LECTURE XX: Herschel Ignites Post-Newton Cosmology; Reason Derailed; Kant Restrains Hume, Assisted by Rousseau and 'Pure Reason'

The Universe continued to expand into the 18th century, especially in England, with marked improvements in the telescope much inspired by Newton's optics and by his own advancements in the instrument. Still, in this age astronomers tended to be observers and cataloguers rather than astrophysicists and cosmologists. They did not speculate on the origin or constitution of the celestial bodies, but rather spent their time locating, measuring, and tracking them with ever increasing accuracy. **John Flamsteed** [1646-1719], who convinced Charles II to build the observatory at Greenwich (and thus was appointed the first Royal Astronomer [1675]), and **Edmund Halley** [1656-1742], famous for discovery of the period of the comet that bears his name, led the way. The king donated the site and paid for the building, but provided no funds for operation or instruments. Flamsteed borrowed what instruments he could, then designed, built, and paid for the necessary tools, entirely devoting his life to mapping the skies. His catalogue of over 3,000 stars is still the basis of our numbering system today, though of course there has been an enormous increase. Later, by comparing modern positions of Aldebaran, Sirius, and Arcturus with the data of Ptolomey, Hipparchus and Timocharis, it was from here that Halley discovered, that the 'fixed' stars—or at least some of them—actually are in motion relative to one another. "What shall we say then," he asked.

> It is scarcely credible that the Ancients could be deceived in so plain a matter, three Observers confirming each other. Again their stars being the most conspicuous in the Heaven, are in all probability the nearest to the Earth; and if they have any particular Motion of their own, it is most likely to be perceived in them.
>
> [*from* Halley, *Philosophical Transactions*, XXX; 1718; p.737, *as quoted in* A. Pannekoek, A HISTORY OF ASTRONOMY; Dover, NY, 1989; p.281 (*republication of that title from* George Allen & Unwin Ltd., London, 1961)]

This presented, or strongly suggested, quite a new perspective of the Universe, tending toward the final abandonment of the 'two spheres' idea and the opening of the Universe in much the manner that had been preached by Bruno nearly two hundred years earlier, and had been hinted at by Nicholas of Cusa even before the work of Copernicus.

In France, too, the government, partially for its own efficiency and preservation, began to enter into the gathering of wider knowledge. Cardinal (Armand Jean du Plessis, Duc de) Richelieu [1585-1642] offered a prize for solving the problem of establishing exact longitude at sea and established Paris as the zero meridian (later to be usurped by Greenwich, England). The problem was, at sea, how to determine the time at the prime meridian? Despite many rewards being offered by governments and by trading companies, the problem was not satisfactorily solved until the 19th century. Jean Picard, chief astronomer in France [not the captain of the *Enterprise*, 'Second Generation'—surely his namesake], convinced the King to build an observatory in Paris in 1667, which became the meeting place of the *Académie des sciences*. Renowned astronomer Domenico Cassini was called from Italy to administer the facility and chair the academy.

Thus practical astronomy soon became a serious and exacting profession rather than an intellectual hobby of scholarly aristocrats. Desire for precision intensified, especially with the meticulous **James Bradley** [1692-1762] taking over the Greenwich Observatory at Halley's death, and with the newly invented achromatic lens. The need for better astronomical instruments and the simultaneous navigational demand for accurate and dependable clocks provided a number of inventive Englishmen the practical training that helped give birth to the machine age.

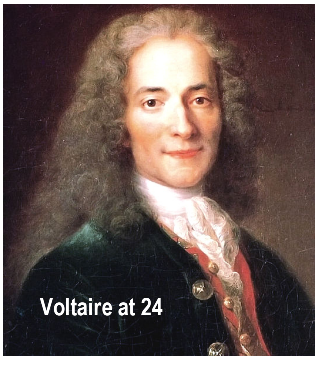
We are not likely to mention Bradley again as we rush through the 18th century, so we ought to insert here a note about his two major contributions to astronomy. Through his insistence on refinement in observations and in connection with the continual search for stellar parallax Bradley came to notice that:

