tle Adams and a handful of others were waging in the U.S. House of Representatives against the British-controlled, intransigent, pro-slavery South. Adams' fight, Douglass tells us, gave him and other slaves the hope they needed that America would reject the institution of slavery, and made Adams a folk hero in many slave quarters. And the eloquence of Adams and other public speakers of the day led Douglass to learn the art of polemical "speechifying."

History 'From the Bottom Up'

While Quarles tells Douglass's story, he fails to convey the true nature of Douglass's intellectual powers. The reason for that lies in his decision to tell Douglass's story "from the bottom up," as opposed to beginning with a concept of what the actual fight in America, against British oligarchism, was, before, during, and after the Civil War.

This is not Quarles' failing alone; it is the state of the history profession in general. Quarles insists, for example, that in 1860, Douglass was campaigning for the Liberty Party presidential candidate, Gerrit Smith. Factually, that may be true. Douglass, however, knew that America's best hope was Lincoln, and in his newspaper, *Douglass' Monthly,* wrote, "The slaveholders know the day of their power is over when a Republican President is elected." His support for Smith was perfunctory, to say the least.

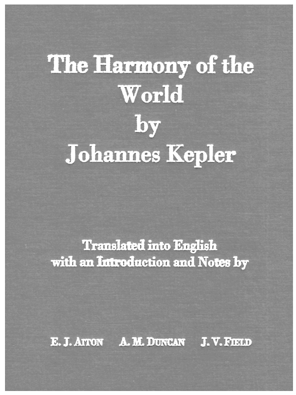
To "boil down" Douglass in this way to "just the facts," does not permit the reader to appreciate the full scope of Douglass's character, or his political integrity. This does not mean that Douglass was right all the time; in fact, he was often, from an empiricist standpoint, wrong, until he came to an understanding of what Lincoln stood for, and was fighting for. However, he chose his battles carefully, and waged them with *Entschlossenheit.* Douglass also could not be led around by the nose, by the Garrisonians or anyone else, which frustrated his white would-be patrons.

As Quarles notes, Douglass used to say that, "No man can be an enemy of mine who loves the violin." He was also a great lover of the poetry of Robert Burns. In his 70's, he began to study German. Such a man is well worth knowing, in all his richness—from the Douglass who waged a determined 18-month campaign in Scotland against the Free Church of Scotland's fundraising from American slaveowners ("you've got to give the money back"), to Douglass the violin-player and proud grandfather of concert violinist Joseph Douglass.

There are several correctives to the limitations of this Quarles classic, and its more recent counterpart, William McFeely's biography of Douglass, which takes the same empirical approach, but is more detailed, only because it, in turn, is based on the collected writings of Douglass currently being published serially by Yale University Press. These original writings, along with Philip Foner's edition of Douglass's writings, which is illuminating if not complete, are one corrective; the other, is Douglass's last autobiography, *The Life and Times of Frederick Douglass.* These primary sources will be far more rewarding to the serious student, who is willing to take the time to understand the true significance of Frederick Douglass's life in the context of the fight for the American Republic.

—Denise Henderson

The Characteristic Truth



The Harmony of the World
by Johannes Kepler,
translated by E.J. Aiton,
A.M. Duncan, and J.V. Fields
Philadelphia, American
Philosophical Society, 1997
549 pages, hardbound, $60.00

The publication of the first complete English translation of Johannes Kepler's work, *Harmonice Mundi* (*The Harmony of the World*), is a cause for great joy. Although parts of this book are difficult for the non-geometrically trained, as Kepler says in his preface, "they should not be frightened off by the difficulty of the geometrical arguments, and deprive themselves of the very great enjoyment of harmonic studies."

In *Harmonice,* Kepler presents to mankind the method by which he had been able to make the breakthroughs in astronomy which resulted in the Three Laws of planetary motion which still bear his name. This method has been attacked by more than the mere neglect which left the works inaccessible to those who could not read Latin or German; it has been buried beneath the weight of authority accorded to the assertion that physical processes can be understood without reference to Reason, by examination of cause-and-effect relations which are fundamentally linear. Kepler, on the other hand, knew that this could not be true.

In fact, the greatest value of the publication of this book, is the way in which it exemplifies Kepler's method of using his knowledge of the overall lawfulness of a system, to develop the proper method of dealing with specific information about events within that system. Contrary to today's belief, such information can never define either the appropriate method for its own analysis, or the lawfulness of the system from which it comes. Thus, the most profound truth, that the Creator must create the best and most beautiful world, leads Kepler to the certainty that there must be harmonic relationships embedded in the elliptical orbits, making them therefore more perfect than the circular shapes that had been previously assumed. Only from that standpoint does he ask from the observations, first, in what particular way are these harmonies expressed, and, secondarily, what are the particular harmonies so expressed.

