

SCIENCE AND CAPITALISM

The Battle for Reason

By Francis Franklin

(The second of a series of articles on the development of modern science and its relation to the social order, written by members of the Editorial Board)

CAPITALISTS are by nature worldly-minded. All their wealth comes from sailing the seas, searching the entire surface of the globe, digging into the bowels of the earth, moulding ore into strange mechanical monsters, transforming materials gathered from all corners of the world into every conceivable kind of article.

The feudal aristocrats did not like the earthy-mindedness of the rising capitalists. They feared that the capitalists would wrest all wealth and power from them. This searching into the secrets of the earth too frequently proved that the theories by means of which feudalism maintained its sway over the minds of the masses were false and absurd. The feudal theologians, therefore, condemned as evil all efforts to explore the mysteries of nature. "Delve not into the mysteries of the Most High." "Lean not upon thy own understanding." Such were favorite admonitions. The natural scientist was looked upon as a blasphemous agent of Satan. Had not Adam been driven from Eden for eating of the Tree of Knowledge? A stigma was put upon all healthy interest in the material world. The familiar world of matter was branded as crude and base. Only the ignoble, lacking in all finer sensibilities, would give a thought to anything so crass. Men of fine soul would turn to "higher things."

SCIENCE VERSUS DOGMA

Science and Black Magic were practically the same. It was only through the aid of the imps of hell that

scientists could make their discoveries. Such men were one with witches and other evil spirits. When a discovery of science contradicted a "truth" taught by the priests, it mattered not how undeniable was the evidence of the scientific discovery. That evidence was put there by Satan to test the faith of believers. Faith was the highest virtue—even in the face of the obvious. In fact, it was better to have faith in what seemed absurd, for such faith was more difficult. Had it not been said by the Saint, "I believe *because* it is absurd"? Therefore, anyone setting forth a scientific discovery in defiance of an existing doctrine of the church was an agent of the devil, seeking to drag mankind into hell, and no punishment—slow burning or any other torture—was too severe for him.

Men in all ages have sought to understand the world. Wonder and desire for knowledge are as much a part of human life as our hands and brains, which distinguish us physically from the lower animals. A certain amount of knowledge is necessary for the production of our daily needs. But it is only after the slow accumulation of knowledge that it can be systematized and thus put into scientific form. The most primitive tribes possess some elements of scientific knowledge, but it is not until the development of relatively high civilizations that thinkers begin to arrange it systematically.

ANCIENT PRIESTHOODS

The priests of ancient India, Babylon and Egypt began to systematize their knowledge of mathematics and the movements of the stars. But at the same time, they ruled by means of superstition, and likewise systematized their superstitious doctrines, so that science and superstition were developed simultaneously and intertwined the one with the other. These priests sought to keep all science within their own hands, so that society would depend upon them for control of floods, the development

of agriculture, the construction of great buildings. They also feared that if others developed science, the superstitious doctrines through which they maintained their power over the minds of men would be destroyed. Science was thus the private property of the priestly class.

It was not until the first appearance of merchant capitalism in ancient Greece that science began to be developed independently. There was no empire in ancient Greece comparable to those of Babylon or Egypt. No vast unified religion such as that of India or these oriental empires had arisen in the Grecian city-states. There was thus no vast all-powerful class of priests. Feudal chieftains ruled in most Greek cities when their earliest written history commences. But there soon arose a class of merchants who began to carry on a thriving commerce along the shores of the Mediterranean. During the five or six centuries before the Christian era, these merchant capitalists carried out a whole series of revolutions against the feudal chieftains, and established democratic republics, in which freedom was limited to the wealthy, who employed slaves, but who sold the products of their slave-labor as merchant capitalists, even as did the landlords of the plantation South before the Civil War. These were turbulent years of plots, intrigues, and rapidly succeeding revolutions and counter-revolutions.

MERCHANT CAPITALISM

In the midst of these battles, the merchant capitalists needed knowledge of mathematics and physics for purposes of navigation and warfare. Thus mathematics was developed to systematize the hurling of projectiles and the construction of military fortifications, ships and buildings. There arose the great mathematician, Euclid; the great physicist, Archimedes; the great physician Hippocrates. Aristotle, "the most encyclopaedic intellect of all antiquity," as Marx called him, began to develop biology and psychology, and to systematize various sciences. Especially did he develop logic and scientific method. These thinkers liberated themselves from the crude superstitions of

the priests, upon which they heaped the greatest ridicule.

The science of Greece was taken over by the Romans, and Roman philosophers also devoted themselves to scientific pursuits. But when Rome conquered all the known Western world, she was unable to impose capitalist productive relations on this vast territory. The means of production had not been developed sufficiently. Capitalism was still merchant capitalism. Nothing like the Industrial Revolution of our own era had begun.

In Italy itself, the slave-owning planters wore out the soil even as did our Southern planters. Slave-labor became unprofitable, and the slaves were converted into serfs, so that on their own little plots of land they could raise their own food and thus not be dependent on the landlords. Thus feudalism arose in Italy on the ruins of the slave plantations. In the barbarian North, the Roman conquerors likewise developed feudal relations. The first appearance of capitalism on the shores of the Mediterranean became a mere memory.