(1) In December of 1725, the star, γ Draconis (so assigned in his great catalogue) was gradually moving southerly until in March of 1726, 20″ of arc out of line, it began its return journey, proceeding northerly until September, a total of 40″, and then returning by December to the original position of the previous year. This could not be due to parallax, because in that case it would have reached its southernmost position in December (with the tilting of the Earth to the winter solstice), not in March. Extending his observation to other stars, he discovered the same 'aberration,' their actual movement decreasing with those stars nearer to the ecliptic. It took Bradley until 1728 to solve the mystery. This was an apparent aberration not of the stars but of the light rays. "Because the telescope is carried on by the earth in its orbital motion," explains Pannekoek, "whilst the telescope is traversed by the light rays with 10,000 times greater velocity, it (the telescope) must be kept inclined by 1/10,000 towards the direction of the earth's movement." This has been mentioned here because this is the very first experimental proof that the earth is in motion, finally establishing that Copernicus was correct.

(2) While continuing his observation of γ Draconis, Bradley also noticed a second oscillation, the star's declination increasing and decreasing by 18″ over a period of nine years, also confirmed in the other stars by Lemonnier in Paris. This was explained by a small 'nutation;' a conical movement on top of the known, much slower conical movement called the earth's precession. This smaller 'nutation' takes 18 years to complete, which is also the period of revolution of the nodes of the moon's orbit, indicating that it is the attraction of the moon that causes this phenomenon.

[Pannekoek, pp.289-290]

Meanwhile, on the Continent, owing much to the persuasion of Voltaire,



François-Marie Arouet, a.k.a., **Voltaire** [1694-1778]

Newton's empty space concept began to replace Descartes' plenum. In his open 'Letters from London on the English,' stemming from his visit to England in 1728, and covering a wide range of topics (English customs, medicine, parliament, commerce, religion, literature, as well as philosophy and science) Voltaire wrote, A Frenchman coming to London finds matters considerably changed, in philosophy as in everything else. He left the world filled, he finds it here empty. In Paris you see the universe consisting of vortices of a subtle matter; in London nothing is seen of this. With us it is the pressure of the moon that causes the tides of the sea; with the English it is the sea that gravitates toward the moon. … Moreover, you may perceive that the sun, which in France is not at all involved in the affair, here has to contribute by nearly one quarter. With your Cartesians everything takes place through pressure, which is not easily comprehensible; with Monsieur Newton it takes place through attraction, the cause of which is not better known either. In Paris you figure the earth as a melon; in London it is flattened on both sides.

[*from* Voltaire, *Lettres sur les Anglais* (*Oeuvres de Voltaire*, 1819), XXIV, p.67; *as found in* Pannekoek, pp.297-8]

Voltaire further introduced his countrymen to the English cosmos with a work on the theories of light and gravitation called *Elements of the Philosophy of Newton* [1733].

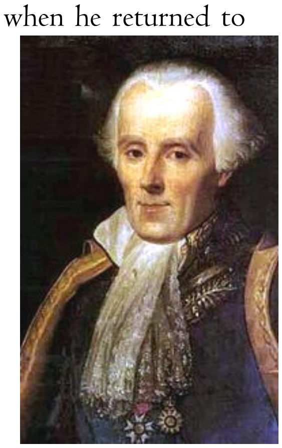
Whereas formerly both doctrines [Newton's and Descartes'] found expression alternately in the transactions of the Paris Academy, after 1740 papers based on the vortex theory disappeared completely. You could do nothing with it, you could derive nothing from it, whereas from Newton's theory precise results could be derived merely by using mathematics. It posed a clear and great task: proceeding from the fundamental law of attraction of all particles of matter, hence of all celestial bodies upon one another, to compute their movements and to test them by observation. The theoretical development of astronomy in the eighteenth century was entirely dominated by gravitation.

[Pannekoek, p.298]

Newton's physics and Locke's psychology were "the two great triumphs of modern thought", says George Sabine:

Newton's success in stating the mechanical laws of nature, true without limitation of space or time, gave color to the presumption that political and economic events could be treated in the same highly generalized fashion, while Locke's proposal of a universal natural history of the mind, conceived on lines substantially similar to those of Newton's physics, implied the psychological explanation of social processes without reference to limitations set by history or the evolution of institutions. … To popularize Newton's physics and Locke's philosophy were the two projects that Voltaire brought with him from England when he returned to France in 1729.