The Languages of Science

As Kepler came to understand more and more deeply the lawfulness of the solar system, he also demanded a richer and more differentiated language than the then-available mathematics, to express his insights. It is for that reason, that he named his greatest work *The Harmony of the World,* and spent so much of it discussing the bases of music.

Kepler himself was not a composer, but he understood that the harmonic relations have some of the characteristics which he required for understanding the lawfulness of the physical universe. Harmonic relations, like the planetary orbits, are *specific*—there is a very narrow band of variation in the relation which is called a fifth, as opposed to the relations which can occur that are "somewhere between" a fifth and the next larger interval, a minor sixth. Further, the orbits of the planets can only occur at specific distances from the sun, not at any point at which a modern-day computer model might locate them. In the same way, there is an ordering principle in the musical domain, in which not every interval occurs lawfully in connection with every other interval (compare, for example, the consonant sound of the two successive fifths, C-G and G-d, with the dissonance resulting from their combination to produce C-d).

In the same way, the planets do not simply have lawful individual distances from the sun, but the characteristics of the orbits, including their size, their periodic times, and their deviation from circularity, are ordered by an overall system, which is partially reflected in Kepler's Third Law, first announced in *Harmonice Mundi,* which relates the radius of each orbit to its corresponding periodic time (or "year," in Earth terms), in a way which is constant for the entire solar system. The high point of *Harmonice* is Kepler's realization that the harmonic relations of the planets are actually those of the *human creation, polyphonic music.*

The musical harmonies alone do not provide the precise language needed for the continued development of astronomy, and physical science generally, so Kepler called for the development of a new level of mathematics. A specific instance occurs in *New Astronomy,* an earlier work, in which he announced the discovery that the planets move in ellipses, and that their speeds vary such that the imaginary ray from the sun to any particular planetary body sweeps out an equal area over any equal time period. As he is developing this concept, he analyzes the related question of a body moving around a circle, but sweeping out an area with a ray from a point that is not its center. He writes, "I exhort the geometers to solve me this problem: Given the area of a part of a semicircle, and a point on the diameter, to find the arc and the angle at that point, the sides of which angle, and which arc, encloses the given area [defined by the line from the given point, the sun, to the end of the arc, the approximate position of a planet–SB]."

The problem, as Kepler conceived of it, implies a pair of relationships, one of which governs the circular motion around the given point, and the other the change in the distance of the end of the arc on the semicircle from the given point. However, the planet is not progressing by fits and starts, moving along a particular circle around the sun only to have its course disrupted by the intervention of a linear attractive or repulsive force between it and the sun. Rather, its path reflects in every shortest interval as well as overall, the interconnected dimensionalities of the entire system, in this case circular and radial forces, conceived of by Kepler as a set of magnetic-like interactions, which express the character of the system by limiting the possibility of movement to those paths which manifest certain particular forms of constantly changing curvature.

Gauss Builds on Kepler

As Lyndon LaRouche has stressed,* this way of thinking—that the characteristic curvature, or species nature, must be present no matter how infinitesimal the portion under examination—, which was embodied in the development of the calculus by Gottfried Leibniz, was also what allowed Carl Gauss to discover the orbit of the asteroid Ceres, a previously unknown body in the solar system, from a mere three observations. Gauss, like Kepler, worked from the ordering principle of a system, to its expression—as opposed to the Newtonians such as Leonhard Euler, who championed a calculus based upon the assumption of "linearity in the small." From the foundation of Kepler's laws, Gauss developed a unified concept of the possible motion of any bodies in the solar system. Every orbit must be along a path traced out by the intersection of a cone and a plane, whether an ellipse, a parabola, or an hyperbola, but always with the sun at the point where the plane cuts the axis of the cone; a ray from the sun to the body sweeps out, in any time period, a section of that figure with an area proportional to that time and to its characteristic distance from the sun. Based on this, Gauss was able to use the very limited data on a newly observed body, the asteroid Ceres, and the calculus as Leibniz had developed it, to discover how that lawfulness was being manifested by that particular body—both what particular type of curve the orbit followed, and its size and shape within the general type—all in a way which was not dependent on fitting a curve to an extended number of data points.

LaRouche has emphasized the stunning success of Gauss's use of this method, in order to warn against the self-consoling habits of mind that lead too many today to believe in linear extrapolation, whether of voting trends, stock prices, or the response of living tissues to radiation. Here, in this great pedagogical work which Kepler left us, we can educate ourselves to grasp the lawfulness of an entire system, as it must be expressed in the smallest detail, and to reflect on the quality of the universe and its Creator which allows this coherence to be comprehensible to our minds.

—*Sylvia Brewda*

* E.g., in "The Classical Principle in Art and Science," *Fidelio,* Winter 1997 (Vol. VI, No. 4). SEE also "How To Think in a Time of Crisis," this issue, esp. footnote 42, page 19.