman, "The Copernicans and the Churches," in *God and Nature: Historical Essays on the Encounter between*

Christianity and Science, ed. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), p. 82.

30. Quoted in Westman, "The Melanchthon Circle," p. 170.

31. See Elert, *The Structure of Lutheranism*, p. 425.

32. Quoted in Westman, "The Melanchthon Circle," p. 172.

33. The designation "Melanchthon Circle," used by Westman and others, is drawn from Lynn Thorndike, *A History of Magic and Experimental Science*, 5 (New York: Columbia University Press, 1941), pp.378-405.

34. Westman, "The Melanchthon Circle," pp. 167-168.

35. Ibid., p. 168.

36. See Elert, *The Structure of Lutheranism*, p. 418.

37. Ibid., p. 418.

38. The standard critical edition of Melanchthon's works is the *Corpus Reformatorum* [henceforth cited as *CR*], ed. C. G. Bretschneider (New York and London: Johnson Reprint Corporation, 1963 ff.). Here see *CR*, 13, p. 216.

39. See Kittleson, "Luther's Impact on the Universities," p. 25; see also Spitz, "The Importance of the Reformation for the Universities," p. 54.

40. *CR*, 4, p. 679.

41. *CR*, 13, pp. 181-411.

42. Ibid., p. 217.

43. Ibid., p. 219.

44. Ibid., p. 244.

45. Ibid., p. 244.

46. *CR*, 11, p. 839.

47. See Westman, "The Melanchthon Circle," p. 173.

48. For a translation of the *Commentariolus* see Edward Rosen, *Three Copernican Treatises* (New York: Dover Publications, 1959), pp. 57-90.

49. Quoted in Westman, "The Melanchton Circle," p. 183.

50. For a translation of the *Narratio Prima* see Edward Rosen, *Three Copernican Treatises* (New York: Dover Publications, 1959), pp. 109-196.

51. Ibid., pp. 167-168.

52. Quoted in Westman, "The Melanchthon Circle," p. 183.

53. *CR*, 4, p. 810.

54. Ibid., p. 839.

55. See Gerrish, "Reformation and the Rise of Modern Science," p. 236, note 11.

56. See *CR*, 7, p. 601.

57. Quoted in Westman, "The Melanchthon Circle," p. 175.

58. Ibid., p. 175.

59. Erasmus Reinhold, *Prutenicae Tabulae Coelestium Motuum*, (Tübingen, 1551).

60. A quotation of Aleksander Birkenmajer in Westman, "The Melanchthon Circle," p. 177, note 48.

61. *CR*, 5, p. 444.

62. For an account of Melanchthon's role in the shaping of these universities see Spitz, "The Importance of the Reformation for the Universities," pp. 54-56.

63. Quoted in Elert, *The Structure of Lutheranism*, p. 426.

64. See Westman, "The Melanchthon Circle," p. 171.

65. Ibid., p. 181.

66. See Jerome J. Langford, *Galileo, Science, and the Church* (Ann Arbor: University of Michigan Press, 1966).

67. See Elert, *The Structure of Lutheranism*, p. 427.