[Sabine, *A History of Political Theory*, 3rd ed.; 1961; p.561]



While England continued to lead in practice (i.e., invention leading to industry) this partial casting off of Descartes led to a tremendous wave of theorizing on the Continent, beginning especially in France. Now came the applied mathematics of the Bernoullis and Leonhardt Euler [1707-1783] from Switzerland, and Clairaut and d'Alambert, whose work would be continued by Lagrange and especially by

Pierre Simon de Laplace [1749-1827];

Laplace, who became the *ad hoc* spokesman for the mechanistic world through his *Traité de méchanique* (TREATISE ON CELESTIAL MECHANICS), 5 vol., completed between 1799 and 1825, wherein he represented the motions of the solar system solely as a problem of mathematics, all in accordance with Newton's system. He later published a general explanation of this work in a non-mathematical format, *Exposition du système du monde* [EXPOSITION OF THE WORLD SYSTEM], showing that all the perturbations due to gravity were continually cancelled out over time and (due to the good fortune that all the planets revolved in the same direction) the structure of the system would continue forever.

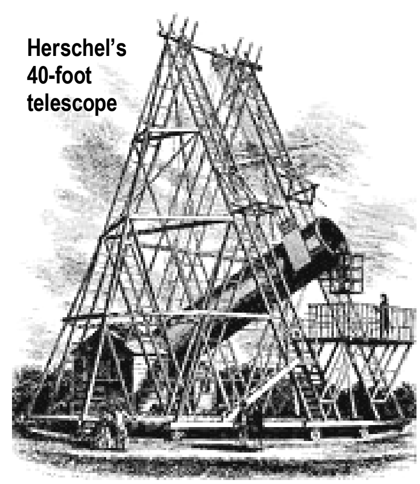
Laplace showed that predictions of planetary positioning could be made thousands of years into the future, and extended equally into the past. He calculated that the solar system was cyclical in its motions and would return to the same configuration again and again, every 929 years. But if the system were to continue forever, what about that past? Was there, then, no beginning? And, if there were, how did it all get started? Despite Laplace's title proclaiming the system of the whole world, his work had really to do only with the solar system. For that he proposed what is called the nebular hypothesis, meaning the solar system developed out of a gaseous cloud, which became the generally accepted theory. If the system was really cyclical, however, must it not return from time to time to its original nebulous state to begin its development again? And how did it relate to the encompassing Universe?—and what was the Universe like?

In the latter half of the 18th century, a musician from Hanover, Wilhelm Herschel

Wilhelm Friedrich Herschel [1738-1822]

emigrated to England with his sister and brother, and changed his name to William. A skilled conductor and descendant of a musical family, he found work at Bath, gaining also some fame as a composer and teacher. But he also had a passion for science and would become, as it were, the George Fredrick Handel [d.1759] of astronomy. Proving the age of the amateur astronomer was not yet dead, he actually built several reflecting telescopes, casting and polishing the lenses and concave mirrors himself. Teaching music by day, his diary reports, "At night I made astronomical observations with telescopes of my own construction." May 1st, 1776: "I observed Saturn with a new 7-foot reflector"; July 13th, 1776: "I observed Saturn with a new 20-foot reflector I had erected in my garden." [*quoted in* Pannekoek, p.312]

He experimented with various metal recipes (alloys of copper and tin) and polished his mirrors assiduously, until he had clarity of image never before achieved. His homemade telescopes were soon larger and far superior to those even of the Greenwich Observatory. He was early able to increase the magnification from what was generally held to be the best at that time of 200 to 460 times to unheard of values of 2,000; then 3,168 times; and finally, with his 20-foot telescopes and mirrors of 12 and 19 inches in diameter, achieving 6,450 times enlargement. In his effort to establish stellar distances and sizes he was examining the brightest stars and looking for a fainter companion by which to compare positions over time.



In 1781,

> On Tuesday the 13th of March between 10 and 11 in the evening, when I was examining the small stars in the neighbourhood of H (η [eta]) Geminorum, I perceived one that appeared visibly larger that the rest; being struck with its uncommon magnitude, I compared it to H Geminorum and the small star in the quartile between Auriga and Gemini, and, finding it so much larger than either of them, I suspected it to be a comet.
>
> [W. Herschel, *Account of a Comet*; PHILOSOPHICAL TRANSACTIONS, LXXI (1781) *quoted in* Pannekoek, p.313]