EARLY CHRISTIANITY

After numerous rebellions on the part of the slaves and oppressed masses of the Roman Empire had been crushed, the toiling classes began to flock to the new Christian religion, which damned the wealthy and powerful as evil and which extolled the poor and oppressed as righteous, as those who would see the kingdom of God. Christianity swept throughout the entire Roman Empire as a vast movement of passive resistance. Its symbol was that of the cross, upon which rebellious slaves had traditionally been crucified. Its earliest converts "left the world," pooled all their goods, and established little communistic communities, in which all men lived together as brothers, sharing all thing in common. Through these communities, Christianity sought to bring about the Kingdom of God on earth.

At first, the rulers sought to crush this new religion of the toiling masses with frantic persecution. Thousands upon thousands of Christians were thrown to the lions, burned at the stake or forced to take refuge in the gloomy catacombs. But these early

Christians went to the stake or the lions refusing to renounce their faith. Rather than betray their religion, many of them had their tongues pulled out or their eyes gouged out. But their movement could not be crushed.

BORING FROM WITHIN

Upon realizing the impossibility of destroying this movement of the poor, the wealthy rulers adopted other tactics. Becoming "converted" themselves, they "bored from within," captured the movement, obtained leading positions in the church, and created a new state-church, with bishops and priests completely subservient to the rule of Rome. The power of Rome had long felt a need for a universal religion as a means of dominating the minds of its subjects. The newly-formed Catholic Church gave it just the instrument it needed. The church continued to make use of the teachings of Jesus, but gave them a new emphasis. It continued to assert that it was the poor and oppressed who were good, but stressed that they were good *because* they submitted to their oppression. If they did not resist, then they would receive their reward after death. But if they rebelled against their exploiters, then they would inherit eternal damnation. In this way, the rulers of Rome converted the gentle religion of Jesus into a new instrument of domination over the poor. The new ruling-class church, following the path of the hierarchies of ancient empires, developed in its own turn an intricate system of theology, through which the feudal landlords maintained their rule over the minds of the masses until the rise of modern capitalism. The Church ignored or kept hidden the natural sciences which had begun to be developed in the ancient world.

RENAISSANCE

When the modern capitalists began in their turn to study this material earth, they found standing as a bulwark against the development of natural science the whole power of the Medieval Church. Throughout the Middle Ages, lonely individual thinkers had sought to develop science. But they had been crushed by the might of the universal church, and there was no



Galileo Faces the Inquisition

class to give them aid. However, when merchant capitalists began to thrive and dream of greater wealth and power in the cities of Europe following the thirteenth century, such lonely seekers for knowledge began to find a class whose economic interests demanded just such probing into the mysteries of the earth. In other words, the thinkers found support in their search for knowledge of the material earth.

The first step in the development of modern natural science consisted in uncovering and bringing to light again the science of ancient Greece. This was the glorious Renaissance (or re-birth) of the fifteenth and sixteenth centuries. In the words of Engels, it was "an age which required giants and produced giants"—Michelangelo, Leonardo da Vinci, Copernicus, Kepler; men who were geniuses in every field, the arts, literature, science, philosophy and practical life. Copernicus, Kepler and Galileo picked up the science of mechanics where it had been left by Archimedes of ancient Greece, and thus laid the basis for modern physics and modern astronomy. Their theories concerning the laws of motion were later systematized by the genius of Sir Isaac Newton.

This early development of physics in

modern history played the same role as in Greece. The rising merchants were then storming the citadels of the city-aristocracies and forming bourgeois republics in the Italian city-states. They required a science of motion in order to manipulate their catapults and early cannons. They required astronomy to sail the seas. They needed geology to obtain ore. Many of the early scientists were also military strategists, builders of fortifications. The discovery of gunpowder and the compass gave the whole bid for power on the part of the merchants great impetus. It was the age of explorers in search of new trade routes. In their explorations, they uncovered new continents, discovered the shape of the earth, and laid the basis for a sounder approach to the whole study of the planet on which we live.

Because the new truths discovered contradicted the doctrines of the church, the latter opposed the development of science with persecution no less cruel than was used against the early Christians. Because of this, and because the doctrines of the contemporary church favored feudal rule as opposed to bourgeois power, science was frequently developed as a conscious fight against the doctrines of the Medieval Church.

The bourgeois revolutions, at first mere seizures of power in city-states, became national in scope. With the Protestant Reformation, all Northern Europe severed its connection with the universal feudal church, and new state-churches, dominated by the rising capitalist classes, were established. There followed the Cromwellian Revolution in England in 1648, and then the Great French Revolution of 1789.

MATERIALISM

As capitalism developed, the theoreticians of the bourgeois revolution became bolder. Many of the revolutionary thinkers of the eighteenth century discarded all religion and boldly proclaimed themselves materialists.

However, once the capitalists were safely in the saddle, they found that, while they still needed science for the development of industry and commerce, they also needed state churches and doctrines of superstition of their own as means of maintaining their sway over the minds of the people. Thus, after the French Revolution, the bourgeois thinkers for the most part ceased to be materialistic and became frank supporters of religion—not as conceived by Jesus, but as conceived by the new exploiting class of capitalists. However, they had already destroyed the one universal church. There were now innumerable sects and denominations, and many were outside the fold of any church. Furthermore, the seeds of doubt had been scattered widely and could never be recalled.

There was one glaring weakness in the development of science under rising capitalism. The early scientists had studied the physical earth, thus giving aid to mining, navigation, and manufacture. They began the development of biology, and therein aided agriculture and medicine. But the vast realm of human society remained largely outside the bounds of scientific investigation. Within this realm, it was still possible for doctrines of the wildest superstition to flourish luxuriously. The reasons for this metaphysical approach to the enormous field of sociology we shall analyze in the next article of this series.