The discovery was immediately communicated to Greenwich and was soon observed also in France. Calculations ultimately indicated its orbit was approximately 19 times larger than that of Earth. Here was not a comet but an additional planet, far beyond the orbit of Saturn, upsetting the Pythagorean-Keplerian geometrical system; adding a clashing dissonance to the spherical harmony while doubling the known size of the solar system. George III awarded him with a rather meager salary, but sufficient to induce him to forego his music business and to devote himself full time to astronomy (though he still had to manufacture and market his telescopes to make ends meet). To display his gratitude, he named his discovery *Georgium Sidus* (Star of George). But that didn't wash in other countries, and the new planet became more widely known as Uranus. Herschel would later discover also the satellites of Uranus, as well as two more moons of Saturn, but his real interest was in the stars.

He was the first to show systems of double, triple, and combinations of even more 'suns', revolving in complex ways about eachother: proving true the separate worlds of Bruno (though not their infinity of number). Also, in cataloguing all the most interesting and strange objects revealed by his telescopes, he advanced the nebulae (at least most of them) to the category of celestial objects; as systems of stars, so that there was no longer any confusing them with comets. It could be said that Herschel, the untrained amateur, by his innovations and improvements in the instruments and his extraordinary observations and calculations, with the help and great patience of his brother and his sister (Caroline would also make her mark in science as a famous discoverer of comets), achieved not just a break-through but a great leap into modern astronomy. Due to the work of all those mentioned and many others, mostly in England and France, astronomy now joined the abstract learning of mathematics as the most advanced of the sciences.

It was not yet astrophysics, but through the accepted universality of the laws of motion *a la* Newton, astronomy sought limited truths: knowledge of position, luminosity, various characteristics, and motion of celestial phenomena. Herschel, and others in his wake, expanded the size of the system almost incomprehensibly, and increased the number of cosmic objects from tens of thousands to thousands of millions. He even suggested that the Universe might in some way be subject to evolution, but no one yet had considered that we might be able to gain knowledge of the actual material or the functioning or the ages and development of stars and nebulae. As for the more local machinations of the solar system: the density and size of the planets and their satellites, how they affected one another, and even whether or not they supported life, these were reasonable topics of lay as well as professional speculation. But natural curiosity alone drove the study deeper and deeper into space, for it had little immediate practical utility.

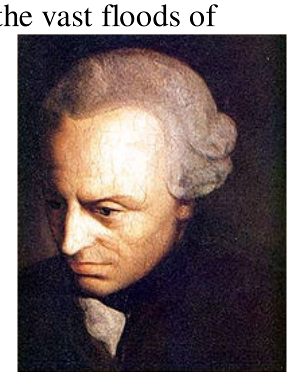
That curiosity, however, often leading to obsession, soon pushed creative minds beyond the restrictions of continually improving observation and the counting and cataloguing of features. One such visionary was Thomas Wright, who came up with not one or even two, but three different attempts to explain the Milky Way phenomenon. Once it had been resolved into billions of distant stars, what was the reason for their banding together in the observed manner: a kind of stellar river across the sky?

Wright *first* speculated that the Universe does have a shape: a hollow sphere of stars, much like the ‘two-sphere’ idea current at the time of Copernicus but with empty space or perhaps some sort of cosmic dust in the center—a very large cantaloupe with a nearly vacant seed cavity. So, instead of being at or near the center, we are simply located among the many stars all around the core in the thick fruity area. If we should look in a direction directly toward or away from the center of the sphere (let us say ‘inward’ or ‘outward’) we would see relatively few stars—stars which form only the thickness of this stellar sphere. If, on the other hand, we sight along the ‘rind,’ (right, left, forward, or back) we would see a much heavier thicket of stars, which, Wright expected, at greater distances would seem to consolidate into the cloudy aspect we observe in the Milky Way.

His *second* idea, perhaps a refinement of the first, was that the solar system and all the stars make up a ring, much like the rings of Saturn. This is often referred to as the ‘pancake theory’ of the Universe. He explained it as viewing from the inside of a pancake, whereby (as with the cantaloupe concept) sighting along the plane of the pancake one would see a great conglomeration of pancake molecules, whereas looking at right angles to the disc, relatively few molecules would encumber one’s line of sight.

His *third* concept (much later in a different publication)—borrowing perhaps from pre-Socratic Greece—was way off the modern mark; a view tending to diminish our first impression of his acuity of conceptual vision and might have served him better had it been lost. It returned to the globular idea of the Universe and envisioned the fixed stars as volcanoes on the inner walls of the outer sphere of the cosmos, and the Milky Way as “no other than a vast chain of burning mountains forming a flood of fire surrounding the whole starry regions and no how different from other luminous spaces [nebulae], but in [the] number of stars that compose them, or where there are none, in the vast floods of celestial lava that form it.” [Wright: *An original Theory or New Hypothesis of the Universe*; (1750); *quoted in* MODERN THEORIES OF THE UNIVERSE *by* Michael J. Crowe, Dover Press, 1994]

From reading about the second of those ideas in only a review of Wright’s book,



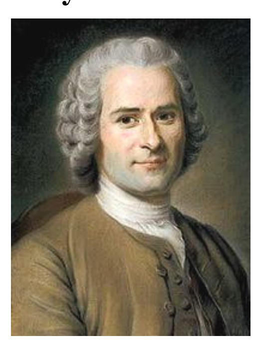
Immanuel Kant [1724-1804]

Kant envisioned a disc-shaped galaxy described in his *Universal Natural History and Theory of the Heavens*. In another case of nearly simultaneous original concepts (when the time or movement of history seems right), Johann Lambert published *Brief Cosmological Letters* [1761] when he realized Kant had anticipated him with the publication the galactic disc theory—an idea Lambert had in 1749. He also said in those letters that he had been told, while at Nürnburg in 1761, that an Englishman (he no doubt meant Wright) had written similar thoughts in letters to friends, but had not much success in convincing anyone. It is interesting to note that all three of these visionaries speculated that the Universe is filled with life. Kant suggested that the level of intelligence among living creatures might differ as a relation to the distance of their planet or moon from the star at the center of their respective systems, or from the center of an even larger system of many galaxies. This was truly visionary since Kant was expressing this idea of 'island universes' (much later to be seen as separate 'galaxies'), and at even more incomprehensible distances from the solar system than are the stars of the Milky Way—and this before Herschel had improved our ability to practically discern them. Kant went further, proposing how entire world-systems might form out of cosmic-scale clouds of raw matter. This was essentially the Universe (solar) system later to be more fully described by Laplace. With no knowledge yet of stellar processes and evolution, it was too early for such ideas to take root. They had to wait till the 20th century for revival and more mature scientific examination.

Kant read widely and wrote on many subjects closer to Earth than his metaphysics and cosmography might suggest: earthquakes, geography, fire, winds, etc. He wonders in his *Anthropology*, should a great disaster wipe out humanity, might an 'orang-outang' *[sic]* or chimpanzee develop organs of reasoning and communication and re-invent the social institutions necessary for political life? Will Durant suggests [*Story of Philosophy*] this was Kant's way of saying man actually may have risen from the more shortsighted but not too far removed mentality of primates. Influenced by Rousseau, he was convinced of an *actual* history of civil society out of primitive life rather than the hypothetical conditions of Hobbes and Locke. This gave an evolutionary bent to his cosmos, though the mechanism for such process, biologically, had to wait nearly a century for Darwin to explain and, cosmologically, until Lemaître's and Gamow's 'big bang' idea in the 20th century. He read of Hume's seeming denial of reality (thus of physics) but could not allow such skeptical extremism. He was convinced that proper reasoning would not lead the intellect to reject science. He realized science would be useless as a tool for discovering the nature of the Universe if matter were but illusion, and thought Hume had performed a terrible disservice by denying religion. If mental 'things' were also doubtful —including the idea of God Himself; that is, if Hume's nihilism were true, it would be unacceptable: disastrous for society. What would become of virtue in a strictly material universe? What would support morality beyond use of arms against those who had made the social contract—especially if humans were naturally bad, or were governed only by 'unenlightened' self-interest? He felt compelled to find a better—well, more practical—understanding of the world. A higher truth was needed, and a way to curb the atheistic tendencies of the spreading Enlightenment, thus to salvage the new science, blown so early in the voyage toward the sandbars of faulty or incomplete reasoning. And so he embarked on a thorough examination of reason itself: a *Critique of Pure Reason*.

Has Progress of Science and the Arts Contributed to Corrupt or to Purify Morals?

This question was to be answered for a prize to be granted from the Academy of Dijon in 1749. The essay entered by Rousseau



Jean Jacques Rousseau [1712-1778]

was declared the winner. He argued that culture brought with it more evil than good. Philosophy is not a good thing for the health of society. "It was even a saying among the philosophers themselves," he pointed out, "that since learned men had appeared, honest men were nowhere to be found." The life of contemplation, far from being the utmost state desired per Aristotle, ought to be avoided. An intellectual, he thought, "is a depraved animal." That sort of 'higher' education makes men clever, rather than good. Rousseau recommended rather nourishing the heart; enhancing one's sensitivity. He claimed the superiority of feelings above intellect, preferring instinct to reason. [*Above quotes are found in* Durant; THE STORY OF PHILOSOPHY; pp.283-4.] His novel, *La Nouvelle Heloise* [1761] had much to do with the sweep of sentimentality through the salons of Europe, leading to the particularly emotive literature of the Romantic era. The brain was in no way replaced by the heart in decision making, but Berkeley and Hume had shown that sheer reasoning falls short of complete trustworthiness in determining the whole truth. Instinct, then, ought to be called upon for support or even, in some cases, to overrule reason.

The concept then taking precedence was that of civil society as an outgrowth of reason's opposition to the state of nature, per Hobbes and Locke; i.e., politics as reaction to insecurity. European civil society was an invention conceived under the influence of limited reason *sans* compassion, Rousseau thought, resting on a rather poor estimation of human nature, undervaluing soul. A regime based on such an idea might, scientifically, provide conditions *allowing* happiness to bloom, but what about actually *generating* happiness? A purely rational civil society can be good, admittedly, and is in many ways (but not in all) superior to pre-civil existence—except perhaps in rare cases of primitives living under conditions of fair climate and absolute abundance. Men do not naturally fear or hate eachother, claimed Rousseau, nor do primitives or natural pre-men constantly attempt to murder one another. Nature, he thought, is *not* a state of continual war. Rousseau actually blames war on the first man to say 'this is mine; you can't take it'; or 'hands off my property'. So, per Locke, it is protection of property that initiates the state: property owners conniving to their advantage to include the property-less many under their new government (preferably without a vote) so that the have-nots might be kept under control. But unlike Locke, who thought property to be natural (the beneficial driving force behind civil progress), Rousseau believes it is artificial (an invention of reason) and that it is the greatest of social evils. With the advent of property comes the state of war between the 'haves' and 'have-nots.' Morality is invented by the 'haves' in the interest of stability. Property as the cause of conflict means war, like politics, is artificial, thus avoidable. Rousseau thinks that the society most honoring the natural state of freedom, equality, and tranquility will be happiest and least torn by internecine events.

Despite Rousseau's fame as a social contract theorist, and despite the title borne by his most famous work, he believes the social contract is an aberration and took exception to Hobbes and Locke and their individualism as the basis of politics. In fact, says George Sabine [A HISTORY OF POLITICAL THOUGHT; Holt, Rinehart and Winston, NY, 1961],

> The philosophy to which Rousseau stood opposed began with fully formed individuals; to them it is imputed a full complement of interests and the power to calculate—a desire for happiness, the idea of ownership, the power to communicate with other men, to bargain with them, to make an agreement, and finally to make a government that will give the agreement force. Plato stimulated Rousseau to ask, Where do individuals get all these capacities except from society? Within a society there may be individuality, freedom, self-interest, respect for covenants; outside it there is nothing moral. From it individuals get their mental and moral faculties and by it they become human; the fundamental moral category is not man but citizen. [p.581]

> ……………
> Obviously if there are no [individual natural] rights, property is not one….[p.583]

So what *is* the truly natural man? Any answer must be hypothetical since natural men may never have existed. Some sort of community is inevitable, of course, as all higher creatures are born into such. Natural 'man', then, was a talented, not yet human beast.

> Natural man was an animal whose behavior was purely instinctive; any thought whatever is "depraved." He wholly lacked language, unless in the form of instinctive cries, and without language any general idea is impossible. Consequently, the natural man was neither moral nor vicious…. Selfishness, taste, regard for the opinion of others, the arts, war, slavery, vice, conjugal and paternal affection all exist in men only as they are sociable beings who live together in larger or smaller groups. [*in* Sabine, p.584]

The modern state, however, has stolen the good life from the common man—or whatever was good about it—forcing him to work for the elite, prompting him to open his *Social Contract* with the famous challenge: "Man is born free [indicating his presumption to knowledge as to the character of an actual pre-civil world: *the* state of nature], and everywhere he is in chains." The state, in other words, serves to destroy natural equality and freedom rather than enhancing or enforcing them. Virtue among the elite is displaced by fat: a desire for comfort and ease; the increase of gluttony and hedonism at the expense of those coerced to be productive. Social virtue remains relevant only as a check on the have-nots. They are taught (rather 'trained' to believe) that the greatest virtue is lawfulness—stoicism; that the ultimate goal is to become heroes of work and obedience. The door is left open for revolution, however, as Rousseau asserts that "no contract can bind to the point of sacrificing that for which it was made, and no man willfully contracts away the freedom which is the core of his being"—whereupon he had to depart monarchical France rather hurriedly to take refuge in his native Geneva. Whether he was right or wrong in that assertion, morality cannot be constantly enforced. Oppression breeds resistance, which is usually rewarded with ever-greater brutality—unless the mob is pacified by basing their nose-to-the-grindstone morality on the will of a loving and forgiving (and/or wrathful) and fatherly, anthropomorphized Creator; one who will make amends for His allowing such worldly suffering by offering forgiveness to the victims (for any offensive behavior on their part in trying to make things better for themselves) and providing an afterlife of eternal bliss—but only, of course, if His creatures put up with some agony in the here-and-now. In fact, the more they suffer on Earth the higher might be their place in heaven. They are taught by the elite themselves to pity the wealthy, to whom eternal bliss may be denied—or, if finally attained, granted only after languishing for millennia in purgatory (which is a major reason the Catholic Church lost effectiveness among the common folk and opened the road to protestantism, particularly to Luther, when it allowed and then encouraged the rich to buy express tickets to heaven).

The best example of how it should work is perhaps from Rousseau's great treatise on education, *Emile* [1762], in a section called 'Confession of Faith of the Savoyard Vicar.' The Vicar had wandered from the Church himself due to excessive reasoning, doubting much about the faith. Finding no comfort in agnosticism, he returned to the teachings of religion, though he had formed his own unique view of God and scripture that hardly conformed to orthodoxy. Still he had no trouble in using Catholic guidelines and mystical ritual in serving the spiritual needs of his congregation. Reason, he admitted, might decry God and the Sacraments, but why follow this contorted skepticism into the despair of nihilism when the soul could find comfort in the arms of faith through mere instinct? After all, once past the problem of self-preservation, the natural goal of humans is happiness. While a rational mind might be practically necessary for sheer survival—for making a living—a life *worth* living could not be commonly found through strict adherence to reason. Reason, in fact, led ultimately to unrest and deterioration of instinct. So the Vicar took comfort in guiding troubled souls into the arms of a God he, himself, had come to doubt. But believing was simply better than not believing, so he made the effort to at least temporarily forget his doubts and to hide them from others.

There seems to be a contradiction, here. Rousseau has *provided the impetus for revolution*, should the government choose to violate natural rights (rights which he seems to have denied)—and the French censor, incidentally, had no trouble seeing that clearly enough to induce Rousseau's exile. *And* he has *suggested the means to prevent revolution*: peaceful religious indoctrination that would act as a calming influence, so such violations of rights (if there were any) might go unnoticed or would be, at least, endured without violent protest. Rousseau's ideas can be understood as a kind of reasoning in the interest of reining-in reason: promoting an intuitive rejection of the threats of deism and atheism and the meaninglessness of strict materialism—all purely in the interest of promoting happiness. But wasn't this simply a soft landing for the many: a sort of net to brake the fall from faith induced by the tripping mechanism of science?

So what? Infecting the masses with the tenets of materialism could lead only to disappointment and even disaster, for there was no possibility that all men would become philosophers and live for the most part inside their heads. So Rousseau's message to common folk, in part, was: if you wish for your children to live contented and at least somewhat natural lives, do not send them off to college where their minds will be warped *hyper*bolically (ever outward-curving) by contemptuous intellectuals; where they will be directed non-teleologically to accept a meaningless world of insentient sub-particles and emptiness. Spare them such ruin! Teach them a trade like carpentry or masonry or shoemaking [plumbing or TV repair or auto mechanics or computer programming]; something that will, if honestly pursued, offer them a decent living and a sense of pride and accomplishment. Send them instead to church where their minds will be warped *para*bolically (inward curving) toward local and family and intimate interests, keeping their eyes on Earthly things wherein lies the only chance at happiness—even should it turn out to be true that life is empty and meaningless, or maybe *because* that is true. We moderns might consider Rousseau to be suggesting that, given the materialist view as true, 'there is nothing but atoms and the void'; yet we have some input as observers, especially via science, as to what form the world takes and how we allow it to affect us. We ought, therefore, to make at least our small portion of it a world conducive to comfort and joy, a world where pain and suffering are minimized if not banished.

To understand Locke vs. Rousseau on the most intuitive level, go to your music library and take an early symphony or chamber piece of Haydn as representative of 'classical physics': the world occurring purely out of motion and matter according to the materialist John Locke. Blind and deaf nature as pure structure is the primary emphasis —but secondarily, by human manipulation, a sentimental frosting decorates that otherwise purely materialistic cake. The whole is pretty, certainly, but without the supportive form, the ornamental frosting can find no means of expression. It can only fancifully decorate a pastry premade in accordance with a recipe; a chemical formula; a pre-conditioned base; the laws of physics; a primed canvas beneath the work of art—a work whose beauty depends very much on the careful, artful, and for the most part symmetrical arranging of otherwise chaotic elements, colors, or noises.

Then, to experience the gravity-like tug of animal instinct holding us close to a living and developing Nature per Rousseau, find Claudio Arrau playing a nocturne by Chopin. Here emotion, the deepest longing of the soul, is the impetus; metaphysics serving as a foundation—and no more magically than insentient atoms. Though necessarily notated with inert lines and silent symbols, the vital warmth of those feelings are transmitted from heart to heart by a highly trained but thoroughly human performer through the cold, unknowing, otherwise mute and meaningless mechanism of the piano.

For the materialists, matter is all there is, the study and understanding of which will eventually provide complete knowledge. Feelings are but fancies. For Rousseau, feelings are the only 'matter' of importance, of which science seems ignorant; to which the high art of modern reasoning in general is blind. In spite of his arguments, of course, promoters of materialism continued their atheistic ways; philosophers would hardly reject Newton's mechanical cosmos in favor of playing checkers by the hearth or studying the bass viol. Many of the best minds of the 18th century came to accept the meaningless, machine-like world that seemed to be revealing itself through the scientific method; teasing them with the suggestion that there was hope of one day knowing it entirely—or merely how it worked, at least hypothetically —despite there being no hope of ultimate redemption and no point at all to such a world, even if we could know it completely.

Average people were not materialists, nor did they rise to these airy heights of speculation. Among the literate, however, fear of nihilism was creeping in to displace the exhilaration of free reason, especially after Hume debunked natural law. At first the power of scientific reason over sheer authority and faith was energizing; then it became troublesome; then scary. Maybe this materialism was not such a good idea—but how to stop it? Rousseau was there, says George Sabine [A HISTORY OF POLITICAL THEORY; ch.XXIX, *Convention and Tradition: Hume and Burke*; Holt, Rinehart & Winston, NY, 1961; p.597], at the right time with his counsel that we must not omit the feelings, human intuition, the natural urgings of the soul. Reason cannot be the ultimate answer to human and social problems since it has no answer for emotion and conscience and empathy. These feelings are just as 'real' and just as important—perhaps more important—than the intellect.

It became Kant's mission, then, to counter the cold rationale of Hume with the feelings of Rousseau: "to save religion from reason, and yet at the same time to save science from skepticism" [Will Durant; THE STORY OF PHILOSOPHY; pp.284-5]; to seek a new, perhaps super-rational basis for an ancient and revealed morality. But how would a diminutive philosophy professor from Königsberg, frail in health and already past middle age, accomplish such a feat? Don't miss our next session to find out.

HANDOUT: Crane Brinton; THE SHAPING OF MODERN THOUGHT;
ch.4, *The Eighteenth Century*; Prentice-Hall; Englewood Cliffs, NJ, 1950; pp.108-138 (?)
plus (supplemental)
Immanuel Kant in FIVE PHILOSOPHERS; Philip Wheelwright & Peter Fuss, Edit.;
(Kant: part III) *The Transcendental Dialectic*; Odyssey Press, NY, 1963; pp.247-275